NATUR CYMRU

A Review of WILDLIFE in Wales

Rhif/Number 9 • Gaeaf/Winter 2003

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A Review of WILDLIFE in Wales

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Articles are published in the language in which they are submitted. They are followed by summaries in the other language, and some regular columns appear in both languages. If you would like to receive a translation of any article, please contact the editor.

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Bwriedir i *Natur Cymru* hyrwyddo a chyfnewid gwybodaeth am fioamrywiaeth a hyrwyddo dadl. Nid yw'r farn a fynegir yn y cylchgrawn hwn o anghenraid yn farn y noddwyr. Os oes gennych wybodaeth, erthyglau neu waith celf y credwch a allai fod o ddiddordeb i'r darllenwyr, cysylltwch â'r Golygydd os gwelwch yn dda.

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Llun y clawr/Cover image: *Icicles on vegetation*. Photo: Jim Clark

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Golygyddol

Wrth i'r glaw bitran-patran y tu allan i'm ffenestr, mae hi'n anodd credu bod rhannau sylweddol o Brydain yn wynebu prinder dŵr. Gan fod ein gwlad oddi ar arfordir gorllewinol Ewrop ac yn digwydd bod ar union lwybr gwyntoedd de-orllewinol cyffredin a glaw trwm, mae daearyddiaeth wedi gwneud popeth o fewn ei gallu i wneud yn siŵr bod digon o ddŵr ar gael i ni. Yr hyn yr ydym yn ei wneud â'r dŵr sy'n bwysig, yn arbennig pa mor effeithlon yw ein ffordd o reoli'r ucheldiroedd o ran cael gwared â phopeth a all rwystro draenio cyflym, gan gynnwys llystyfiant naturiol. Mae cymhellion ariannol wedi annog ffermwyr i gael gwared â'r glaw oddi ar eu tir cyn gynted â phosibl. Yn wir, mae effeithiau ecolegol anfwriadol y polisi amaeth Ewropeaidd wedi ein brathu'n sydyn pan oeddem wedi troi ein cefn arno.

Llun: CCGC.

Mae diflaniad darnau mawr o dir a oedd yn dal dŵr, gyda grug neu fwsoglau corsydd arnynt er enghraifft, nid yn unig yn bygwth tai, ond hefyd yn bygwth gorlifdiroedd. Fe all rhywfaint o asid mewn dŵr ladd pysgod mewn afonydd. Yn wir, fe all digwyddiadau o'r fath ddifetha'r holl waith caled sy'n cael ei wneud i wella cyflwr rhai afonydd bendigedig, fel yr afon Gwy a'r afon Wysg. Ceir dwy erthygl yn trafod sut y gall dyddodiad asidig niweidio Cymru, a'r hyn sy'n cael ei wneud i fynd i'r afael â'r broblem.

Pan mae rhostiroedd a chynefinoedd agored eraill yn dirywio, dydy'r bywyd gwyllt sy'n gysylltiedig â chynefinoedd o'r fath ddim i'w weld mor aml. Mae'r bywyd gwyllt yma yn cynnwys y gwyfynod mwyaf cyfareddol sydd i'w cael, sef gwyfynod teigr, y sonnir amdanyn nhw yma. Efallai fod hyn yn wir hefyd am greadur arall y cyfeirir ato, sef llygoden bengron y dŵr, un o'r mamaliaid delaf sydd i'w gael. Pwy a feddyliai y gallai'r ucheldiroedd dyfrllyd fod yn gadarnle yn y gorffennol i lygod pengrwn y dŵr, gan eu galluogi i fentro oddi yno i gytrefu mewn cynefinoedd iseldirol newydd?

Diolch am hynny, mae digonedd o ddŵr i'w gael yng Nghymru o hyd, ac mae'n dod â phleser a ffyniant i drigolion y wlad. Mae mwy na digon o straeon da i'w cael am gynefinoedd dŵr croyw i lenwi tudalennau'r cylchgrawn yma lawer gwaith. Hefyd, mae cwestiwn pwysig yn codi – pwy sy'n berchen ar y dŵr, o gofio bod pentref Tryweryn, y boddwyd ei adeiladau a'i atgofion am byth er mwyn cynnig ffynhonnell ddŵr i Lerpwl, yn gefndir i'r cwbl?

Os oes yna rywbeth wedi bod o gymorth i ni ganolbwyntio ar y ffordd y mae adnoddau'n gwbl ganolog i unrhyw frwydr wleidyddol, yna y rhyfel yn Irac yw hwnnw. Dim ond rhai ohonom yn unig sy'n ddigon diniwed i gredu nad oes gan olew – ac awydd anniwall America i gael gafael arno – ddim byd o gwbl i'w wneud â'r rhyfel.

Mae pob gwlad yn dymuno cael gafael ar ddigon o adnoddau ar gyfer ei thrigolion. Ond mae'n rhaid i ni graffu y tu hwnt i'r gystadleuaeth ryfedd hon rhwng gwledydd am y goron sy'n arwydd o bwy'n union yw prif ddefnyddiwr adnoddau'r byd. Mae ein bïosffer bregus eisoes yn ysigo dan bwysau polisïau sydd o blaid twf ar draul popeth arall. Ys dywed Morgan Parry yn y rhifyn yma, does dim llawer o bwynt i ni honni bod perfformiad amgylcheddol Cymru yn gwbl iach os ydym yn ymelwa ar gymunedau ac adnoddau naturiol y tu hwnt i'n gwlad ein hunain.

James Robertson

Editorial

As the rain falls outside my window, it is hard to credit that much of Britain faces a shortage of water. Lying off the west coast of mainland Europe in the path of prevailing south-westerly winds heavy with rain, geography has done everything it can to ensure a plentiful supply of the wet stuff. It is what we do with it that counts; not least the efficiency with which our management of the uplands in particular has removed all obstacles to rapid drainage, including natural vegetation. Financial incentives have encouraged farmers to get the rain to leave the land as quickly as it came. The unintended ecological effects of European agricultural policy have truly bitten us from behind.

The disappearance of great swathes of the upland sponge which is typified by heathers and bog mosses not only threatens houses built in flood plains. A sudden spate of acid water can wipe out fish stocks in rivers. These episodes can undo all the good work than is being done to bring wonderful rivers like the Wye and Usk to health. Two articles examine Wales' vulnerability to acid deposition, and what is being done to tackle the problems.

When moorland and other open habitats decline, we encounter their associated wildlife less often. This includes members of one of the most charismatic groups of moths, the Tiger Moths, which are profiled here. This may also be true of that most attractive of mammals, the water vole, which is also featured. Who would have thought that the watery uplands may have provided a stronghold in the past from which water voles were able to colonise newly created lowland habitat?

Thankfully, water is still an abundant resource in Wales, providing both pleasure and prosperity. There are enough good stories about freshwater habitats to fill the magazine several times over. There is also the sensitive issue of who does water belong to, with the ghost of Treweryn, flooded to supply Liverpool with water, in the background.

If any issue has helped to focus minds on the way in which resources lie at the heart of the power contest that is politics, it is the conflict in Iraq. Few people can be innocent enough to think that oil, and America's insatiable appetite for the black gold, has nothing to do with it.

All nations want to acquire resources for the benefit of their citizens. But we need to look beyond competition between nations for the consumption of resources. Our fragile biosphere is already trembling under the strain of growth at any cost policies. As Morgan Parry points out in this issue, it is not much good claiming a clean bill of health for our environmental performance here in Wales, if we are exploiting natural resources and communities beyond our shores.

James Robertson

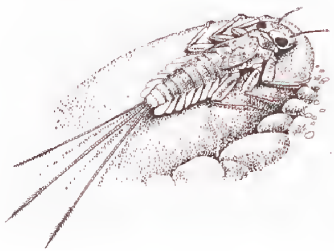
Photo: Shane Farrell.

The acid test – *returning a river to health*

Headwaters of the river Wye.

Photo: Ingrid Jüttner, NMGW.

With thousands of kilometres of Welsh rivers still affected by acid rain, and signs of recovery barely detectable, ***Ingrid Jüttner*** *and* ***Steve Ormerod*** *review the case for and against treating the symptoms by liming. A large investigation into the practicality and effects of liming on river biodiversity is now under way in the Wye catchment.*



For a nation proud to market its green image – particularly since the pollution legacy from collieries, industry and domestic sewage has been effectively moderated – Wales has a surprisingly large pollution problem at its rural heart. Ever since the industrial revolution, the fall of acid rain – or more correctly acid deposition – has been radically changing the quality of Wales' streams, rivers and lakes. The problems are most acute in exactly those upland, green locations that were long considered pollution free.

To any casual observer, even the most acidified streams could easily be perceived as clean, wholesome or even pristine: gin clear, or delicate, peaty amber. The reality, however, is very different. In soft-water areas of Wales where basic (neutralising) ions such as calcium are scarce, many streams are distinctly acid (c pH 4.5-5.5) and laden with toxic metals such as aluminium, particularly at high flow. Just as much as rivers affected by mine run-off or nutrients from agriculture, these acid streams are truly polluted waters.

Our most recent – but now rather dated – estimate from the Environment Agency (EA), the 1995 Welsh Acid Waters Survey, suggests that a staggering 12,000 km of Welsh streams are affected – almost half of their total length. The mean pH of these streams in winter was below pH 6, and around one-third had aluminium concentrations above 0.1 mg/l, high enough to kill salmon or trout in a matter of days. Lakes, too, have been acidified, and indeed some of the best evidence about the time trends and causes of acidification comes from lake sedimentary records gathered throughout mid and north Wales.

Acidification: the causes …

Acidification occurs in Wales because all the required factors have converged upon us. The rocks that give Wales its rugged upland character weather too slowly to effectively neutralize acids that fall in mist and rain. Roughly one in four rainstorms arriving in Wales has passed over our eastern neighbours and so

brings the products of fossil-fuel combustion: oxides of sulphur and nitrogen. Some acidifying contributions also arise more locally, for example as ammonia from agriculture. While our rain is only moderately acid as a result, large amounts fall, in some places over 2-3 metres each year, so that the total loading of pollutants is multiplied over large volumes. The most recent comprehensive measurements show that high altitude areas in Wales receive around 15-25 kg/ha of sulphur each year from polluting sources, and 20-25 kg/ha of nitrogen. Finally, problems can sometimes be exacerbated locally by the presence of conifer forest at high altitudes where the trees effectively increase acid loadings.

... the consequences ...

With their clarity and apparently wholesome character, the most directly obvious clues about the polluted nature of acidified streams are in their animal and plant life. So fundamental are the biological effects of acidification that they pervade all levels in freshwater food webs. In streams, communities of bacteria, algae, bryophytes, fungi, invertebrates, fish, birds and mammals are radically different at low and high pH. Well-known examples involve the loss of most mayflies, molluscs and some caddisfly larvae from acid streams, large reductions in the densities of trout and salmon, and a reduction in the numbers and breeding performance of dippers. Key indicator groups such as diatoms also change from the usual diverse flora to a very restricted flora dominated by *Eunotia spp.* in acid streams. Their ecosystems do not function properly, for example because the decomposition of leaf litter slows in acid streams. This is important because the energy derived from fallen leaves contributes to the whole economy of streams. In combination, these ecological effects dramatically reduce local biodiversity, cause local extinctions, and have consequences for important organisms.

... and recovery.

Although air pollution abatement is now taking effect across Europe, there is little evidence that Wales' acidified situation is changing rapidly. Between comprehensive surveys undertaken in 1984 and 1995, mean total sulphate and nitrate concentration in rainfall declined by 30% and 18% respectively, while the deposited tonnages of these pollutants fell by similar amounts. Although sulphate concentrations fell by about 20% in streams, they became only slightly less acid. These chemical changes were far too modest to engender any biological change, and almost certainly acid episodes or chronic acidity in many locations continue to limit biological recovery. While these data are now almost 10 years old, current indications from critical loads maps (with all their uncertainties) are that 40-50% of Welsh freshwaters drain catchments that receive more acid pollution than can be buffered.

Photo: Ingrid Jüttner, NMGW.

Afforestation of the catchment increases acid loadings.

Acidification and the Wye

Reaching out across mid and north Wales, acidification affects the headwaters of many of our most important rivers for conservation and fisheries. Among the most prestigious of all is the Wye, one of the first ever rivers in the United Kingdom to be designated a Site of Special Scientific Interest along its entire length and now a candidate for Special Area of Conservation. This development in status brought a subtle shift in emphasis on the conservation importance of the Wye – from its diverse and often highly localised species of invertebrates and other groups which were emphasised in *A Nature Conservation Review* [1], to the more limited array of species that figure on the EU Species and Habitats Directive. Among them is the Atlantic salmon *Salmo salar*, whose status unites conservation appeal, increasing scarcity, economic value and charisma as one of the world's major sport fishes.

Only 25 years ago, around 25% of all the rod-caught salmon in England and Wales came from the Wye, or about 6000 fish in peak years. Now, however, the catch has declined to some hundreds of fish. While catch statistics are notoriously misleading as population indices, fishery owners and other interested groups, represented by the Wye & Usk Foundation, estimate that the spawning stock is now also severely depleted: egg deposition has been below the 'conservation limit' of population maintenance since 1987, and it may still be declining[2]. While these trends represent many confounding causes, acidification is significant. With large reaches of the main upper Wye, Tarenig, Bidno, Irfon and other tributaries north of Llangurig or Llanwrtyd among Wales' most acidified locations, the Foundation estimates that 17% of the 'loss of salmon production' in the Wye can be attributed to this cause. In corroboration, the EA (2003) ranked acidification fourth of 23 major issues affecting salmon in the Wye in 2003, and third of 25 issues which would benefit from management action.

With interest groups and environmental professionals clearly in agreement about the needs for action, one of the major questions is about what management steps might be feasible or desirable. Moreover, to what extent might management action for salmon benefit other organisms while avoiding possible adverse impact?

A solution to acidification problems in the Wye?

With recovery from reduced acid deposition apparently slow, and possibly even decades or centuries into the future, symptomatic treatments for acidification have had a steady number of advocates whose ranks may now be growing. Among the possibilities, liming is the best understood, and has been used very extensively to combat acidification in Scandinavia and occasionally in North America. In the UK, the EA have been at the forefront of lake liming and the deployment of direct dosing silos on small numbers of rivers. They were instrumental also in establishing government-funded experiments at Llyn Brianne that still examine the effectiveness of catchment liming. This work has been continued by Cardiff University and provides one of the most important long-term studies of its type anywhere in the world. Now, almost 20 years after these experiments were initially established, very substantial data and experience have accumulated on the risks and benefits of this and other liming techniques. So far, however, there has never been any Welsh or British attempt to scale-up from the Brianne experiments to the logistically demanding challenge of strategic lime applications to key headwater points – hydrological source areas – in larger catchments (more than 50-60 sq km).

It was partly for these reasons, and because concern about the plight of the Wye's salmon is shared across interest groups and government organisations, that catchment lime applications were selected as a pivotal part of the Wye & Usk Foundation's 'Wye pHISH' programme of enhancements, initiated in 2002.

Photo: Ingrid Jittner, NMGW.

Liming Plynlimon.

Funded by the European Regional Development Fund, pHISH aims broadly to improve water quality and habitats for salmonids in the upper Wye catchment. A substantial science programme is also in place to monitor the scheme's effectiveness. It blends funding and participation from Cardiff University, the National Museums and Galleries of Wales, the EA, Countryside Council for Wales (CCW), Forestry Commission, the Centre for Ecology and Hydrology (CEH) Bangor and Welsh Assembly – all key players in environmental investigation and protection. The first lime applications were made in August 2003 to an array of targeted wetland locations in the upper Wye, Bidno and Tarenig, and further applications will be made in 2004 in the catchment of the Irfon. In addition to its real aim of restoring salmonid habitat, the project offers the opportunity for a sophisticated, large-scale, replicated experiment in which effects on water quality, diatoms, invertebrates and salmon will be assessed over several years. Ecological rehabilitation is expected to have positive impacts not only on wildlife but also on tourism and employment in traditional practices related to river management.

The choice of liming methods in the programme was not straightforward, although some options could be easily ruled out. Direct lake liming, for example, is a non-starter in the Wye since no large lakes are in the most important upper-catchment locations. Direct dosing silos – used previously on the upper Tywi – were ruled out partly due to their expense. The need to cover running costs beyond the three-year duration of the pHISH programme was a significant problem. Perhaps more importantly, dosers cannot be positioned in sufficient numbers or in sufficiently upstream locations to recover true headwaters. Not only are these important salmonid spawning habitats, but they also hold distinct groups of organisms that contribute to catchment-wide biodiversity. Headwaters also provide the small-stream network through which we expect acid-sensitive organisms to disperse from catchment to catchment as recovery from acidification proceeds. Lime sedimentation problems downstream from dosers might also have significant local effects on salmonid habitat, and at Llyn Brianne the survival of insects in the immediate downstream zone is impaired.

Catchment liming, in contrast, contributes calcium carbonate to run-off through natural catchment processes that might be similar to the natural release that occurred before acidification. As a result, even one-off applications can have long-lasting effects. At Llyn Brianne, stream pH and calcium concentrations have remained elevated, and aluminium low, throughout the 16 years that followed single lime dressings in 1988. On the negative side, catchment liming at Brianne had limited effects in promoting sustained invertebrate recovery for reasons that are still under investigation. The favourite hypotheses at present are that acid episodes were not wholly prevented following liming, while climatic instability might also have been involved. These episodes are still a significant concern: lime applications need to strike a delicate balance between adding sufficient calcium carbonate to catchment run-off to prevent the occurrence of acid water surging through the catchment, but not so much that stream chemistry is made wholly unlike the near-pristine soft waters that preceded acid deposition.

One of the most significant arguments raised against catchment liming in the 1980s reflected the possible impacts on calcium-sensitive organisms that occurred in exactly those naturally base-poor habitats where lime applications are often targeted: small upland bogs, mires and flushes. Many such habitats in the UK are globally important, and there is clear evidence that lime applications detrimentally affect *Sphagnum* and other wetland plants with knock-on effects also on invertebrates. However, the most important and sensitive locations are identifiable. With the full involvement of CCW in the pHISH programme, there is no danger that any such habitats would be targeted in this programme. In addition, any impacts on wetlands of low conservation importance clearly have to be weighed against the possible benefits of more favourable conservation status of the Wye's salmon – so prominent in the proposed Wye SAC. It might be argued that any chemical intervention in the SAC is inappropriate, but the effects of calcium addition will not be detectable outside the acid-sensitive reaches that have, in any case, already been substantially altered by acidification.

Another basic science view on liming might be that it removes the opportunity to observe natural recovery from acidification as acid deposition problems recede. This view has been fully accommodated in pHISH by leaving unlimed 'reference' streams where future trends can be observed. Ideal reference locations were easily chosen on Plynlimon and elsewhere where so much scientific work on the ecology of the Wye has been carried out. Indeed, this existing science adds valuable baseline data to the new project.

Conclusion: a win-win outcome?

It is clear that we are in a much better position now to design catchment liming schemes more carefully than ever before to maximise the strengths and avoid the risks or problems. In the end, however, none of us can guarantee the success of the pHISH programme of liming. There are challenging logistics involved, there are unknown elements in the ecological recovery of rivers from such a major long-term stress as acidification, and there are clearly problems in restoring salmon numbers under the current complex circumstances where many adverse factors restrict their populations. But consider also the benefits of success: many tens of kilometres of spawning habitat for trout and salmon in the Wye and Irfon stand to be recovered with important spin-offs for other organisms. There is clear value, too, in the project as a demonstration. If recovery from acidification elsewhere in Wales, the UK and Europe occurs only slowly as acid deposition abates, as seems very likely,

Salmon. Photo: CCW.

then pHISH will have offered crucial leadership in illustrating the strengths, weaknesses and logistical challenges of an alternative recovery strategy. If, by contrast, recovery from acidification is rapid over the next 10 years, with Wales predicted to gain positive acid neutralising capacity more rapidly than any other British region, then pHISH will have served to kick start positive trends in one of Wales' most important rivers. Is this not the best of all possible win-win outcomes for one of our best loved rivers?

Dr Ingrid Jüttner is Research Curator of Limnology with the National Museums and Galleries of Wales. She has a long-standing interest particularly in the value of diatoms as indicators of aquatic ecosystem quality. **Professor Steve Ormerod** works in Cardiff School of Biosciences and is known widely for his research into acidification and other large-scale impacts on rivers and other wetlands.

References

1 Ratcliffe, D.A. (1977) *A Nature Conservation Review*. Vols. I and II. Cambridge University Press, Cambridge.

2 The Wye & Usk Foundation, *Conserving our Fisheries*, Autumn 2003, Issue No.1.

Arbrawf calch ym mlaenau Gwy

Ym mis Awst, dechreuodd prosiect mawr i geisio lleihau effeithiau asid ar afon Gwy trwy ychwanegu calch at flaenau'r afon a'r nentydd sy'n ei bwydo. Mae calchu'r dalgylch yn hytrach na'r afon ei hun yn creu proses sy'n debycach i ymdreiddiad naturiol calsiwm carbonad ac mae'r effaith yn hir dymor. Tra byddai seilos calchu mewn afon yn ddrud, yn methu â chyrraedd rhannau ucha'r afon ac efallai'n amharu ar gynefinoedd eogiaid yn is i lawr, mae modd gwarchod planhigion prin fel migwyn rhag effaith y calchu dalgylch a bydd rhai nentydd yn cael eu cadw heb galch, er mwyn astudio sut y mae natur ei hun yn ymladd asideiddio. Byddai llwyddiant yn golygu achub degau o gilomedrau o gynefinoedd dodwy eogiaid o fod yn brif afon eogiaid Cymru a Lloegr, mae Sefydliad yr Wysg a Gwy yn credu fod lefelau dodwy ar afon Gwy bellach yn is na'r hyn sydd ei angen i gynnal y boblogaeth, gydag asid yn y dŵr yn gyfrifol am 17% o'r gostyngiad. Yn ogystal ag adfer cynefinoedd eogiaid, mae'r cynllun hefyd yn gyfle i gynnal arbrawf mawr, soffistigedig, gyda'r posibilrwydd o asesu ei effaith tros nifer o flynyddoedd.

Llên y llysiau: *y llugwe fawr*

Y mae'r gyfres hon yn olrhain cysylltiadau diwylliannol gwahanol blanhigion. Fel botanegydd a hanesydd planhigion yng Nghymru, sôn yn bennaf am hanes casglu'r redynen wrychog mae ***Dewi Jones*** *yn yr erthygl hon.*

Ffoto: Peter Wakely

Mae llyfr diweddaraf Dewi Jones, *Naturiaethwr Mawr Môr a Mynydd, Bywyd a Gwaith J. Lloyd Williams*, ar gael yn awr. Gwasg Dwyfor £12.50. ISBN 1-870394-84-4

Enwau Cymraeg safonol:	**llugwe fawr, rhedyn Cilarne**
Enwau Cymraeg eraill:	**rhedynen wrychog**
Enw Saesneg:	**Killarney fern**
Enw Gwyddonol:	***Trichomanes speciosum***

Disgrifiad

Rhedynen lled-dryloyw yw'r llugwe fawr a'i llafn o siâp blaen gwaywffon. Mae'n mesur rhwng 5cm a 20cm. Mae ganddi risomau du, cryfion wedi eu gorchuddio gan flewiach cymalog tywyll. Un arall o'i henwau Saesneg yw 'bristle fern' sy'n deillio o'r ffaith bod colyn ar flaen y sorws (sef y llestr sy'n gwarchod y sborau). Fel sboroffyt (y cyflwr atgynhyrchu an-rhywiol) mae'n redynen brin iawn ac o dan warchodaeth deddf gwlad. Yn ei chyflwr rhywiol, di-nod mae'n syndod o gyffredin, ond stori arall yw honno!

Mae'r enw Saesneg 'Killarney fern' yn deillio o'r ffaith mai yn ne-orllewin yr Iwerddon y mae ei chadarnle. Mae'r rhedynen wrychog yn hoff o gynefin cysgodol gwlyb, fel ogofeydd bychain neu y tu cefn i raeadrau lle caiff gyflenwad cyson o leithder, a'r ffaith hon sydd yn ei gwneud yn anodd i'w darganfod.

Cofnodi a chasglu

Bron na ddywedwn bod hanes y llugwe fawr yn fytholegol. Cofnodwyd hi am y tro cyntaf yng Nghymru gan J. F. Rowbotham o Fanceinion yn 1863 yn dilyn ei ddarganfyddiad o nifer dda o ffrondiau cryfion yn tyfu o nenfwd ac ochrau ogof laith "yn union fel llenni sidan", ond ni ddatgelwyd yr union safle ond i garfan fechan o fotanegwyr. Ymwelodd rhai ohonynt â'r ogof yn ystod y blynyddoedd dilynol gan gasglu yn hael sbesimenau ohoni.
O edrych ar sbesimenau herbariwm a gasglwyd o'r safle hwn, gwelir eu bod tua 56cm o hyd, ac yn cymharu'n gyfartal â'r safleoedd Gwyddelig gorau. Mae hyn yn awgrymu bod y llugwe fawr wedi hen sefydlu yn yr ogof arbennig hon. Erys safle'r ogof yn ddirgelwch hyd heddiw, a'r unig gliw a oroesodd yn y wybodaeth a geir ar hen ddalennau'r herbariwm, yw mai yn rhywle ar yr Wyddfa yr oedd.

Yn ddiweddarach cafwyd hyd i safleoedd eraill ar fynydd-dir Meirionnydd, ond mae un o'r rhain yng nghyffiniau Harlech wedi ei golli bellach drwy or-gasglu. Ni lwyddwyd i gadw'r gyfrinach yn Harlech fel y gwnaethpwyd ar safle'r Wyddfa, a daeth gormod i wybod am y lle; hefyd, yr oedd yn tyfu mewn safle hwylus i'r casglyddion sydd yn agos i briffordd brysur ac yn hawdd cael ato. Nid yw safle arall y redynen wrychog ym Meirionnydd mor hawdd ei gyrraedd ac oherwydd hynny, a'r ffaith nad oes ond ychydig yn gwybod amdano, mae'r redynen yn cael llonydd i ffynnu.

Dichon fod i'r llugwe fawr le arbennig yng nghalon y botanegydd o Gymro John Lloyd Williams (1854-1945), ac iddo ef mae'r clod am ddarganfyddiad safle arall sydd mewn bodolaeth o hyd. Dim ond carfan fechan o arbenigwyr sydd yn gwybod amdano. Hysbysebwyd darganfyddiad J Ll Williams yn y cylchgrawn Journal of Botany yn 1887. Ni ddatgelwyd hyd yn oed enw'r mynydd lle tyfai, heblaw dweud nad ar yr Wyddfa ydoedd, rhag ofn i'r wybodaeth gyrraedd clust y casglwyr a oedd yn rheibio'r planhigion prin yn ystod Oes Victoria. Er yr holl ofal daeth rhywun o hyd i'r safle drwy ddilyn J Ll Williams yno o hirbell, ac aeth â'r cyfan o'r redynen oddi yno gyda'r bwriad o elwa drwy ei gwerthu i'r casglwyr. Ond ni ddifawyd hi'n llwyr a gwelodd John Lloyd Williams hi wedyn yn 1922, a'r tebyg yw iddo gadw'r gyfrinach iddo ef ei hun y tro hwn. Darganfuwyd safle John Lloyd Williams yn 1967 gan Gomer Hughes o Feddgelert a chafodd lonydd i ffynnu byth ers hynny.

Mae un safle arall i'r llugwe fawr yng Nghymru, yng Ngheredigion. Mae'r ffaith bod darganfyddiad Ceredigion wedi ei wneud mor ddiweddar â 1961 yn awgrymu nad oedd y Fictoriaid wedi darganfod popeth, a bod gwneud darganfyddiadau newydd allan yn y maes yn bosib o hyd, hyd yn oed yn yr oes hon.

Ffoto: Peter Wakely.

A hoffech wybod mwy am brosiect **Llên y llysiau**?

A hoffech wybod mwy am ddefnydd y rhedyn a phlanhigion eraill?

A hoffech gyfrannu o'ch gwybodaeth eich hun i'r gronfa o ddata?

Cysylltwch felly â safle wê'r Gymdeithas www.cymdeithasedwardllwyd.org.uk cliciwch ar y botwm ... ac fe welwch safle newydd arbrofol y prosiect gyda chyfle i ychwanegu eich sylwadau ac i gyrchu'r wybodaeth a gasglwyd hyd yma. Rhowch gynnig arni, mae'n hawdd! ... neu, os yw'n well gennych, rhowch nodyn ar bapur a'i anfon at **Haf Meredydd, 14 Stryd Wesla, Porthmadog**.

Llên y llysiau (the Lore of Plants) is a project initiated by Cymdeithas Edward Llwyd to collect information on the cultural connections of plants in Wales, and to celebrate them. If you have any facts or anecdotes you would like to contribute, please write to **Haf Meredydd, 14 Stryd Wesla, Porthmadog, Gwynedd**.

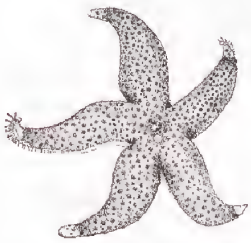
Killarney fern

Historical botanist Dewi Jones follows the discovery of the Killarney fern and its fate on various sites in Wales over the last two centuries. Information about the locality of some sites, notably one near Harlech and another somewhere on Snowdon became known to collectors and the former was completely denuded. Although the Snowdon site was described and recorded by Rowbotham, the exact location was never placed on record anywhere, and remains a mystery. A site discovered by John Ll Williams 'not on Snowdon' and recently rediscovered by Gomer Hughes, another in Meirionnydd and a third in Ceredigion, still support a viable group of Killarney ferns despite the fact that the one 'not on Snowdon' was seriously disturbed by a collector who discreetly followed Williams to the site on one of his visits. The Killarney fern survives in Wales, says Dewi Jones, despite the potential pressures of this modern age.

Wales and the world *with Sarah Jones*

Sarah Jones and one of her exotic destinations. Photo: S4C.

The television wildlife series, **Gwyllt**, *returns to S4C in the new year. Twenty-five year old* ***Sarah Jones*** *from Ganllwyd near Dolgellau, is one of the presenters of the series. Sarah has been talking to* Natur Cymru *about her interest in nature and conservation in Wales and abroad.*



What first sparked your interest in wildlife?

I am a farmer's daughter and have always been surrounded by wildlife. I remember taking an interest in the farm's resident barn owl when Ted Breeze Jones came to visit. He taught me all about this magnificent bird of prey and I'm glad to say that it is still breeding successfully on the farm to date. In addition, our local vet Mike Dallimore is a keen birder. He's always been there to help me with any problems with the young chicks. These days the vets call me out if they receive calls concerning injured birds of prey.

What can other young people interested in Welsh wildlife do to make a difference?

I gained a lot of experience by doing voluntary work with various organisations, and even managed to get some paid work too! I thoroughly enjoyed working for the Snowdonia National Park, the RSPB and more recently the North Wales Wildlife Trust. For young people considering a career in nature and conservation, there are a number of excellent courses on offer. I completed a Forestry and Environmental Studies course at Coleg Meirion Dwyfor, Glynllifon. I gained a lot of confidence and plenty of practical skills, including a chainsaw certificate! I also followed a course in Countryside Management in Aberystwyth, but was unable to finish the course due to a sporting injury. I've always regretted this; it's certainly worth getting a qualification in the field if you're serious about working with wildlife.

Cader Idris, near Sarah's home town Dolgellau. Photo: P.H. Evans/CCW.

Until March, you worked for the North Wales Wildlife Trust. What did your work entail?

At first I was a warden at the old Cooke's Works site, which is now a nature reserve, bursting with history and wildlife. During my final year of work for the Trust I was a People and Wildlife Officer. My job was to promote the nature reserves and the work of the Trust and I organised guided walks, talks and slide shows.

In the New Year we'll see you on television presenting the S4C wildlife series, *Gwyllt*. You filmed extensively overseas – where did you go and what did you see?

Last year I filmed a programme in South Africa. I didn't fancy a normal safari so I went on a course for Game Rangers. I wanted to go behind-the-scenes to see how reserves are managed in other countries and I fell in love with South Africa and its wildlife. In the new series of *Gwyllt*, I go back to visit two other big nature reserves, Shamwari and Sanbona. Both are situated on sites formerly used for agriculture and I take at look at the contrasting methods used for turning the land back to nature. Shamwari has been open to the public for ten years, but the Sanbona project is in its early stages: A lot of hard work and money has gone into establishing and maintaining these wonderful reserves. My second trip was to Sri Lanka. Although it's a very poor country, everyone seemed to be smiling all the time! The wildlife there is amazing. I met elephants of all shapes and sizes and even managed to fall off one! I saw elephants out in the wild, orphaned elephants and working elephants. The Leopard project at the Yala nature reserve was also very exciting. The most memorable moment for me was watching two cubs hunting a monitor lizard – you'll have to watch the programme to find out what happened!

Mexico was the next trip and I really didn't want to come home. I was taught to dive on the second largest barrier reef in the world, in the Caribbean sea. Global Vision International helps the Sian Khan nature reserve protect its reef and the mangroves. It was a different world down at the bottom of the sea. I saw the many varieties of fish and creatures which feed off the reef, and even got to release some baby turtles back to the wild – about 160 of them!

Canada is next, where I'll be studying polar bears. I am really looking forward to this trip.

Photo: S4C.

Releasing baby turtles.

How do our more modest habitats compare to the dramatic reserves and spectacular wildlife you show viewers in *Gwyllt*?

We have spectacular habitats in Wales – forests, mountains, lakes, mud-flats and a dramatic coastline – but on a smaller scale. The difference is that in larger countries there are habitats which are still untouched by human hand.

People travel from all over the world to see the polar bears of Canada and the 'big 5' in the game reserves of South Africa. Which of Wales' creatures deserves similar acclaim?

All of them, I believe that every wild animal should be managed and respected. I suppose my own particular favourite would have to be the barn owl.

What are your own specialised fields of interest?

The barn owl and the otter. I've studied them closely and worked on projects that have helped to reintroduce both species to their original habitats.

Which conservation issues do you think most important at a local level?

Local countryside management, protection and beauty are three of the most important issues for me. But there are so many to choose from. It's important to remember that little things can make a difference. Teaching children to respect the environment and place litter in bins; recycling bottles, papers and cans; using a compost bin in the garden ... These are things we can all do to make a difference.

If a friend from abroad came to stay with you in Dolgellau to learn more about the local countryside and wildlife, what are the main things you'd show them?

I'd want them to understand the variety of natural habitats and ecosystems found in the area. There are rivers (the Mawddach and the Wnion); lakes (Tan-y-Graig, Cynnwch, Cregennan, Tal-y-Llyn); mountains (Cader Idris and Snowdonia) and the nearby coastline at Barmouth. I'd also point out the nature trails and walks which have been developed for local people and visitors to enjoy – for example the Precipice Walk, the Forest Walk and the Llyn y Gadair Walk.

What are your plans for the future?

I hope to stay in the field of conservation, but I've got the travel bug and would love to see more nature in other countries and take a camera crew with me! I think I will have to have a chat with Sir David Attenborough; I would love to work with him.

Gwyllt is a Welsh language programme which returns to S4C in the new year and can be seen with English language subtitles on Teletext 888.

Sarah yn mentro i'r Gwyllt

Sarah Jones yw un o gyflwynwyr cyfres deledu newydd o *Gwyllt*. Yn ogystal â'i diddordeb arbennig mewn tylluanod a dyfrgwn, mae'r ferch 25 oed o'r Ganllwyd, wedi ffilmio ar warchodfeydd yn Ne Affrica ac yn y gyfres hon fe fydd yn ymweld â dwy arall. Roedd taith i Sri Lanka yn cynnwys marchogaeth eliffant a gweld prosiect i warchod y llewpart tra bod deifio ar ail farriff mwya'r byd yn rhan o'i gwaith ffilmio ym Mecsico.

Mae pedwaredd taith i ddod i astudio eirth gwyn yng Nghanada. Ond mae ei phrofiad o fyd natur hefyd yn cynnwys gwaith gwirfoddol gartre' gyda Phare Cenedlaethol Eryri, y Gymdeithas Gwarchod Adar ac Ymddiriedolaeth Bywyd Gwyllt Gogledd Cymru. Bellach, fe fydd milfeddygon lleol yn ei galw i helpu pan fydd adar ysglyfaethus wedi brifo.

What and where is the Welsh environment?

How clean and green are we? Photo: CCW

As global pressures mount, policy-makers need an accurate assessment of the state of our environment. What could be more important than a report which tells us exactly what condition our environment is in, and gives a clear picture of what is improving and what is deteriorating? But do we really have such a report, ***Morgan Parry*** *wonders, and surely we need to consider the state of Wales within the context of the global environment?*

The Countryside Council for Wales (CCW), Environment Agency Wales (EAW) and Forestry Commission Wales (FCW) published the latest *State of the Welsh Environment Report* (SoER) on 16th October 2003. Poor press coverage provoked no public debate, but the report may draw attention to the roles of the Agencies which produced it. It might also begin a debate about what exactly is the 'Welsh Environment' in the context of the global economy and the imperative of sustainable development.

There is some good news in the report, and CCW deserves credit for its work on Tir Gofal, the EAW for its good regulatory performance, and the Forestry Commission for its increasingly sustainable management practices. However, even accepting the limitations of the brief given to the authors, it reads more like a 'State of the Quangos' report, with successes being listed for many of the schemes and programmes run by the agencies themselves. The report tells us little about the bigger picture – the declining state of the global environment and our responsibility for that decline – nor of the relationship between people, the economy and the environment.

Because of these major omissions, and the Agencies' reluctance to give bad news, the report's conclusions are two dimensional and rather complacent. There is no mention of sustainable development at all, and no analysis of the global perspective. It could be argued that other reports and strategies address these issues, but the SoER data were meant to become the environmental baseline for the Welsh Assembly Government's sustainable development policies and programmes. There is a grave danger that

Photo: Jeremy Moore/CCW.

Responsibility for pollution does not stop at national boundaries.

politicians and decision makers will take the cautiously optimistic tone of the SoER to mean that we are moving in the right direction.

The reality is very different: we are becoming more unsustainable with every year that passes, and if the SoER didn't want to engage with the wider debate, the *least* it should have done would have been to acknowledge at the start that the picture presented was only a partial one, and that the report should be read alongside other research. Some comparative data would provide perspective: what are other organisations and agencies saying about environmental sustainability and do they share the Assembly Sponsored Public Bodies' (ASPB's) cautiously optimistic tone? Are Welsh trends replicated elsewhere in the UK, Europe and further afield? How much does a four-year comparison tell us, and what are the longer historical trends?

A major problem arises from the natural science tradition which is dominant in much of CCW, and which is often antipathetic to the concept of sustainable development. The surveying and monitoring of species and habitats provides important information, and has a long pedigree in CCW and its predecessor bodies, but without a wider context it can be misleading. It looks for objectivity, but makes few connections, offers little analysis and draws even fewer conclusions. In particular, the report fails to identify the economic drivers for environmental trends. According to the report, air and water quality in Wales continue to improve, echoing the recent UK Government's framework for sustainable consumption and production, which claims that "the evidence is that we are now successfully decoupling air and water pollution from growth in GDP".

In other words, economic growth is no longer happening at the expense of the environment. However, the evidence tells us nothing of the sort, and such a claim is a misrepresentation of the truth by the UK Government. But it is based on reports such as the *State of the Welsh Environment 2003*. Certainly our scientists are measuring some positive trends, but the majority of our economic growth is now generated by the exploitation of natural resources (and workers) outside the UK, and our national accounts ignore the environmental (and social) impacts of that exploitation.

The reality is that we continue to pillage the Earth's natural resources to feed our appetite for consumption and economic growth. Powerful companies based in northern Europe and North America now own and control vast areas of the environment of Africa, Asia and Latin America to provide food and raw materials for our consumption. However the calculations are done, this amounts to Wales appropriating a land area almost twice the size of Wales itself, and increasing every year. We should take responsibility for that 'other Wales' in our State of the Environment Report: we can't measure sustainability solely within the boundaries of Wales.

Three examples. The report points to the environmental impact of Welsh farming being reduced through sensitive land management and schemes such as Tir Gofal. This is to be welcomed of course, and our wildlife will surely benefit and people's enjoyment of the countryside will be enhanced. But this doesn't mean that the food we consume is more sustainably produced. Figures are hard to come by, but the majority of the food we eat in Wales is produced elsewhere in the world, often in environmentally sensitive and threatened habitats. An example is the Mediterranean region, where agriculture is being

intensified to allow the production of year-round fruit and vegetables for the global marketplace. A vast and hugely damaging infrastructure project in Spain is diverting water from the north east of the country to irrigate crops in the semi-arid south. Part of the responsibility for this environmental destruction rests with us in Wales, because we buy the products.

Secondly, even the sheep and beef we do produce ourselves are still dependent on imported feedstuffs: soya beans for European and North American livestock are grown in Brazil and other tropical countries where rainforests are being cleared at an increasing rate.

Thirdly the claim that our rivers and air are becoming cleaner hides the fact that most of the mineral extraction, refining and heavy manufacturing (which in earlier times produced significant pollution) now takes place elsewhere on the planet. What industry we have left (with a few exceptions) is in component assembly and services, which generate few environmental impacts and use little land. Since the majority of our manufactured goods is imported, we have all the economic benefits and few of the environmental costs.

These distant impacts are on a scale and an intensity unlike anything we see in this country. Making the links between those impacts and our economy is a challenge - we can't measure it in the way we measure populations of black grouse on the Migneint or pesticide levels in the River Dee. But to ignore them completely is a scandalous denial of responsibility.

Sadly, no public agency is advising the Government on the global impacts of economic policies, production processes and consumption patterns. (The WDA should be radically transformed to fulfil that task, creating a Sustainable Development Agency for Wales, which develops the Welsh economy while reducing our global environmental and social impact. But that's another story!). CCW, EAW and the FCW do claim to be working to make Wales more sustainable though. Maybe if the land management functions of these Agencies were combined into a new body (as Lord Haskins is proposing in England) there would be greater capacity to generate innovative policies and provide independent advice based on the work of our scientists. That policy analysis and advice, coupled to the perspective provided by a new Sustainable Development Agency for Wales, would result in a State of the Environment Report which assessed not only the state of nature in Wales but also the extent and health of the global resource base on which our economy depends. That would be a revealing document indeed.

The SoER recommends that the Welsh Assembly Government and its Agencies produce an Environmental Strategy, without making a convincing argument why one is needed. Will it be used to defer taking action? If an Environmental Strategy is produced, it must not start from the same narrow perspective of the SoER Report. The task of researching and writing such a strategy should be given to an independent group with wide perspectives and a holistic understanding of what and where the Welsh environment is. That group should be capable of telling the politicians what they don't want to hear. With increasing Government pressure on ASPBs to justify their budgets and give Ministers good news, and despite the high integrity of their staff and Members, its doubtful whether the current agencies can fulfil that role.

Morgan Parry is Director, WWF Cymru.

Cyflwr Amgylchedd Cymru

Cyhoeddodd Cyngor Cefn Gwlad, Asiantaeth yr Amgylchedd a'r Comisiwn Coedwigaeth ei hadroddiad ar "Gyflwr Amgylchedd Cymru 2003" mis Hydref. Mae yna newyddion da, ond nid yw'r Adroddiad yn cyfleu'r darlun cyfan: dim sôn am gyflwr yr amgylchedd ehangach a'n cyfrifoldeb ni am y dirywiad, na chwaith y cysylltiad rhwng yr amgylchedd, yr economi a phobl (datblygu cynaladwy). Oherwydd y diffygion yma, mae canlyniadau'r Adroddiad yn rhai hunan-boddhaol ac arwynebol. Ni roddodd sylw iddo yn y wasg, ond efallai bydd yr Adroddiad yn dechrau dadl ar ddyfodol yr Asiantaethau amgylcheddol yng Nghymru, ac ar beth yn union yw 'amgylchedd Cymru' yng nghyd-destun yr economi byd-eang.

Saving salmon *and restoring a great river*

After coppicing and conservation work on the Wye tributary, the Bachawy. All photos: Wye and Usk Foundation.

The river Wye rises in Pumlumon and flows through the uplands of Montgomery, Radnor and Brecknock before reaching England. After a meandering detour through Hereford, it finally flows back into Monmouthshire and Gloucestershire and thence into the Severn estuary. Once known as the best salmon fishery south of the border, it has suffered a chequered history. ***Stephen Marsh-Smith*** *describes the rise and fall over the last hundred years and the huge efforts to restore the river and its salmon.*

The story told of the Wye one hundred years ago was one of a fantastic recovery. At its nadir at the end of the 19th century, the fishery was reduced to an annual catch of less than 500 fish for the entire 150 miles. At its peak however, rods and nets took over 12,000 fish in a season. Incredibly, before the advent of acid rain, diffuse pollution, habitat destruction, water abstraction and the invention of monofilament nets, simple over-exploitation achieved in a mere 20 years what subsequently in the mid and late 20th century took forty years of 'supervised neglect' to reach.

Between 1870 and the early twentieth century, salmon were mainly exploited in the estuary and lower river, but netting was allowed in freshwater throughout its length. Added to this there was a thriving market in 'pinks' – salmon smolts en route to the sea. The spawning tributaries were considered fair game in October, November and December when adult fish were easily caught but barely fit to eat.

This sorry state was, in short, a classic example of man's folly in managing a crucial natural resource and, as you can imagine, it was hard to break the deadlock. Action was taken only when the situation became so bad that most of the fisheries upstream of Monmouth were no longer viable; and when a key figure, John Hotckiss, took control, he 'knocked heads together' and persuaded the majority of owners of the benefit of raising funds for a net buyout. By 1901 he had pushed through the purchase of the more damaging commercial fisheries near the estuary. By 1905 enough fish entered the river to start the run again.

So low had stocks been that it took more than a single generation for full recovery, but within five years large numbers of fish were again being caught: 4417 in 1910, and by 1927 this had reached 7710 (to rods and remaining nets). Most exciting from a fisher's perspective was that these fish were exceptionally large. They averaged 20lbs in the spring but were topped by a colossal 59½ lbs spring fish landed by Miss Doreen Davey in 1923. In 1936, Robert Pashley caught 678 fish to his own rod.

Salmon catches were still improving up to the early 1970s, but then a series of disasters struck. The first of these was the salmon disease, Ulcerous Dermal Necrosis (UDN) which took its toll of these big early fish in particular. First pestilence then drought: 1976 followed the extremely dry summer, autumn and winter of 1975. With almost continuous sun from early spring, low flows enticed the entire spring run into the lower river. By mid June, high temperatures resulted in the sudden death of an estimated 10,000 fish in 24 hours.

Salmon spawning on Wye tributary.

About that time astute observers noticed that in the extreme upper tributaries such as Tarenig, Irfon, Bidno and even the upper Wye itself, there was a marked decline in the numbers of small brown trout, which had almost assumed nuisance proportions previously. This malaise covered the neighbouring upper Tywi too; in fact any catchment where significant areas of coniferous trees had been planted on acidic soils. It took many years to identify and explain fully the mechanism by which airborne acidity affected these upland waters, but the result was that by the mid 1980s, some 17% of the entire Wye catchment had been lost for salmon and trout production.

From the 1970s onward, another threat appeared: survival of salmon smolts at sea had been of the order of 20%, peaking at 40% throughout the 60s and 70s. Partly due to changing oceanographic conditions and partly due to the discovery of the sea feeding areas of the salmon, this figure now dropped to 5%. It was a bad time to develop monofilament netting and other fish-finding devices. Off the west coast of Eire the number of driftnets increased to over 1000. These nets took 31% of the Welsh salmon population, as the tagging of smolts and subsequent returns later showed.

Another 'advance' in the 1970s was the intensification of agriculture in the Welsh uplands. Thanks to generous subsidies, stocking levels of sheep in particular rose dramatically, effectively doubling twice in just 45 years. To support such numbers, sheep rearing was taking place on areas that formerly acted as buffers and sponges for rivers. Commons appeared to take the brunt of the assault but the subsidy-driven over-grazing affected all land, including river catchments and banks. Salmon, though, were by no means the only casualty of this agricultural revolution.

Other land use changes included the cessation of rotation coppicing of bank-side alders. The resultant shading from multi-stemmed trees, together with the overgrazing of banks, contrived to remove the armouring that keeps the natural width of the tributary streams. Toppling trees rip out huge areas of bank and streams have sometimes re-routed themselves as a result. A shallower, wider, watercourse with increased silt deposits equals fewer salmonids. Trout and salmon juveniles require quite specific depth and flow at various life stages, though their requirements are different.

The list of woes seems endless: commercial afforestation brings with it reduced summer flows – up to 28% for any given area, and the accompanying increased runoffs in winter add yet more silt. 1982 saw the completion of the Lugg flood alleviation scheme and fish were denied proper access to the river's biggest tributary. Touching again on water quality, acidification is not the only problem. In 1994 and again in 1995, serious spot pollution incidents at Hereford and above

Livestock contributes to riverbank erosion.

Rhaeadr resulted in serious and largely unquantifiable fish kills. In 1996 staff of the Wye Foundation found a small stream near Erwood where the entire invertebrate population, including all the white-clawed crayfish, had suddenly died. Water sampling revealed that the cause was synthetic pyrethroid sheep dip. At that time the dip was promoted as less dangerous than the organo-phosphate alternative. Its environmental impact had perhaps not been studied too closely.

Following up this incident, the Environment Agency undertook a survey of mid Wales's streams to determine the extent of sheep dip involvement. Some 98% of the streams they sampled tested positive for dips, and that level of pollution has scarcely improved to date. Details of the extent of the Wye's diffuse pollution problems would fill a small library.

The fact that there are any salmon in the Wye is testament to the enormous resilience of these animals. Efforts are being made to restore runs to at least sustainable if not former levels by dealing with the many causes described above, rather than simply relying on the unique fecundity of salmon. That much over-used word 'sustainable' has a particular relevance when describing salmon densities, for there is a point at which the population is not necessarily capable of producing enough juveniles to ensure their continued survival. The Wye salmon population is below sustainable levels. The neighbouring Usk, however, has a population that is at a level that is safer and sustainable and yet uses the same estuary and sea routes.

The Wye and Usk Foundation, with its partners, has secured a second significant tranche of European funding to tackle the central issues of habitat restoration, fish access to sections blocked with weirs and amelioration of the acidified areas. To the total 50km of tributary already restored, we plan to add another 40km. The restoration process is simple enough: we fence out stock animals and manage the trees which border the typical Wye tributary in such a way that light – crucial to the food chain – allows the re-establishment of a tough, armouring bank-side vegetation. In this way streams are permitted to naturally regain their normal width and depth, which is always deeper and narrower than a shaded or heavily grazed section.

Habitat restoration increases the *quality* and hence numbers of fish reared from a given area. Three more fish passes will be added to the fourteen already constructed increasing the *quantity* of stream available. Previously, between 1994 and 1997, 518 other barriers to fish migration were removed on upper Wye tributaries (those above Hay) alone.

Before and after fencing on a Wye tributary.

The permanent leaching of calcium ions from an already impoverished system is believed to explain the delayed recovery in the upper river following liming. To remedy this we are liming certain hydrological sources in sufficient number and distribution to cause a slow release of positive calcium ions into the affected watercourses. This has been shown to last for over a decade and a half. The habitat is often completely unspoilt in these sections.

In 2001 we bought off most of the commercial fisheries in the estuary. This comprised six drift net boats but also several putcher ranks. These, incidentally, are a method of catching salmon unique to the high tides and turbid waters of the Severn estuary. A putt or putcher is a wicker basket, which is held in a series or rank often three to five deep and fifty or more long. Funnel or trumpet shaped, it catches fish when they swim into it and get wedged in the constriction. The murky waters and high flows of the estuary ensure the effectiveness of this method. Wicker has given way to steel and aluminium.

The Foundation has lobbied successfully for catch restraint in the rod fishery. Working with its partners over the next three to five years, access will also be re-established to the two largest tributaries, the Lugg and Monnow. Slowly, by eliminating grazing animals from the watercourses themselves, siltation and other diffuse effects can be controlled. Finally, voluntary restraint and byelaws have saved more adult fish for spawning, and will contribute to this century's own story of the Wye's great salmon revival.

Our partners include:
Environment Agency Wales, The Countryside Council for Wales, Forestry Commission, University of Cardiff, Centre for Ecology and Hydrology, Brecknock and Radnor Wildlife Trusts, Anglers Conservation Association, Country Landowners Association.

Dr Stephen Marsh-Smith is Director of the Wye and Usk Foundation. Details of the Foundation are at www.wyeuskfoundation.org and our office address is office@wyeuskfoundation.org

Achub eogiaid Gwy

Am yr ail dro o fewn canrif, mae brwydr fawr i geisio achub eogiaid Afon Gwy. Ddechrau'r ugeinfed ganrif, bu'n rhaid prynu hawliau pysgota masnachol er mwyn atal gor-bysgota, ond llygredd ac esgeulustod sy'n gyfrifol y tro yma. Ers yr 1970au fe fu cyfres o drychinebau: Afiechyd yn 1975 ac yna sychder a gwres yn 1976. Effaith glaw asid ar nentydd sy'n bwydo'r afon. Roedd 31% o eogiaid Cymru'n cael eu dal ger Iwerddon. Effaith ffermio dwys a choedwigaeth ar gysgod a llif afonydd. Llygredd o ddip defaid a damweiniau diwydiannol. Rhwystrau'n cadw eogiaid o nentydd pwysig. Erbyn hyn mae Sefydliad yr Wy a'r Wysg yn adfer glannau, yn ychwanegu llwybrau pysgod, rhoi calch yn y dŵr a phrynu hawliau rhwydo a thrapio masnachol yn yr aber. Gyda genweirwyr yn ymatal, y gobaith yw fod mwy o bysgod llawn-dwf ar gael i ddodwy ac y bydd eogiaid Afon Gwy yn cael eu hachub yn y ganrif hon eto.

Tiger moths – *records needed!*

Ruby tiger moth. Photo: Keith Dover.

There are five species of tiger moths in Wales. Sadly, their bright colours and their once familiar 'woolly bear' caterpillars are no longer a common sight in gardens and the countryside. So if you see one of these large, handsome moths, your record will make a difference. They may even spur you into recording other large moths, and help to get the proposed national macro-moth recording scheme off to a flying start, as ***Russel Hobson*** *explains.*

Over the last decade there has been a surge of interest in moth recording in Wales. The need for distribution information for Local Biodiversity Action Plans, the funding available through the Species Challenge Fund and the formation of moth recording groups, have all contributed to increasing the opportunities, advice and support available to fledgling 'moth-ers' and more established recorders alike.

One highly recognisable group of macro-moths – the tiger moths – is a good place for beginners to start because either the distinctive adults or the caterpillars can be found during the day. For instance, the garden tiger has a long folk history; its caterpillars, now commonly called 'woolly bears', were first mentioned in English in the 16th century as 'walbode'. In Welsh the caterpillars are referred to as *siani flewog* (furry Jenny) and possibly the oldest adult name is *torgoch yr ardd* (garden redbelly), a very apt description. The garden tiger is also one of the few 'common' moth species whose abundance has recently been studied - but more about this later.

Tiger moths in Wales

Not every tiger moth species is found throughout Wales. Hopefully the following descriptions and photographs will help you locate and identify the tiger moths you see. Please send any records of tiger or other moths to your county recorder (contact details from Butterfly Conservation's Wales Office). They should be able to provide advice and further help with identification.

Ruby tiger

Widespread and locally common in a range of open habitats.

The ruby tiger is smaller than and not as highly patterned as the other species of tiger moth, but as the name suggests it is a deep ruby colour on the hind wings and body. It has two broods, adults flying from mid-April to June and mid-July to early September. First brood adults are occasionally seen flying during the day.

The caterpillars occur May to July and August to April feeding on a variety of plants including ragwort, plantains, heathers and broom. The second brood overwinter when fully grown and can be found on spring days basking in the sunshine.

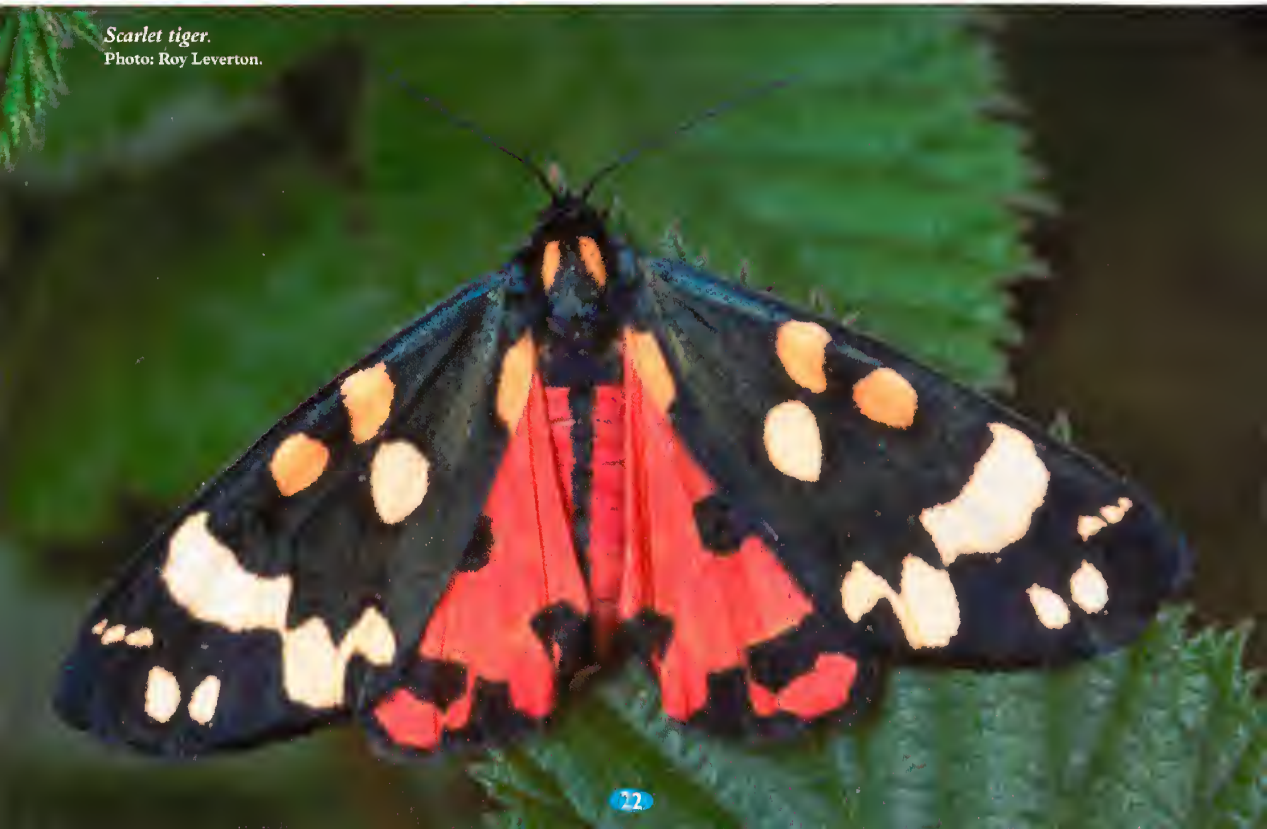
Scarlet tiger

Widespread but local in south and west Wales, forming discrete colonies along damp river valleys and on marshy grassland in the uplands.

It is single brooded, flying during the day and at night in June and July, the males patrolling widely in the late afternoon and early evening. For example, in June I observed adults flying back and forth from a solitary willow bush in late afternoon sunshine on the Sennybridge ranges in Brecknockshire.

The caterpillars can be found from August to May. They feed openly on sunny days on plants such as bramble, hemp-agrimony, comfrey and meadowsweet.

The advantage of being colonial is that local predators 'learn' just how distasteful this moth is. While in years of abundance the scarlet tiger can disperse widely to form temporary colonies, elsewhere it does not seem able to re-colonise former sites for long. Under laboratory conditions females prefer males of a different genotype to their own; a useful adaptation for a colonial species that helps prevent inbreeding.



Scarlet tiger.
Photo: Roy Leverton.

Cream-spot tiger larva. Photo: Jeroen Voogd.

Cream-spot tiger

Mainly found in south Wales and primarily a coastal species associated with woodland, cliffs, dunes, the edges of saltmarsh and road verges. It is single brooded, flying from late May to early July and the adults can be seen on plants during the day, or even walking across bare ground. The caterpillars feed on a wide variety of plants from July to early May. Over the winter they can be found feeding in mild weather and basking on sunny days. The caterpillars pupate in a flimsy cocoon amongst leaf litter.

Photo: Roy Leverton.

Cream-spot tiger.

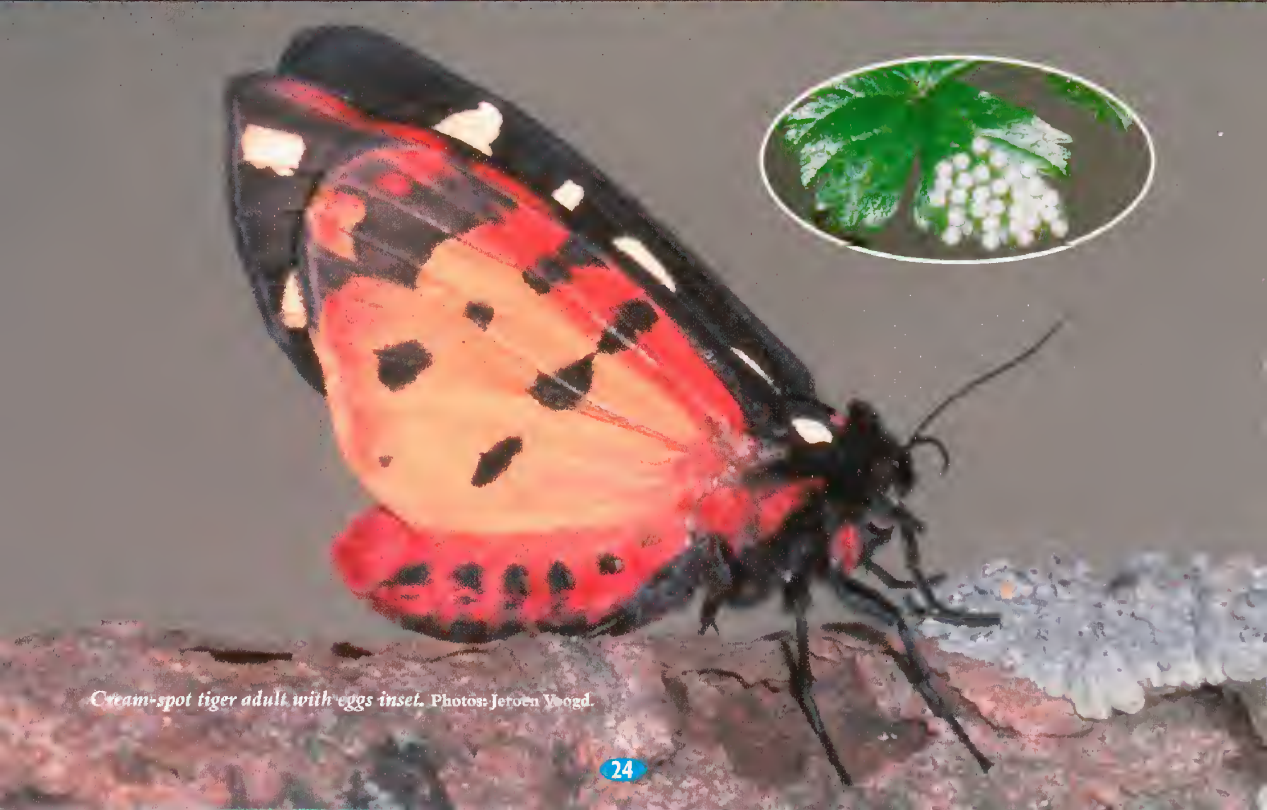
Garden tiger

A widespread and common species of open habitats, though in Wales it is particularly associated with wetlands and the coast. For example, the caterpillars are relatively easy to find on the dune grasslands around the Gower. It is single brooded, flying during July and August. Unfortunately the adults only fly late at night, but the conspicuous caterpillars can be found between September and June feeding on a wide variety of plants including nettle and dock.

All tiger moth caterpillars and other members of the same family, such as the ermine moths, obtain alkaloid poisons from their foodplants. These, together with their hairy bodies, make them unpalatable to most birds. Likewise, the colours and patterns of the adult moths serve as a warning that they are distasteful. However, the garden tiger is not as poisonous as its flashing scarlet hind wings might suggest. The appearance of tiger moths serves another function. At a distance it acts as camouflage by disrupting the outline of the moth.

Garden tiger moths have been observed to mate for many hours. This 'mate guarding' by the male occupies the female until she is no longer attractive to other males (perhaps until her pheromone attractants have evaporated) and/or her eggs are matured and she is ready to lay. As the name suggests, this species has long been associated with gardens. Gardeners can help the moths by leaving areas of rough ground with nettles, docks and other 'weeds', particularly over winter, to protect the hibernating 'woolly bears'.

Garden tiger adult with larva inset. Photos: Shane [illegible]



Cream-spot tiger adult with eggs inset. Photos: Jeroen Voogd.

Wood tiger

A widespread but very local species which is largely absent from south-west Wales. It favours moorland, heathland, scrubby places and open woodland. Like the scarlet tiger, heavy grazing is the main threat to its colonies.

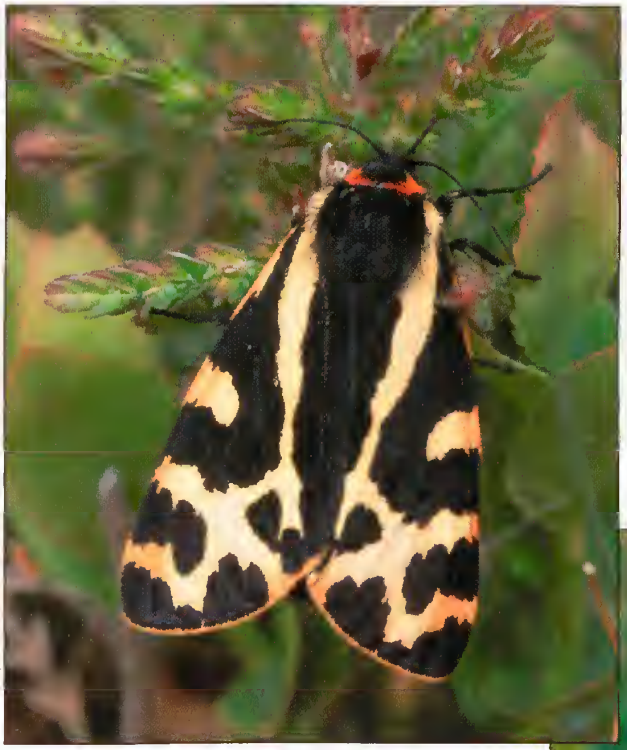


Photo: Roy Leverton.

Wood tiger.

It is single brooded, flying from late May to July. During the late afternoon and early evening on hot days, the males fly rapidly and erratically searching for the more sluggish females. In the uplands this species occupies similar habitat to the small pearl-bordered fritillary. Colonies of both the moth and butterfly were found in 2001 in sedge-dominated marshy areas within Clocaenog Forest in north-east Wales.

From July to early May the caterpillars feed on a range of herbaceous plants including bell heather and ribwort plantain. The half grown caterpillars overwinter low down in the vegetation. They pupate in a cocoon spun amongst plant stems.

Tigers and cuckoos

Recently, work has begun to analyse trends from the thirty years of moth data gathered at the network of Rothamsted Moth Traps situated throughout the UK. The garden tiger was shown to have declined in abundance by 44% over this period and to have been lost from 42% of the trapping locations. As the 'woolly bears' are not fussy eaters, researchers looked for another explanation. They now believe that warmer, wetter winters and springs are the problem. These conditions are perfect for deadly fungal growths to develop on the caterpillars as they hibernate in loose cocoons amongst leaf litter. Even the most conservative climate change predictions are likely to result in further declines. Puzzlingly the moths' strongholds tend to be at wetter coastal sites in the UK, and in Wales the most abundant sites for garden tiger have shifted from the south-west to north-west in the last twenty years.

Photo: Gianpiero Ferrari.

Wood tiger larva.

The decline in the abundance of the garden tiger has knock-on effects. Hairy caterpillars, including garden tigers, are a favourite food of adult cuckoos. Along with declines in other moths this may be contributing to the 15% decline in cuckoo numbers between 1994 and 1998 recorded by the BTO's Breeding Bird Survey.

Photo: Shane Farrell.

Garden tiger larva.

Towards a UK macro-moth recording scheme

We know a little about the garden tiger, but what about the other tiger moths or the rest of the 900 macro-moths found in Britain and Ireland? Not only are moths fascinating creatures in their own right but they are important pollinators as well as food for birds, bats and a range of other animals. The garden tiger research shows why we need a much better system to gather, collate and analyse moth records at a national level. Butterfly Conservation and partner organisations across the UK, including RSPB, the British Entomology and Natural History Society and the Countryside Council for Wales, have embarked on a full planning phase (supported by the Heritage Lottery Fund and English Nature) as a first step to towards the establishment of a national recording scheme for macro-moths.

The three key aims of the planning phase are:

- to consult fully with moth-ers, county recorders, BC Branches, local moth groups and national organisations
- to develop the rationale, methodology, mechanisms and outputs of the proposed new scheme
- to develop bids for long-term funding to enable implementation

A questionnaire has been produced so that moth recorders can contribute their views easily and a consultation day was held at the Environment Centre in Swansea on 6th December. If you missed the consultation day please still contribute your views. Full details and an on-line version of the questionnaire can be found on www.mothrecording.org.uk or a paper copy can be obtained by contacting Butterfly Conservation's Wales Office.

Russel Hobson is Butterfly Conservation's Conservation Officer for Wales – email rhobson.bcw@btconnect.com Telephone 01792 642972.

Acknowledgements

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Cyfri'r gwyfynod

Gyda diddordeb cynyddol mewn cofnodi gwyfynod yng Nghymru, un o'r rhywogaethau gorau i ddechreuwyr yw'r gwyfynod teigr. Mae pum math cymharol gyffredin yng Nghymru neu rannau ohoni ond gwyfyn teigr yr ardd yw un o'r ychydig rai sydd wedi'u cyfri'n fanwl. Yr hen enw arno yw torgoch yr ardd a'i lindys yw'r siani flewog. Mae gwaith ymchwil diweddar trwy'r DU yn dangos ei fod wedi lleihau o 44% dros 30 mlynedd ac wedi diflannu o 42% o'r mannau cyfri'. Efallai mai gaeafau a gwanwynau twymach a gwlypach yw'r broblem ac efallai fod y dirywiad yn cyfrannu at ostyngiad o 15% yn niferoedd y gwcw rhwng 1994 ac 1998 – y siani flewog yw un o'i hoff fwydydd. Mae'r ymchwil ar dorgoch yr ardd yn dangos fod angen system llawer gwell i gasglu gwybodaeth am wyfynod yn gyffredinol – mae nifer o gyrff yn cynllunio hynny, gyda'r bwriad o gael arian i weithredu.

The *North West Wales Moth Report 2001* is now available, giving detailed accounts of moth recordings. Copies are available for a suggested donation of £4 from John Harold, Hen Ardd, Carreg y Garth, Rhiwlas, Gwynedd LL57 4HD Tel: 01248 361126

Lampreiod *afon Ddyfrdwy*

Lamprai'r afon/river lamprey Lampetra fluviatilis. Ffoto: Mike Hammett.

Ni fyddai'r rhan fwyaf ohonom yn gwirioni o gael ein galw'n ddi-asgwrn-cefn, ond yn achos y lamprai, mae hyn yn gwbl wir! Dyma erthygl gan ***Rhys Williams*** *yn sôn am fywyd y lamprai yn afon Ddyfrdwy.*

Ffoto: Mark Potter.

Ceg geugrom a rhesi o ddannedd miniog. Sucker mouth with rows of sharp teeth.

Cafodd afon Ddyfrdwy a nifer o'i hisafonydd eu dynodi fel safle o Ddiddordeb Gwyddonol Arbennig a hefyd fel Ardal Cadwraeth Arbennig yn ddiweddar, ac un o'r prif resymau am hyn yw'r pysgod sydd yn yr afon.

Mae pawb yn ymwybodol o bwysigrwydd yr eog *Salmo salar*, y pysgodyn sy'n nofio miloedd o filltiroedd i'w fannau bwydo ger Yr Ynys Las ac yna'n dychwelyd gan neidio rhaeadrau i gyrraedd yn ôl i'r union nant lle cafodd ei eni er mwyn bwrw ei rawn. Oherwydd ei fod yn ymgymryd â'r siwrnai yma mae'r eog yn aml iawn yn cael ei adnabod fel 'Brenin y Pysgod'. Ond am fod y rhan fwyaf ohonom yn eitha' cyfarwydd â'r eog 'rwyf am ganolbwyntio ar rai o'r pysgod llai adnabyddus, sef y lampreiod.

Dim ond yn y blynyddoedd diweddar y rhoddwyd sylw cadwraethol i'r lampreiod er eu bod yn bysgod arbennig iawn. Yn hanesyddol roedd y lamprai yn fwyd poblogaidd iawn ac yn cael ei ystyried yn well dewis i'w fwyta na'r eog. Yn wir, ceir hanes bod brenin Lloegr yn 1135, Harri'r 1af, wrth ei fodd yn bwyta lampreiod ac wedi marw oherwydd iddo fwyta gormod ohonynt.

Mae lampreiod yn bysgod cwbl wahanol i unrhyw bysgod eraill yn afonydd Prydain. Mae tri math o lampreiod yn afonydd Cymru, lamprai'r nant *Lampetra planeri*, lamprai'r afon *Lampetra fluviatilis*, a lamprai'r môr, *Petromyzon marinus*, ac mae'r tri i'w cael yn afon Ddyfrdwy.

O ran siâp mae'r tair lamprai yn debyg i lyswennod, ond dyna'r unig debygrwydd. Mae'r lampreiod ymysg y mwyaf cyntefig o'r holl bysgod ac nid oes ganddynt ên. Yn lle hynny mae ganddynt geg geugrom. Yn syml, mae'r geg yn sugnydd crwn sy'n cynnwys rhesi o ddannedd miniog. Mae ganddynt sgerbwd wedi ei wneud o gartilag yn lle asgwrn ac mae'r tagellau yn agor trwy saith twll ar y naill ochr i'r pen.

Ar ôl deor o'r wyau mae'r lampreiod ifanc, neu'r amosetau fel y'i gelwir, yn cael dechrau digon digynnwrf i'w bywydau gan fyw am ryw bump neu chwech o flynyddoedd wedi eu claddu yn y llaid ar wely'r afon. Am y blynyddoedd yma mae'r amosetau'n ddall ac nid yw eu ceg ddisgaidd wedi datblygu'n iawn, ac felly maent yn bwyta deunydd organig yn y llaid. Mae'n debygol bod yr amosetau yn nofio o un gwely llaid i'r llall i chwilio am gyflenwad newydd o fwyd fel bo'r angen. Un o'r ffyrdd mwyaf effeithiol o samplo am

Ffoto: Mark Potter.

Mesur a chyfri amosetau. Measuring and counting ammocetes.

lampreiod yw electro-bysgota ardaloedd o'r afon lle ceir llawer o laid a lle mae llif y dŵr yn araf. Mae gweld yr amosetau yn cael eu denu allan o'r llaid at yr anod yn olygfa ryfeddol, ac ar ôl eu dal mae'n bosibl eu mesur a phennu pa rywogaeth ydynt.

Ffoto: CCGC.

Lamprai'r afon fel oedolyn. Adult river lamprey.

Ar ôl rhyw bump neu chwech o flynyddoedd o fyw yn y llaid mae'r amosetau yn troi'n oedolion ac yn gadael y mannau meithrin. Mae lampreiod y nant yn aros yn y nentydd a'r afonydd ac nid ydynt yn bwyta o gwbl fel oedolion, tra mae lamprai'r môr a lamprai'r afon yn mudo i lawr i aber yr afon a'r môr lle maent yn bwydo'n barasitig ar bysgod eraill fel yr eog a brithyll y môr. Cyfeiria pysgotwyr afon Ddyfrdwy at ddal eog ambell waith sydd â briw crwn ar ei ochr lle mae lamprai wedi cydio ynddo. Ceir hefyd hanesion am lamprai yn cydio yng nghoesau'r pysgotwyr eu hunain tra byddant yn sefyll yn yr afon yn pysgota! Mi fuaswn i'n tybio bod y pysgotwyr yn cael tipyn o fraw gan fod lamprai'r môr yn gallu bod hyd at dair troedfedd o hyd a chyn dewed â braich oedolyn.

Ffoto: David Hatcher.

Y Ddyfrdwy ger Llangollen. The Dee near Llangollen.

Yn oedolion, mae lamprai'r nant yn tyfu hyd at 25cm o hyd, lamprai'r afon hyd at rhwng 17 a 50cm, a lamprai'r môr rhwng 45cm ac 1m. Mae gan y tri math o lampreiod ddwy asgell ar eu cefn ond nid oes ganddynt

Safle bridio i lampreiod ar yr afon Ceiriog. Lamprey breeding area on the river Ceiriog. Ffoto: David Hatcher.

Ffoto: Mark Potter.

Lampreiod o'r trap pysgod yng Nghaer.
Lampreys from the fish trap in Chester.

Ffoto: Mark Potter.

Asiantaeth yr Amgylchedd yn electro bysgota.
Environment Agency staff electrofishing.

gennau ar eu croen. Mae lamprai'r môr yn llwydwyrdd efo smotiau tywyllach tra bo'r ddwy lamprai arall yn fwy golau eu lliw.

Ar ôl bwydo yn y môr a'r aber mae lamprai'r môr a lamprai'r afon yn dychwelyd yn ôl i'r afon ar gyfer bridio. Ar afon Ddyfrdwy yng Nghaer mae gan Asiantaeth yr Amgylchedd drap pysgod ac mae nifer o lampreiod yr afon a'r môr yn cael eu dal yno. Mae'r lampreiod môr yn nofio drwy'r trap yn ystod misoedd Mai a Mehefin tra bo lampreiod yr afon yn cael eu dal ar ddau brif gyfnod sef yn gynnar yn y gwanwyn, mis Mawrth ac Ebrill, ac wedyn yn hwyr yn yr haf, mis Awst, Medi a Hydref.

Mae'r lamprai yn bridio ac yn dodwy ei hwyau mewn rhannau caregog neu raeanog o'r afon lle mae'r dŵr yn llifo'n gyflym, fel arfer yn ystod misoedd Mai a Mehefin. Maent yn adeiladu nyth gron o gerrig gan symud y cerrig o gwmpas efo'u 'cegau'. Yn aml iawn ceir nifer fawr o lampreiod yn defnyddio'r un nyth ac mae eu gweld yno yn nofio dros ei gilydd yn wyllt yn atgoffa rhywun o loddest Rhufeinig. Ar ôl dodwy'r wyau mae'r oedolion i gyd yn marw.

Mae nifer o ffactorau wedi effeithio ar y lamprai yn ystod y ganrif ddiwethaf gan achosi i'w niferoedd leihau

yn sylweddol. Mae'r rhain yn ffactorau sy'n effeithio ar bob afon sy'n cynnwys lampreiod, nid yn unig afon Ddyfrdwy. Mae llygredd, yn enwedig digwyddiad mawr fel y llygredd yn ardal Bangor-Is-Coed yn y flwyddyn 2000, yn gallu lladd amosetau ac oedolion. Mae ansawdd arferol y dŵr hefyd yn bwysig, yn enwedig lefel yr ocsigen yn y dŵr. Mae lefel y llaid yn y dŵr hefyd yn ffactor gan fod y llaid yn gallu setlo dros yr wyau tra maent yn y graean, gan eu mygu. Mae rhaeadrau ac argaeau hefyd yn gallu bod yn broblem gan eu bod yn rhwystro'r lamprai rhag cyrraedd yn ôl i'w mannau bridio, ond mae astudiaethau wedi dangos bod y lamprai yn gallu nofio dros yr argae sydd ar afon Ddyfrdwy yn Erbistock.

I fod yn onest, mae llawer iawn na wyddom am y lamprai ac mi gymer flynyddoedd o astudio i ddod i adnabod y pysgod yn iawn. Ond pwy a ŵyr, efallai yn y dyfodol, os gwnawn reoli'r afon, defnydd tir a datblygiadau yn y dalgylch yn gall, y gwelwn niferoedd y lampreiod yn cynyddu i'r graddau na fyddant mwyach yn bysgod prin. Efallai, hyd yn oed, y gwelwn y dydd pan fydd pobl eto yn eu bwyta fel y gwnaeth y Brenin Harri, ond gobeithio na fyddant yn marw drwy fwyta gormod!

Mae **Rhys Williams** yn Uwch Swyddog Cadwraeth gyda Cyngor Cefn Gwlad Cymru. Yn ystod y blynyddoedd diwethaf mae wedi bod yn gweithio ar yr afonydd Gwy, Wysg, Teifi, Tywi ac yn fwyaf diweddar yr Afon Dyfrdwy.

Ffoto: David Hatcher.

Safle bridio lamprai'r môr ger Bangor-is-y-coed.
Sea lamprey breeding site at Bangor on Dee.

Ffoto: David Hatcher.

Y Ddyfrdwy ger Corwen. Dee near Corwen.

Ffoto: Mark Potter.

Ceg gegrom a thyllau fel tagellau.
Sucker mouth and hole-like gills.

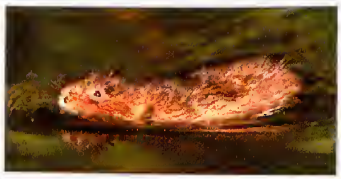
The lampreys of the river Dee

Lampreys are primitive fish with mouths like round suckers with teeth and seven holes on both sides of the head serving as gills. Three types are found in the river Dee, a contributing factor to its special conservation status. They start life in the mud on the river bed and develop into adults after 5 or 6 years. As adults, brook lampreys do not feed, but river and sea lampreys migrate to the estuary where they parasitise other fish, and occasionally fishermen's legs! – a frightening experience, as sea lampreys can grow up to 1m long. Lampreys have declined in numbers in the last century, not just in the Dee. Pollution, low oxygen levels and too much mud are all contributing factors. With the right management, they may increase to their former levels.

The hills are alive with ... water voles

Upland water vole latrine. Photo: Kate Williamson.

'Ratty' in Wind in the Willows *is an enchanting small furry mammal, which you are lucky to see these days in the waterways of Wales. All is not lost; indeed, water voles may be as much at home in small upland streams as in lowland rivers, provided that the habitat is right and fearsome predators like mink are absent, as* **Kate Williamson** *and* **Chris Hall** *explain.*



I remember my early childhood in industrial Tyneside where the city centre canals lurked behind decaying factories like ribbons of oily treacle. The canals remained as the city modernised but many became criss-crossed with new roads and flyovers and evolved into forgotten strips of urban wilderness, hidden from the car-borne population and frequented only by the occasional adventurous dog walker.

It was beneath these bridges that I heard the distinctive 'plop' of a diving water vole, *Arvicola terrestris*, for the first time, the sound greatly accentuated in the echoey stillness as it reverberated between concrete and filthy water. Water rats, they were called, a reflection on both the ignorance of the people and the ubiquitous nature of the animal.

Later, in rural Warwickshire, with cleaner but fairly slow moving rushy rivers, I came across the water vole again. By now my approach was different and rather than delighting in the 'plops' of diving voles as I spread panic along the tow-path, I preferred to sit, watch and wait. With this approach the first sign that a vole was present was usually the sound of munching. It could take some time to locate the source of the sound but once discovered you always wondered how you had managed to miss this guinea pig sized animal in the first place. They were usually sitting quite openly on a raft of floating vegetation anchored to a reed bed or the base of a bridge, nibbling away noisily on the stem of a water plant.

Now, in Snowdonia National Park, the situation has changed dramatically. The childhood tactic of running screaming along the banks of lowland rivers and ditches will produce only the panicked bleating of sheep. The sit, watch and wait approach will only produce the munching sounds of those same sheep. Many of the older generation of landowners here remember when their ponds, rivers and ditches were alive with Ratty's relations, especially during the April to October breeding season, but not any more.

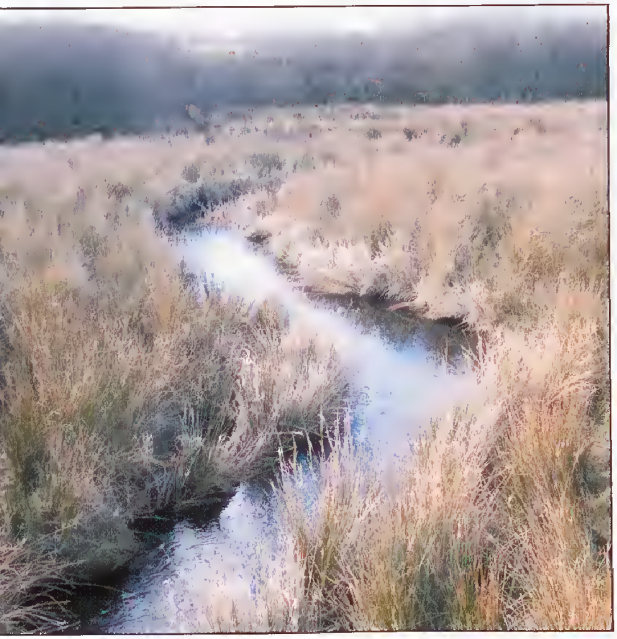


Photo: Kate Williamson.

Water voles inhabit this upland stream at Trawsfynydd.

Many colonies of voles have been subject to local extinction. This leads to the fragmentation and isolation of the remaining vole colonies, increasing their vulnerability to sudden events, decreasing genetic migration and generally exacerbating the risk of future local extinctions. The main factors contributing to the problem in Eryri (Snowdonia) have been habitat loss and land use changes, largely brought about by agricultural intensification. Increased stocking rates have led to trampling and poaching of water courses; the drainage of wetlands and minor water courses and the overgrazing of the riparian zone have all reduced available vole habitat. With this sustained habitat pressure the water vole has been particularly susceptible to the invasion of the feral American mink, (*Mustela vison*). This has been the 'last straw' for numerous vole colonies previously hanging on in the remaining sub-optimal areas. The expansion of mink populations has been mirrored in many areas by the retraction in water vole distribution.

However, in some upland areas water voles can still be seen and heard. Their preference seems to be for narrow, peaty streams with deeply undercut banks that conceal them from the numerous predators that see them as a tasty snack. In these situations the first indication that a vole is present are the ripples coming from below the under-cut bank as the animal swims from its burrow. Holes connect its concealed water-ways with the top of the bank where it needs to go to feed as nothing will grow in the darkness below. Bright, beady eyes and a blunt, whiskery face appear above ground, nervously sniffing for danger. Once confident that it is going out for dinner rather than to be dinner, the vole emerges. Colour varies from a rufous brown, similar to a bank vole, to almost black in some areas and the tail is slightly furry, unlike that of the rat which is virtually hairless. And then you hear the familiar munching. Upland voles need to do a lot of munching as their diet is less varied and nutritious, hence quantity has to make up for quality.

In the past few months, usually whilst traipsing around the uplands of Eryri doing other fieldwork, we have been finding signs of water voles at several sites around the Dwyryd floodplain. Some of these are sites where signs of water voles were recorded in a survey in 1999, and others are 'new' discoveries. Have they always been there and we are just noticing them more now that they are becoming a rarer encounter? Could these be the remnant colonies from a previously much larger metapopulation network that was spread throughout the catchment? It is even possible that these fragmented groups are refugees from the lowlands, where habitat pressure has been severe and mink have been reported for several years. We decided to look a bit closer at the historic nature of our area to see if we could unravel the mystery.

A great deal of information is known about the history and the ecology of the Dwyryd floodplain, nestling between Maentwrog and where the mountains meet the sea at the coast by Penrhyndeudraeth. In the nicest possible way, it has been referred to as the 'armpit' of Wales, situated as it is beneath the Llŷn peninsula. Perhaps the main reason for the concentration of knowledge is the presence of Plas Tan y Bwlch, majestically overlooking the valley. This building, once the home of the Oakley family, previous owners of the surrounding land, is now the Snowdonia National Park Study Centre. As such, a steady stream of top UK ecologists and naturalists pass through the area to teach on the variety of professional courses offered at the Plas, or to make the most of the superb setting for conferences. The fieldwork from these events yields an almost continuous flow of data. For this reason, we took the Dwyryd floodplain as our focus area, although we believe the situation to be almost identical on the nearby Glaslyn.

Photo: Kate Williamson.

A fenced out ditch on the Dwyryd floodplain.

If we go back approximately 200 years, both floodplains were primarily saltmarsh, being totally submerged twice a day by the tide. This was obviously totally unsuitable habitat for water voles. During the late 1700s, the Dwyryd flood embankments were constructed and large areas of the floodplain were reclaimed for agriculture. This newly reclaimed area on the Dwyryd is completely surrounded by the uplands.

A similar story can be told regarding the Glaslyn. In 1808, the Porthmadog Cob was completed, linking Minffordd with Porthmadog. This led to a large area of reclaimed land behind the Cob on the Glaslyn floodplain. Large floodgates at the Porthmadog end allow water to flow out to sea but keep out the saltwater by closing automatically with the incoming tide.

In both cases the reclamation and flood defence work created a whole network of ditches which, with the correct management, can provide ideal water vole habitat. Using relatively recent survey data and anecdotal evidence, we can build up a picture of water vole distribution in this area. The species seems to have been widespread and numerous but to have undergone a drastic decline in the last few decades to a point where they have now largely disappeared.

We started asking ourselves where the voles present in this lowland habitat could have come from, seeing as they must have colonised sometime over the last 200 years. There are only three possible explanations. Could they have spread along the coast? This is unlikely. All the water vole literature says that they are not to be found in saline conditions, although we have found them in brackish ditches. Could they have spread down-stream, along the Dwyryd itself? Upstream from the floodplain, the main river has a rocky substrate, very unsuitable for a burrowing, riparian mammal. The river is also very fast flowing. After all, it does drain the Blaenau Ffestiniog area – one of the highest rainfall areas in Wales! All in all the river presents a vole-unfriendly picture much further upstream than Maentwrog.

Disregarding the first two routes as improbable, we are left with only one option. At about the same time as the reclamation work, most of the local woodlands on the sides of the Dwyryd valley were clear-felled for use in shipbuilding. This created the potential for rapid regeneration of the herbaceous vegetation and the opening of viable commuting corridors for the water voles between the uplands and the newly enhanced lowland habitat.

If we look at maps of the area we can see potential linkages with all the upland colonies that we know about and the Dwyryd floodplain. There are also several other upland sites that seem to offer suitable habitat. In July 2002 we had a fairly comprehensive survey of the whole floodplain conducted, which found that the Afon Cae Fali contained the only remaining population of any significance. This river, at the Penrhyndeudraeth end of the area, is managed under Environment Agency Wales' work programme, and is fenced out and annually cleared. Following the river upstream leads to Rhyd, a small village above Penrhyndeudraeth. There is a strong extant population of voles up in this area on a site containing small, slow-flowing watercourses within a large area of *Juncus*-dominated wetland. Rhyd sits halfway between the Dwyryd and the Glaslyn valleys.

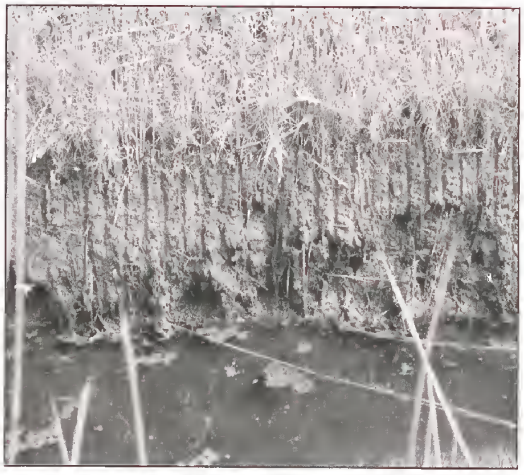


Photo: Kate Williamson.

Inappropriate ditching work is fatal for water voles.

Following a similar small stream up from its confluence with the Dwyryd below Plas Tan y Bwlch leads us to a series of upland lakes, sitting within conifer plantation and lowland heath. A good population of water voles is known from at least one of these lakes and although others have not been surveyed, the habitat looks very promising. Land at these sites is managed by a forestry company which is very sympathetic to biodiversity and conservation issues. Narrow, peaty streams link some of these lakes and areas of *Molinia/Juncus* wetland in a diverse network of habitats. There is little or no grazing, thus poaching and trampling do not present problems and the voles have a very 3-dimensional habitat at their disposal.

A similar pattern is found when tracing other streams and inflows back upstream from the Dwyryd main river, including good vole sites up at Trawsfynydd. The Dwyryd Otter Partnership has been monitoring otter populations on the Dwyryd catchment since 2000 and analysing the spraints. As part of this long-term study, otter spraints have been recorded with water vole remains in them from several sites, especially the Afon Glyn, Trawsfynydd. A rather unfortunate method of recording water vole distribution!

Although many of these isolated upland populations still seem to be hanging on, we have seen that the Dwyryd itself is now largely devoid of voles. It is thought that most of the floodplain has been minked out, a situation that has been exacerbated by inappropriate management of the watercourses and the riparian zone in many cases. Unfortunately the vertical teeth marks of a digger bucket and bisected, exposed burrows have been too regular a sight on some of the ditches in the area. Careful use of a 'bradshaw bucket' enables ditch maintenance to be carried out without bank profiling. Lengths of ditch done in rotation, one bank at a time, at appropriate times of the year can all minimise the disturbance to vole colonies. Training and awareness-raising amongst landowners and machine operators has improved the situation although over-zealous activities still occur. It must be remembered that no maintenance at all can also be a problem, allowing scrubbing over and the loss of open water.

So what are we doing about these problems? Well, a draft water vole conservation and mink control strategy has been prepared for north-west Wales by a focus group from the North West Wales Riparian Mammal Group. The area covered by the strategy closely resembles one of the UK priority areas for water voles as identified by the UK Steering Group. We are currently waiting for a national Wales strategy to be completed, ensuring that we are all pulling in the same direction. The main focus in north-west Wales is habitat

enhancement work and controlled bouts of mink trapping where required. Habitat works have been completed this spring in Snowdonia National Park (on the Dwyryd), in Gwynedd (on the Glaslyn) and on Anglesey. On the Dwyryd this work involved re-opening and clearing out ditches, riparian fencing and creating junction pools to allow for standing water over the summer.

A month-long mink control project was carried out on the Dwyryd in March 2003, according to UK Steering Group guidelines, by a licensed trapper and the local angling club. It was hoped to try and discover whether mink were still present in the area. Anecdotal evidence suggested they had disappeared since an earlier trapping bout in 2001/2002. No animals were caught, although recent research suggests that this may not necessarily be because they are not present. It was also intended to give the remaining voles a 'breathing space' at the start of the breeding season this year, to expand into the areas of newly created habitat. The floodplain will be resurveyed this year and on an annual basis, to monitor the species and the effectiveness of the conservation measures implemented.

It is possible that the remaining populations on the Dwyryd are already too small and fragmented to survive and expand. With this in mind we return to our thinking on the original, historical colonisation of the area. Can the surrounding upland populations perhaps provide a source for future recolonisation as we suggest they may already have done in the past? Let us look again at the potential linkages that were available historically. Are these still open? In general the answer is no. Power stations, nuclear or otherwise, provide fairly efficient barriers to water vole dispersal, e.g. Trawsfynydd nuclear power station. Other problems include coniferisation, increased grazing levels and hydro-electric schemes.

The outlook is not all doom and gloom. For example, the Afon Cae Fali is currently heavily coniferised between the Dwyryd and Rhyd. However, due to an initiative with the land managers to provide commuting routes for lesser horseshoe bats, the conifers are going to be cleared from the riparian zone and natural vegetation allowed to regenerate. This will re-open the potential links between our best vole site on the Dwyryd and viable populations at Rhyd, which also has links to sites down on the Glaslyn. This is a good example of a habitat approach to conservation which has multi-species benefits.

Photo: Kate Williamson.

Trawsfynydd power station is an example of a barrier to water vole dispersal.

So where does all this bring us? We suggest it is most likely in our focus area that water voles have always been an upland species and that the present lowland populations originated from the surrounding uplands. It is an indisputable fact that this lowland population is rapidly disappearing and has been for the past couple of decades at the least. There is considerable habitat enhancement and re-instatement work to be tackled in this areas, as well as the problem of feral mink. This is beginning to be addressed now through targeted projects and Tir Gofal. The remaining upland colonies could again be important as a source for future recolonisation of these enhanced lowland habitats. However, the potential commuting routes are now largely unsuitable to allow this. We need more survey and monitoring effort in the uplands to elucidate the size and viability of the colonies. Have the mink arrived

Photo: Jean Matthews.

here yet? We need to look not only at habitat enhancement in the 'classic' lowlands but also to protect our upland sinks and reinstate dispersal corridors between the two.

A great deal of research has been carried out in the past 10 years into water vole and mink ecology and several different approaches are now being piloted in the field. However, there is still a lot we do not know and continued research is needed. Having said this, it is imperative that we implement active conservation measures on the ground now in a strategic manner, looking at past, present and future distributions.

Kate Williamson is the Biodiversity Co-ordinator for the Snowdonia National Park, with a particular interest in mammals. **Chris Hall** works for an environmental consultancy and has a special interest in mammal conservation.

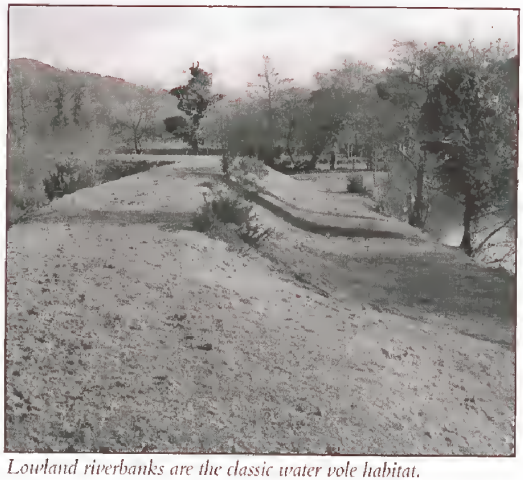


Photo: Kate Williamson.

Lowland riverbanks are the classic water vole habitat.

Y llygod yn dianc i'r bryniau

Dyw tacteg plentyn o ddychryn llygod dŵr o'u tyllau ddim yn gweithio bellach, fwy na thacteg y naturiaethwr o aros am eu sŵn yn cnoi. Creadur a fu unwaith yn gyffredin yw'r mamal sydd bellach mewn mwya' o beryg yng ngwledydd Prydain. Mae'r sefyllfa yng Nghymru'n arbennig o ddifrifol ac, mae'n debyg, yn mynd o ddrwg i waeth. Collwyd sawl poblogaeth leol o lygod dŵr, gan fylchu ac ynysu'r gweddill – yn Eryri, y brif broblem yw colli cynefin a newid defnydd tir. Yr hoelen ola' i lawer oedd bygythiad y minc.

Fodd bynnag, mae llygod dŵr o hyd ar dir uchel, yn arbennig mewn nentydd cul, mawnoglyd gyda cheulannau i gynnig cuddfan. Ar ôl gweld eu hôl yn nalgylch afon Dwyryd, a chyda'r wybodaeth fanwl sydd ym Mhlas Tan y Bwlch gerllaw, dyma benderfynu ymchwilio ymhellach. Codi morgloddiau ar afonydd Dwyryd a Glaslyn, a grëodd amodau perffaith i lygod dŵr fudo o'r ucheldir, cyn diflannu bron yn ystod y degawdau diwetha'.

Os yw'r minc a gwaith draenio wedi gwastrodi llygod y Ddwyryd ei hun, mae rhai'n goroesi mewn nentydd a llynnoedd uwchlaw. Bellach paratowyd strategaeth i warchod llygod dŵr a rheoli minc yn y Gogledd-orllewin ac mae disgwyl strategaeth genedlaethol. Y prif waith yw dal minc a gwella cynefinoedd – agor ffosydd, ffensio afonydd a chreu pyllau llonydd lle mae dyfrffyrdd yn cwrdd. Efallai bod modd ailadrodd stori'r gorffennol a chael llygod o'r ucheldir i ailfeddiannu'r ardal. Ond mae angen rhagor o ymchwil a sicrhau fod llwybrau mudo ar gael.

The fungi of Welsh sand dunes

Morels can be numerous in dune grasslands.

All photos: Peter Rhind.

In a state of continuous change through the forces of wind and sea, sand dunes are one of our most dynamic and natural habitats. We are blessed in Wales with as rich a sand dune heritage as any country in Europe. Their wildlife includes many specially adapted plants and animals, pioneers of this ever-changing and challenging world of sand. ***Peter Rhind*** *and* ***James Robertson*** *describe one of the lesser-known components of sand dune wildlife, the fungi.*

Coastal dunes provide a remarkably rich and varied habitat for fungi, one of their most important habitats in Britain and a refuge for many rare species. Through their role in decomposition and the mycorrhizal associations they form with higher plants, they play a crucial part in sand dune ecology. They help plants colonise sand dunes by making phosphorus, nitrogen and other nutrients, such as potassium, calcium, sulphur and zinc, more available to them.

The semi-fixed dunes and dune slacks support the largest numbers of species. In fact, the number of large fungi recorded for dune slacks is similar to the number of vascular plants.

Problems with identification and the sporadic appearance of fungi have made it difficult to fully describe the fungus floras of habitats such as sand dunes. To produce a comprehensive account would probably require decades of observation. Here are some notes to give an idea of the mycological richness of this habitat.

Fungi of unstable dunes

About ten species of large fungi are entirely confined to sand dunes and most of these are specially adapted to colonising mobile dunes. In fact, their mycelial strands below the surface are likely to contribute to the stabilisation of these areas. As saprophytes they depend on dead marram or buried rabbit dung and appear to require a continuous input of freshly deposited sand. The Marram Brittle-cap *Psathyrella ammophila* is the

commonest of these and may produce troops of several hundred fruiting bodies. The dune cup fungus *Peziza ammaphila* and the dune stinkhorn *Phallus hadriani* are also fairly widespread.

Here you may also encounter the Field Bird's Nest *Cyathus olla* and Dung Bird's Nest *Cyathus stercoreus*. The latter species appears to be restricted to sand dunes in Britain, but so far it has only been recorded from a handful of sites such as Ynyslas in mid Wales, while the former species has been found on dunes throughout Britain including Dawlish Warren in Devon and Whiteford Burrows in South Wales. Both species are usually anchored to the bases of marram, but they rely on the presence of dung. These peculiar fungi measure about 10mm in diameter, and their 'eggs' are actually small spherical structures containing masses of spores, while their 'nests' act as splash-cups. The spores are splashed out by the action of raindrops to a distance of over one metre. This may sound implausible, but apparently raindrops can have a terminal velocity of up to eight metres per second.

Elegant Earthstar.

Gasteroid fungi (stomach fungi) are also quite plentiful. Some of the more common species found here include Brown Bovist *Bavista nigrescens*, and Lead-Grey Bovist *B. plumbea*, Grassland Puffball *Lycoperdan lividum* and Meadow Puffball *Vascellum pratense*. Most puffballs have a culinary value, especially when young before the spores develop, but all earthballs contain toxins and should be avoided. Less common species include the Least Bovist *Bovista limasa*, Winter Stalked Puffballs, *Tulastama brumale*, Elegant Earthstar *Geastrum elegans*, White-Egg Bird's Nest *Crucibulum laeve*, and the Cannon Fungus *Sphaerobolus stellatus*. The Cannon Fungus, closely allied to the bird's nest fungi, only contains a single 'egg' in each of its cups, and gets its name from the fact that it can shoot these 'eggs' like miniature cannonballs for up to four metres. For a species measuring just two millimetres, this is quite some achievement.

Winter Stalked Puffball.

The Least Bovist was recently found at Whiteford Burrows in an area that had previously been burnt and may represent a primary coloniser of such sites. Of the stalked puffballs, the Winter Stalked Puffball is the one most likely to be encountered, the other species being very rare in Britain.

Fungi of fixed dune grasslands

In well-grazed, natural dune grasslands devoid of fertilizer, the number of fungus species can outnumber green plants. Grazing is absolutely crucial though. In dunes that have become rank due to the lack of grazing, such as Pendine dunes in south Wales, the fungus flora can be almost eliminated. Conversely, well-grazed systems such as Whiteford Burrows can have a remarkably rich assemblage of fungus species.

Troops of parasol mushrooms (*Macralepiata*) are often conspicuous features of well-grazed dune grasslands, but it can be difficult to identify individual species. A species new to Britain turned up at Newborough in

1996, and there may be other species waiting to be discovered. In fact, some of the more recent discoveries appear to be widespread. A species of yellow staining mushroom found at Ynyslas in 1985, also proved to be a new British record, and yet it was the most frequently encountered member of the true mushrooms on fixed dune grasslands, fruiting from mid-July until the end of November.

Fixed dune grasslands also support a great diversity of colourful waxcaps (*Hygrocybe*) including red species such as Crimson Waxcap *H. punicea*, Scarlet Hood *H. coccinea* and *H. conicoides*; yellow species such as *H. ceracea*, *H. chlorophana* and *H. persistens*; orange species such as *H. pratense* and *H. reidii*, and green ones such as the viscid Parrot Toadstool *H. psittacina*. In autumn the dune grasslands of sites such as Aberffraw in north Wales are often colourfully dotted with thousands of waxcaps.

Scarlet Hood, Hygrocybe conicoides.

In total about 24 waxcap species and varieties have been found in British dune grasslands, but only where soil nitrate and phosphate levels are very low. They will not tolerate even small amounts of fertiliser and because of this they provide good indicators of habitat quality and terms such as 'waxcap grasslands' and 'waxcap meadows' have been used to identify such habitats.

A troop of parasol mushrooms.

Other colourful species you may encounter are the bright yellow *Balbitius vitellinus*, the pale yellow caps of *Stropharia coranilla*, the flesh pink *Calacybe carnea*, the lilac purple *Calacybe ionides* and the deadly poisonous Ivory Clitocybe *Clytocybe dealbata*.

Fairy rings are caused when a fungus mycelium spreads evenly in all directions from an initial growth. Species which can form dramatic circles include three edible species, Blewits *Lepista saeva*, Field Mushroom *Agaricus campestris*, and, most commonly, the Fairy-Ring Champignon *Marasmius oreades*.

Where a large number of domestic stock, rabbits or both are present, the amount of dung in fixed dune grassland can be extremely high. This provides habitat for a variety of dung-loving species, especially of the genus *Coprinus* and *Panaelus*. In a survey of dung fungi at Newborough Warren a total of about 28 species were recorded. These included a variety of colourful cup fungi.

One of the more unusual species found in the survey was the Nail Fungus *Porania punctata*. Its fruiting bodies look like miniature pepper pots and only occur on horse dung. In fact, the species is confined to the dung of horses fed on natural, rough grassland, and although it was quite common during the 19th century, it now appears to be very rare outside the New Forest. As an endangered Red Data Book species, its discovery at Newborough Warren provides another good example of how important these

Mosaic Puffball.

natural dune grasslands are for fungi. Gasteroid fungi, especially puffballs such as the Grassland Puffball *Lycoperdon lividum*, Lead-Grey Bovist *Bovista plumbea* and Meadow Puffball *Vascellum pratense*, are commonly found in dune grasslands. Two other giants of the puffball world, the Mosaic Puffball *Handkea utriformis* and the Pestle-Shaped Puffball *H. excipuliformis*, are occasionally seen, for example at Oxwich and Whiteford burrows in south Wales. Reaching heights of 15 cm, or even 20 cm in the case of the latter species, these impressive fungi rarely go unnoticed.

Large ascomycetes tend to be few in number, but Yellow Morel *Morella esculenta* can occur in large numbers in springtime, growing in both fixed and semi-fixed dune grassland as well as in dune slacks. This is probably the most prized of all edible fungi with its delicate flavour and meaty texture. In good years it can be so abundant at Newborough Warren that people have been known to collect this gastronomic delicacy by the basket-full, but this practice is now frowned upon on conservation grounds.

Fungi of dune slacks

More species of fungi have been recorded in dune slacks than all other sand dune zones put together. They include members of genera noted for their culinary qualities, such as the true mushrooms *Agaricus*, the blewits *Lepista* and the milk caps *Lactarius*. Some fungus-eaters may look on the hallucinogenic *Psilocybe* favourably, but unfortunately dunes also have their share of poisonous mushroom look-alikes in genera such as *Hebeloma*, *Inocybe* and *Leptonia (Entoloma)*.

Roll Rim *Paxillus involutus* is one of Europe's commonest large fungi. Outside sand dunes it is commonly found with birch and oak, and can produce very large fruiting bodies, but when associated with creeping willow in dune slacks, it tends to produce very small fruiting bodies in large numbers.

At the right time of year, dune slacks can be visually stunning places, but people are usually drawn to them for their swathes of purple-spiked marsh orchids, the delicate violet blooms of common butterwort or the perfect white flowers of grass of Parnassus. These wet, sandy hollows, in common with the surrounding sand hills and grasslands, are also home to an abundant and colourful array of fungi. What is more, the closer you look, the more you will find, and there are still new species out there, waiting to be discovered.

Peter Rhind is CCW's Coastal Ecologist, and edited the award winning book *The Plant Life of Snowdonia*.
James Robertson is a writer and editor.

Ffwng y twyni tywod

Mae gan Gymru gystal twyni tywod ag unrhyw wlad yn Ewrop ac mae ffwng ymhlith y rhywogaethau sydd wedi addasu i ffynnu yno a chwarae rhan allweddol yn eu hecoleg. Ar dwyni ansefydlog y bydd deg math o ffwng mawr yn tyfu ac mae'n bosib eu bod yn helpu i'w sadio. Yn aml ar dwyni sefydlog, mewn glaswellt di-wrtaith sydd wedi ei bori'n dda, mae mwy o rywogaethau o ffwng nag o blanhigion glas. Daethpwyd o hyd i rywogaethau newydd i wledydd Prydain yn Ynyslas yn 1985 a Niwbwrch yn 1996. Mae mwy o ffwng wedi eu canfod ar laciau twyni nag ar bob math arall o dwyni gyda'i gilydd. Yn eu tymor, maen nhw'n olygfeydd trawiadol ... ac mae yna ragor o rywogaethau newydd i'w darganfod.

In Memoriam

Munro Taylor, 1932-2003

With the recent death of Munro Taylor, Cardigan Bay has lost one of its best friends. Munro, who died suddenly at the end of September, aged 71, was the leading figure in the influential marine conservation group Friends of Cardigan Bay.

He was instrumental in setting up the Cardigan Bay Forum, whose meetings brought together industrialists, conservationists, recreationalists and many other *ists*, to discuss and debate issues from fishing to oil developments. The model of the Cardigan Bay Forum was copied in other areas around the UK as the importance of marine conservation was increasingly being recognised.

Munro's enthusiasm and skills as a sailor also helped develop Friends of Cardigan Bay's research activities. By now the owner of the elegant ketch *Pendragon*, Munro made her available to FoCB and other groups as a research vessel. The stories generated by these trips, with Munro as skipper, would fill a couple of volumes of *Natur Cymru* on their own, but Munro's drive and generosity helped with increasing our understanding of the cetaceans in the Bay and the importance of the area for conservation.

In recent years, despite repeated warnings to take things easy, Munro was busier than ever. He helped build up FoCB from a low point by recruiting and helping to train many new volunteers, he took over as Treasurer and he spent more time at sea on increasingly long surveys over a wide area of the Bay.

Munro was many things – sailor, art teacher, amateur historian, fencing instructor, conservationist and more. His energy and eagerness could over-dominate and his uncompromising stand over issues could be seen as stubbornness by some, but all these qualities were necessary to getting things done – something which Munro did in all aspects of his life. Most of all though, Munro was a friend, to all those who knew him and to Cardigan Bay and its wildlife: we'll not be seeing the likes of him again.

Mike Green

R.H. (Dick) Roberts, 1910-2003

Ganwyd Dick yn 1910 ar fferm Llwyn Penddu ym mhlwyf Llanllechid mewn ardal Gymreig ac fe lynodd at ei wreiddiau Cymreig drwy gydol ei oes. Cafodd ei addysg gynnar yn Ysgol Sir Bethesda. Bu'n dysgu yn Sussex, Evesham (lle cyfarfu a'i wraig Bet) a Phenmachno a gorffennodd ei yrfa yn Brifathro Ysgol Hirael, Bangor.

Mae ei gyfraniad i'r byd botanegol yn enfawr ac yn enwedig ei gyfraniad at gadwraeth bywyd gwyllt. Fe gyd-sefydlodd â Dr Lacey Ymddiriedolaeth Natur Gogledd Cymru yn 1963. Bu'n weithgar am flynyddoedd yng Nghors Goch a Chors Geirch ym Môn a chanlyniad hyn oedd prynu 100 acer o dir, eto yn 1963, i sefydlu gwarchodfa natur yng Nghors Goch – gwarchodfa tir gwlyb o ddiddordeb botanegol arbennig – gwarchodfa natur gyntaf yr ymddiriedolaeth.

Treuliodd y rhan fwyaf o'i fywyd yn cofnodi planhigion i'r BSBI – Cymdeithas Fotanegol Prydain. Ystyrid ef hefyd yn arbenigwr byd enwog ym myd y tegeirianau gwyllt a'r rhedyn. Rhoddai bob cymorth i athrawon prifysgolion, efrydwyr ac amgueddfeydd a hynny mewn ffordd fonheddig a di-lol.

Derbyniodd radd M.Sc er anrhydedd gan Brifysgol Cymru fel gwerthfawrogiad o'i waith enfawr ym myd botaneg. Ymhen blynyddoedd wedyn derbyniodd Fedal H.H. Bloomer gan y Gymdeithas Linneaidd. Yn 1982 cyhoeddwyd ei lyfr *Flowering Plants and Ferns of Anglesey* gan Amgueddfa Genedlaethol Cymru. Yn ogystal â rhannu ei wybodaeth â phrifysgolion ac amgueddfeydd yr oedd bob amser yn barod i roi o'i wybodaeth i bobl gyffredin yr ardal. Yr oedd yn amlochrog ei ddiddordebau – yn artist, archeolegydd a hanesydd.

Yr oedd yn gymeriad cynnes a dymunol ac roedd yn hapus gyda'i deulu – ei wraig Bet Roberts a'i ddwy ferch Pat ac Anne. Mae colled ar ei ôl ym myd y planhigion yng Nghymru ond diolch am y cyhoeddiadau gwerthfawr a adawyd i ni.

***Enid Griffith** (Diolch i Bill Chapman)*

Nodiadau'r **Cynulliad**

gan **Gethyn Williams**

Ar ôl rhai misoedd cymharol dawel yn dilyn yr etholiadau, bu'r tymor yma'n un prysur iawn ym Mae Caerdydd. Ym mis Medi, fe ddadlennodd Llywodraeth y Cynulliad y blaenoriaethau strategol newydd ar gyfer y pedair blynedd nesaf ar ffurf *Cymru: Gwlad Well*, sy'n seiliedig yn gyfan gwbl bron ar addewidion maniffesto mis Mai diwethaf. Er ei bod yn ymddangos mai ychydig o bwyslais a roddir ar yr amgylchedd yn y cynllun (cynllun y mae angen esbonio ei statws yn iawn, o'i gymharu â dogfennau strategaeth sydd i'w cael eisoes, fel *Cymru ar ei Hennill* a'r cynllun strategol *Gwell Cymru*), mae gan y garfan wasgu sy'n ymwneud â'r amgylchedd ddigon i gnoi ei chil arno o rŵan hyd y Nadolig. Yn ddiweddar, mae Llywodraeth y Cynulliad wedi rhyddhau ymgynghoriadau ar yr Adolygiad o'r Cynllun Datblygu Cynaliadwy a Chynllun Gofodol Cymru. Mae'r olaf o'r rhain yn cynnig dull newydd o ymdrin â chynllunio rhanbarthol, gan anwybyddu ffiniau gweinyddol. Bydd y ddau ymgynghoriad yn cael eu cynnal tan y flwyddyn newydd, gan adlewyrchu ymdrechion Llywodraeth y Cynulliad i roi dulliau newydd o ddatblygu polisïau ar waith; ond ni ellir dweud ar hyn o bryd pa mor arloesol ydynt mewn gwirionedd. Ym mis Mawrth, fe fydd Cymru'n croesawu'r Rhwydwaith Datblygu Cynaliadwy Rhyngwladol – elfen y cyfrannodd Llywodraeth y Cynulliad at ei chreu yn ystod Uwch-gynhadledd y Byd ar Ddatblygu Cynaliadwy yn Johannesburg yn y flwyddyn 2002. O leiaf mae'r ymgynghoriadau pwysig yma wedi rhoi hwb i faterion amgylcheddol yng Nghymru, fel eu bod yn nes at frig yr agenda wleidyddol, a hynny yn dilyn cyfnod etholiadol lle na chawsant eu crybwyll o gwbl bron.

O fewn y Siambr Gyflawn, mae rhai digwyddiadau o bwys wedi cynnwys dadlau brwd ynghylch polisïau'n ymwneud ag organeddau wedi eu haddasu'n enetig (GM) a'r gyllideb drafft (a gyflwynwyd i holl Aelodau'r Cynulliad ddiwedd mis Hydref). Ymddengys fod canlyniadau'r profion GM ar ffermydd Prydain wedi ychwanegu at bwysigrwydd 'y polisi mwyaf cyfyngol bosibl' ar GM, sydd bellach yn ddwyflwydd oed. Hefyd, yn ddiweddar fe ddatgelodd Carwyn Jones, Gweinidog yr Amgylchedd, fod ei swyddogion ym Mrwsel, a'u bod yn ceisio llunio datganiad polisi cyffredin yn ymwneud â GM rhwng Cymru a Llywodraethau Rhanbarthol eraill yn Ewrop sy'n rhannu'r un farn. Fe gododd cyllideb ddrafft y Cynulliad wrychyn llawer o Aelodau Cynulliad my gwrthbleidiau, a hynny gan fod cyllideb fynegol *Tir Gofal* – sef cynllun amaeth-amgylcheddol hollbwysig y Cynulliad – wedi gweld toriad o oddeutu £2 filiwn. Ar y cyfan, fodd bynnag, mynnodd Carwyn Jones fod y gyllideb ar gyfer datblygu gwledig wedi cynyddu, a bod Llywodraeth y Cynulliad wedi ymrwymo i roi cynllun peilot amaeth-amgylcheddol o fath arall ar waith rywdro.

Mewn mannau eraill, mae trafodaethau o fewn y DU ac Ewrop ynglŷn â'r manyldeb a'r opsiynau sydd ar gael i aelod-wladwriaethau wrth weithredu'r diwygiadau i'r Polisi Amaeth Cyffredin, yn parhau, a byddant yn penderfynu a yw'r pecyn yma yn becyn o ddiwygiadau sy'n torri tir gwirioneddol newydd yn y ffordd y mae rhai'n honno y bydd, ai peidio. Rhaid mynd i'r afael â llawer o drafod ac ymgynghori eto yn ystod 2003/04. Yn wir, un enghraifft o hyn yw ymgynghori cychwynnol y Cynulliad ar y PAC, a ddaeth i ben ddiwedd fis Tachwedd. Yng ngweddill y Cynulliad, mae Pwyllgor yr Amgylchedd wedi mynd ati i adolygu tai fforddiadwy a chymunedau cynaliadwy yng nghefn gwlad Cymru. O ran y brîff Datblygu Economaidd, bellach mae'r Gweinidog Andrew Davies wedi ymateb i adolygiad eang ei gyn Bwyllgor a aeth i'r afael ag ynni, er nad oes fawr ddim gweithredu arall yn y maes. Nid yw'r canllawiau cynllunio ar ynni adnewyddol ar ffurf TAN8 y bu cryn oedi cyn eu rhyddhau (mater i Carwyn Jones, mewn gwirionedd) wedi helpu i ddatblygu marchnadoedd ynni adnewyddol yng Nghymru, ac yn ôl yr wybodaeth ddiweddaraf ni fyddant yn cael eu rhoi ar waith tan ddiwedd hydref 2004.O ran deddfwriaeth a fydd yn cyrraedd y Cynulliad eleni, yn sicr fe allwn ddisgwyl y bydd cryn drafod ar Fesur Cynllunio a Phryniant Gorfodol Cymru a Lloegr. (Cymalau Cymreig y mesur yma a ddenodd ganmoliaeth o du San Steffan oherwydd eu pragmatiaeth.) Hefyd, fe fydd Cyfarwyddeb Fframwaith Dŵr yr UE yn dod i ddwylo gweinyddiaeth ddatganoledig yn eich ardal, lle mae aelodau o'r Pwyllgor Cynllunio Amgylcheddol eisoes wedi datgan llawer o ddiddordeb. Felly, mae nifer o eitemau ar yr agenda, ac mae cystadlu am le bob amser yn beth i'w groesawu. Ond allwch chi ddim peidio â gofyn tybed pwy, neu beth, fydd yn llwyddiannus yn y pen draw.

Gethyn Williams yw Swyddog Gwybodaeth y Cynulliad i Cyswllt Amgylchedd Cymru.

Assembly *Notebook*

by **Gethyn Williams**

After a slow few months following the election, this has been a very busy term in Cardiff Bay. In September the Welsh Assembly Government (WAG) quickly unveiled their new strategic priorities for the next four years in the form of *Wales: A Better Country*, based almost entirely on their manifesto commitments from last May. Although there appears to be little environmental content to the plan (whose status seems to supersede the previous *Plan for Wales*, although with a significantly less strategic approach) there is plenty to occupy the environmental lobby this side of Christmas. Recently WAG has released for consultation the *Review of the Sustainable Development Scheme* and the draft *Wales Spatial Plan*, the latter offering a new approach to planning ignoring administrative boundaries.

Both consultations run until the new year and reflect attempts by WAG to initiate new methods of policy development, but it remains to be seen how innovative they really are. In March 2004, Wales will play host to the International Sustainable Development Network, which WAG was instrumental in creating during 2002's Johannesburg World Summit. These two consultations have at least had the effect of pushing environmental issues further up the political agenda in Wales, following an election period in which they hardly featured.

Within the Plenary Chamber, recent events of note have included heated debates over GM policy and the draft budget, presented to AMs in late October. Results of the UK Farm Scale GM Trials appear to have added weight to the Assembly's 'most restrictive possible policy' on GM, now two years old. Recently Environment Minister Carwyn Jones also revealed that his officials were in Brussels, attempting to draw up a common policy statement on GM between Wales and other European Regional Governments of similar feeling. Many opposition AMs reacted angrily to the draft Assembly budget after about £2m was cut from an indicative budget line for Tir Gofal, the Assembly's flagship Agri-Environment scheme. Overall however, Carwyn Jones insisted that the rural development budget had increased and that WAG was committed to piloting a broad and shallow 'entry level' agri-environment scheme at some stage.

Elsewhere, negotiations continue within the UK and Europe on the detail and the options available to member states in implementing the reform of the Common Agricultural Policy, and will determine the extent to which this package is truly the groundbreaking reform some have reported it to be. There are many discussions and consultations still to be held during 2003/04, not least of which is the Assembly's initial CAP consultation which concluded at the end of November. Across the rest of the Assembly, the Environment Committee has undertaken a review of affordable housing and sustainable communities in rural areas. With regard to the Economic Development brief, Minister Andrew Davies has now responded to his former Committee's wide-ranging review of energy, although there has been little other action in this field.

The much delayed release of planning guidance on renewable energy in the form of TAN 8 (technically, a Carwyn Jones matter) has not helped the development of renewable energy markets in Wales and latest estimates for its deployment are as late as Autumn 2004. In terms of legislation coming into the Assembly this year, we can certainly expect debate surrounding the England & Wales Planning & Compulsory Purchase Bill, the Welsh clauses of which have attracted some praise at Westminster for their pragmatism. Also coming to a devolved administration near you is the EU Water Framework Directive, in which EPC Committee members have previously declared much interest. So, a packed agenda it is and competition for places is always healthy, but you can't help but wonder who will make it onto the pitch.

Gethyn Williams is Assembly Information Officer for Wales Environment Link.

Biodiversity *news*

BTO Conference

The British Trust for Ornithology held its first ever conference specifically for BTO members in Wales at Machynlleth on 17 October. It was well attended, the chat was animated, and the audience appreciated a series of stimulating presentations. Derek Moore started the proceedings with an optimistic account of the greater conservation opportunities which might lie ahead, even suggesting some radical changes to the Towy valley, where ecological restoration could reduce flooding. Early and unharvestable forestry plantations were also in his sights.

Dawn Balmer described the declining fortunes of the pied flycatcher, which Tony Jenkins reported in the last edition of *Natur Cymru*. She described the enormous amount of work being done on the species, and how much there is still to learn.

Steve Sutcliffe gave a riveting account of ringing projects on Skokholm, Skomer and other islands. The statistic that Ronald Lockley managed to ring 15,000 shearwaters between 1933 and 1936 will be hard to beat. Cormorants, which have started moving north, are yet another possible biological indicator of global warming.

The rest of the entertainment included talks from Dick Loxton on the usefulness of bird observatory data, David Leech on the BTO nest records scheme and Bridget Griffin on swallows and the reasons for their decline. The fact that 200,000 were caught and eaten in one year can't help.

A similar conference is proposed in the next three or four years, which is quite long enough a wait, on the evidence of this successful first outing.

Christmas greens

This is the season of indulgence, which is not necessarily good news for our health or that of the Planet. Luckily there are now farmers' markets, fair trade food and many ways for us to have a greener Christmas. For example, you can try a spot of wildlife gardening. The good thing about helping wildlife is that often you don't have to do very much at all.

The great temptation in winter is to 'tidy up' – cut down those dead stems, clear that rampaging ivy, sweep up the old leaves and burn any dead wood. Conventional gardening advice has it that these things all harbour pests and diseases and it is bad garden hygiene to leave them lying around. But this is not Nature's way.

As Russel Hobson explains on pages 21-26, many moths need places to overwinter in the garden: leave areas of rough ground with nettles, docks and other weeds, to protect the hibernating caterpillars, and bonfire heaps for hibernating hedgehogs.

If your pond is likely to freeze, leave a plastic football on the surface: this will help dragonfly larvae and frogs to survive. "That's not Nature's way," you say – ah, but neither are butyl pond liners. Artificial ponds require a bit of artificial management. So instead of putting on your wellies and waterproofs and grubbing around in all that half-rotted stuff, you could feel just as virtuous by sitting indoors with your feet up, or going for a nice long walk.

Those three evergreen stalwarts, holly, ivy and mistletoe, are not just good for decoration, they are valuable assets for wildlife in your garden. All have berries at a time when there is little other food available, and holly and ivy are invaluable in providing year-round shelter for insects, birds and small mammals.

The holly and the ivy

Holly grows easily from berries: anyone who already has a tree will tell you how many small saplings spring up. It has separate male and female trees, so if you want to be certain of berries you must strike cuttings or take rooted suckers from a female tree. The trees provide excellent shelter and when grown as a tightly clipped hedge they will keep even cats at bay. The small white flowers are essential food for the caterpillars of the holly blue butterfly.

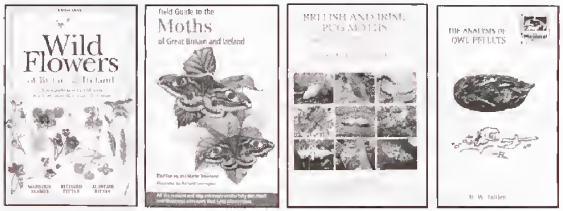
Ivy flowers only appear when the branches have risen above their support and the familiar pointed leaves become ovate: low, creeping ivy will never flower. It blooms throughout the autumn and provides a late source of nectar for many insects, some of which then hibernate amongst the creepers. From December onwards the blue-black berries are devoured by many birds, including winter visitors such as redwings and blackcaps.

Mistletoe

Mistletoe is a parasitic plant whose favourite host is the cultivated apple tree: it is therefore most commonly found in gardens and orchards. In 1994 the National Mistletoe Survey was set up to establish whether mistletoe was in decline following the digging up of many traditional orchards. The results were mixed, with this parasite doing well in some places and badly in others. Its greatest stronghold is in the border counties of Hereford, Worcester and Gloucester. Nevertheless, mistletoe remains scarce, especially in Wales.

Most of the mistletoe on sale at Christmas is imported from Europe. If you want to try to grow your own plant, only use berries from a British source, preferably as local to you as possible. In the wild, mistletoe is spread by birds which eat the berries and wipe the sticky seeds onto bark: you must imitate this process for success. In late February choose a suitable deciduous tree – apple, lime and hawthorn are the top favourites – and cut a T-shaped notch on the underside of a branch about 5 feet from the ground. Squash a berry into the cut and press back the bark, securing with twine if necessary. To make sure of success, and to ensure berries (mistletoe needs male and female plants to produce them), make several notches on similar branches. Then forget about them: it could be two years before you see the first leaf, and five before you, and the birds, will be able to harvest berries.

Green **Bookshelf**
Silff Lyfrau *Amgylcheddol*



Wild Flowers of Britain and Ireland
Blamey, Fitter and Fitter, A&C Black, 2003
£16.99 Softback ISBN 0-7136-5944-0

Field Guide to the Moths of Great Britain and Ireland
Waring, Townsend and Lewington, British Wildlife Publishing, 2003
£29.95 Softback ISBN 0-9531399-2-1

British and Irish Pug Moths
Riley and Prior, Harley Books 2003
£29.50 Hardback ISBN 0-946 58951-8

Whatever branch of natural history lures you in, your first identification guide often becomes more than a book. The hours spent turning its pages, hunting for the description which best chimes with the bird you have seen or the plant or insect you have found, turn it into a sort of familiar and, by stages, an old friend.

Wherever you are on the knowledge ladder, there is always more to learn and a constant supply of natural history field guides meets the demand. The latest is from some very old hands in the flower guide firmament, indeed something of a dream team. *Wild Flowers of Britain and Ireland* is written by Richard Fitter, with maps by son Alastair, and illustrations by Marjorie Blamey. They have a string of previous guides under their belts.

First the statistics. Five thousand of Marjorie Blamey's superb colour drawings illustrate all the flowers, including trees and shrubs, grasses, sedges, rushes and ferns, which you are likely to come across in these islands. Moreover, there are 1,600 distribution maps, so that you can tell at a glance whether a plant is really likely to be the one you think you found in a particular geographical area.

The plant descriptions are clear and easy to follow, and for ease of reference, the maps are adjacent to the text in the left-hand margin. An innovative feature, this does mean that the maps have to be very small, making it impossible to tell whether plants are found on Anglesey, for example.

My quibbles are all minute – for example, why is pillwort entered under adderstongues and not given its own map? The bigger picture is that this is a fine work, probably the last we can expect from this venerable team, and it is packed with information. You get approaching 500 pages of the latest and best 'what' and 'where' plant knowledge for your money, which is good value in my book.

There are many plant guides to choose from, but there is now really only one moth guide. The new *Field Guide to the Moths of Great Britain and Ireland* is out on its own – as far as I'm aware, no comparable moth field guide has ever been published. The gap it fills is more cavern than niche.

The 1,600 or so illustrations show nearly 900 species of moths as they appear at rest in the field, rather than as the victims of collectors, with wings pinned back, an approach which can lend something of the mortuary slab to images of moths. Richard Lewington's superb illustrations are supplemented by excellent photographs of larvae.

The aim throughout is to make the guide as useful as possible to the beginner as well as the long-term enthusiast. An introductory section full of information about moths and mothing is followed by species accounts which present all the salient information with great clarity. The authors' up to date knowledge is particularly apparent in the status and distribution sections.

When you are constantly using a guide, the quicker you can get to the page you want the better. In a nice touch, page numbers appear in colour-coded boxes at the side of each page, to take you to the main groups of moths. A lot of dedication, as well as a good measure of passion, are required to pull off a publication of this quality. It is a class act, and its creators are to be congratulated.

As a postscript, I have just received another impressive moth book, *British and Irish Pug Moths*. This volume is aimed at the serious lepidopterist, featuring, for example, seven plates each illustrating male and female genitalia. It has been long in the making – one of its authors died nine years ago – and I think this shows slightly. For all that, professional entomologists will welcome this guide to the biology and identification of a large, important group of moths. No doubt it will appeal to some non-professionals who, by way of the new field guide, get bitten by the moth bug.

James Robertson

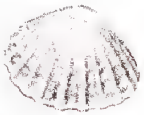
The Analysis of Owl Pellets
D.W. Yalden, The Mammal Society 2003
£3.50 (incl. p&p) ISBN 0 906282 45 4

This excellent booklet is aimed at mammalogists hoping to study small mammals by identifying their remains in owl pellets, though no doubt it will be just as useful to ornithologists researching owl diets. It is clearly written and illustrated, so that even an amateur like me is inspired to go rooting around in the leaf mould looking for pellets; but there is plenty there for the more serious, committed expert too. The references provide a useful 'further reading' list. Copies are available from The Mammal Society 020 7250 2200, gshearer@mammal.org.uk

Mandy Marsh

Marine *matters*

Welsh islands round-up, compiled by **Geoff Gibbs**



Sea arch at Flatholm.

Photo: Charles Lindenbaum.

Flatholm

Flatholm is a small, roughly circular island in the Bristol Channel, four kilometres from the nearest part of the Welsh coastline at Lavernock Point, and 10 kilometres from Barry. The nearest land to Flatholm is the smaller island of Steepholm, which lies 3.7 kilometres due south. The terrestrial area of the site is around 24 hectares, but this figure does not take into account the shingle beaches, intertidal reef and rocks, or the surface of the tall limestone cliff faces, which increase the area to 35 hectares. Owned by Cardiff Council, it is managed as a Local Nature Reserve by the Project Officer, two wardens and up to four voluntary wardens.

There are a number of interesting buildings on the island, including gun batteries, farmhouse, lighthouse and foghorn station, and the unique Cholera Hospital. This last pavilion-style building probably had more use as a NAAFI during WWII than it did as an actual isolation hospital, and has been derelict since the end of the war.

Flatholm's designation as a Site of Special Scientific Interest (SSSI) includes both earth science (carboniferous limestone sections) and biological interests. The latter include rare and uncommon plant species, coastal plant communities and the breeding colony of lesser black-backed (around 4,000 pairs) and herring gulls (300 pairs). The breeding gull colonies are a significant part of the Severn Estuary Ramsar Site and Special Protection Area (SPA).

Flora: Flatholm is one of the few British sites of the wild leek *Allium ampeloprasum*, a magnificent plant growing to a height of 6 feet tall, topped with what can be described as a large, pale purple, pompom-like flower. This attractive but pungent smelling plant grows mainly around the barracks and lighthouse area and on the cliff edges, with a few discrete clumps elsewhere. Another of Flatholm's remarkable plants is the wild peony *Paeonia mascula*, introduced from Steepholm.

Management: When the Flatholm Project was set up in 1982, the gull colony was in its thousands and elder scrub covered much of the surface of the island, with the result that very few areas of high botanical interest remained. Both the gull colony and the now depleted maritime grassland were considered important for nature conservation, and it was decided to manage the island in two quite separate ways for these two features. A concerted effort was made to restore the grassland on the north half of the island, by removing scrub, mowing, grazing and initially spraying chemicals on tall ruderal vegetation. The south half was kept as a gull colony with only minimal management in this area.

Grazing of the LNR began with goats (1989), followed by a flock of Soay sheep (1992). The Soay sheep proved to be hardy but difficult to control; also, they are small sheep which tend to feed fairly selectively without having a heavy impact on the sward. They have been replaced by lowland/mountain cross non-breeding ewes of a much larger, heavier and hungrier nature! There are now 50 of these. Mowing is now only needed to top thistles and nettles.

Visiting: There is limited pressure from boats during the summer, mainly sailing boats and canoes. Although these visitors are small in number, they do increase the workload of staff because they have to be managed.

For organised visits (March – October), the Flatholm Project runs a purpose-built vessel, the *Lewis Alexander*, which takes both visitors and supplies to the island. The height and strength of tides limit visits to the 3 hours up to high water. There are around 70 day trips a year, and 20 residential weeks/weekends for schools, youth interest groups and conservation groups.

Further information: www.cardiff-info.com/flatholm, or phone 01446 747661.

Bardsey Island (Ynys Enlli)

New director for the island's Trust

Michael Wynne has taken over from Simon Glyn as Director of the Bardsey Island Trust, which owns and manages the island. He lives near Pwllheli and was previously working for the National Trust, at Plas-yn-Rhiw and more recently as Property Manager for Chirk Castle.

BBFO 50th

The biggest gathering on Ynys Enlli for many years occurred during the weekend of July 25/26th 2003, when the Bird Observatory celebrated 50 years of bird ringing, migration watching and other studies of natural history. Past wardens and assistant wardens, committee members and friends gathered from all over the UK. Over 100 people visited or stayed over for the weekend. Luckily this very successful and memorable weekend was blessed with warm, sunny weather.

Previous wardens and assistants present included Peter Roberts, Mike Harris, Ian Fisher, Simon Walker, and Paddy Jenks; some of the children running about were 3rd generation visitors to the Observatory! Quite a few migrants were around, including pied flycatchers and willow warblers, while peregrines and choughs soared over the mountain by day and Manx shearwaters called at night, maybe even including the fifty year old veteran which was caught again this spring.

Breeding birds 2002

Observatory warden Steve Stansfield's report, in the Bardsey Observatory Report for 2002, contains much of interest. A thorough survey of storm petrels, using playback of taped calls, produced 33 apparently breeding adults in rocks and scree along the north-east coast. Other possible breeding areas for petrels are less accessible, especially at night, so the population may actually be even higher.

Two puffin chicks were found in burrows in a razorbill colony, and four adult puffins ringed here; the first definite breeding records for the island in recent times. John Ray did record the species here in 1662, although some authorities consider that he was referring to Manx shearwaters (*Puffinus puffinus*).

Another increasing breeding species is the shelduck, a species for which Bardsey appears to be an unlikely habitat. A pair reared four young from a brood of eight in 2001, but two pairs in 2002 had all their ducklings predated by large gulls. In 2003, two pairs raised four young.

Unusual visitors in 2002

Two species were new to the island's list in 2002: ring-billed gull (at the end of March), and avocet (three briefly on 13 May). Other interesting birds in May were little ringed plover, red-throated pipit and … house sparrow! Around twenty pairs of sparrows used to nest on Bardsey, but failed to survive the departure of Wil and Nellie Evans (and their hens) to the mainland in 1970. Another sparrow turned up in September.

Finally, an Isabelline wheatear (a large, pale, species breeding no nearer than Turkey and Greece) appeared on 16 October, the second record for the island and for Wales.

Visitors in 2003

Unusual bird visitors were rather thin on the ground, but included a female serin in May and an ortolan bunting in August. A count of 159 whimbrel on May 4th was Bardsey's highest ever; these birds were very likely heading for Iceland or the Faroes.

Migrant insects helped to compensate for the lack of birds, with many hummingbird hawkmoths (27 counted on 24th September), Bardsey's second convolvulus hawkmoth, and numerous painted lady and red admiral butterflies.

Hysbysfwrdd / NoticeBoard

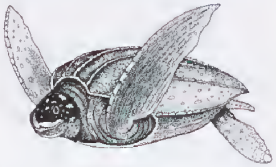
If you would like your wildlife event to feature on this page please contact Mandy Marsh on 01248 385574 or e-mail m.marsh@naturcymru.org.uk

Whether you prefer Talks or Walks, the **WILDLIFE TRUST OF SOUTH AND WEST WALES** has something to offer you. **Everyone is welcome to participate in a Wildlife Trust event** but subscriptions and donations enable us to promote wildlife conservation in your local area.

Here's just a taster of some of the many events on offer. Contacts for more details are given in brackets. For a full programme contact the Trust on **01656 724100** or information@wtsww.cix.co.uk

Cardiff New Group

6 Jan 2004, 7.30pm Lisvane Memorial Hall (Richard Cowie 029 20752673). www.wtswwCardiff.org.uk Inaugural Meeting of the local group, at which a committee will be elected.



Leatherback Turtles and Jellyfish in the Irish Sea

A talk by Dr Jon Houghton
5 Jan, 7.30pm The Hunters Lodge, Brackla. (Peter Hatherley 01656 662196).

13 Jan, 7.30pm Community Centre, Pembroke. (Maddy Berridge 01646 651218).

25 Feb, 7.30pm Maes Elfryn Hall, Llandeilo. (Denys Smith 01558 822152).

Winter Waders & Wildfowl

22 Feb, Laugharne and Ginst Point. Wrap up well!
(Tony Ivens 01267 222873 or David Stacey 01267 241309).

The Fen Raft Spider in Wales

A talk by Mike Clark
17 Mar, 7.30 pm
Maes Elfryn Hall, Llandeilo
(Denys Smith 01558 822152).

Reserve Work, Carmarthenshire

20 Mar Help prepare for the new season (Tony Ivens 01267 222873 or David Stacey 01267 241309).

Coed-y-Bwl Open Day

21 Mar – spectacular display of wild daffodils. No parking at the reserve, so shuttle service will operate. (Peter Hatherley 01656 662196).

The Mammal Society
DORMICE AND DEVELOPMENT

20 Jan, Environment Centre, Swansea. For this and other courses throughout the UK, phone 020 7350 2200 or e-mail training@mammal.org.uk
Web: www.mammal.org.uk

Ramblers' Association
FESTIVAL OF WINTER WALKS

26 Dec 2003 – 1 Jan 2004
Walks throughout Wales.
01978 855148 or email:
cerddwyr@ramblers.org.uk
Website: www.ramblers.org.uk

Shared Earth Trust
PRACTICAL HEDGELAYING & COPPICING

27 Feb 2004 at Denmark Farm Conservation Centre
01570 493358 or email:
set@denmark-farm.freeserve.co.uk

The Moth-ers Union
MOTH MEETINGS

8pm **1st Monday** of every month at Pensychnant Nature Conservation Centre, Conwy. Full details John Harold 01248 361126.

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Ionawr 12 – 14 January

Deddf Cefn Gwlad a Hawliau Tramwy – Gablygiadau ar gyfer Gwarchod Biaamrywiaeth a Amddiffyn Bywyd Gwyllt. The CROW Act – Implications for Biodiversity Conservation and Wildlife Protection

Ionawr 26 – 29 January

Trin Geiriau: Ysgrifennu am leoedd, ysgrifennu i ymwelwyr
A Way with Words: Writing about places, writing for visitors.

Chwefror 2 – 5 February

Gweithdy Cynllunio Rheali Uwch
Advanced Management Planning Workshop

Chwefror 9 – 12 February

Cyflwyniad i Reoli eich Hunan ac Eraill
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