# NATUR CYMRU

## *Nature of Wales*

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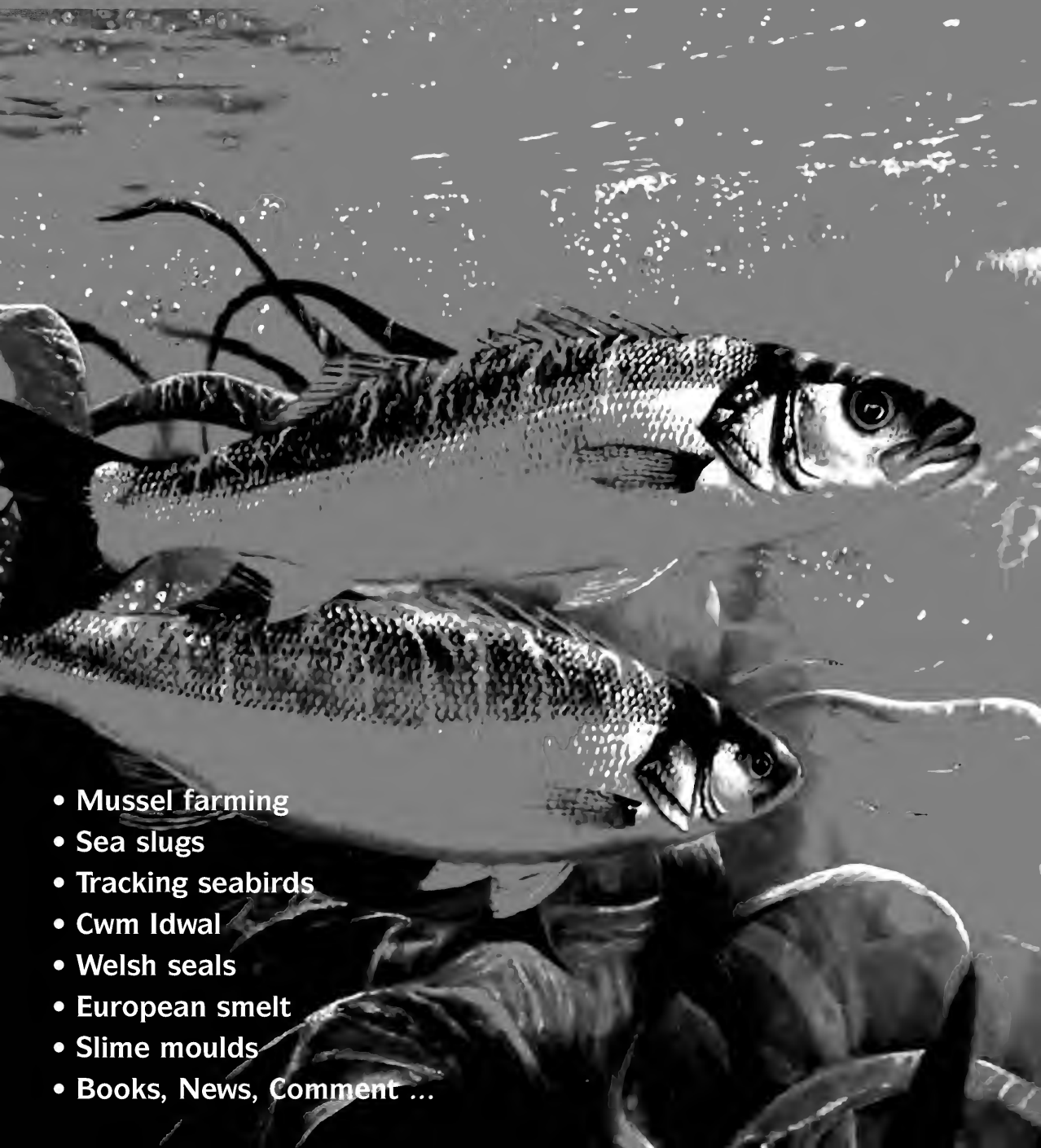

- Mussel farming
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- Cwm Idwal
- Welsh seals
- European smelt
- Slime moulds
- Books, News, Comment ...

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# NATUR CYMRU
## Nature of Wales

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*Natur Cymru* is intended to promote the exchange of information about biodiversity and encourage debate. If you have information, ideas for articles or artwork which you think might be of interest to readers, please contact the Editor.

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*Llun y clawr/Front cover: 'Bass in the Kelp' by David Miller. Limited edition prints, signed and numbered by the artist, are available: www.davidmillerart.co.uk 01994 453545.*

**Dylunio gan/Design by: Mel Parry Design, melparry1@tiscali.co.uk**

# NATUR CYMRU CYNNWYS • CONTENTS



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***NODWEDDION ARFEROL / REGULAR FEATURES***



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# NATUR CYMRU EDITORIAL GOLYGYDDOL

Artists, like other contributors to *Natur Cymru*, do not get paid, but the cover story of the autumn edition had a happy ending. A subscriber in Pembrokeshire contacted Paul Burgess the artist and bought the original of *Bridge over the River Wye*. Our latest cover, *Bass in the Kelp*, is by David Miller and just in case more than one subscriber wants it, I am pleased to say it is available as a limited edition print.

This marine-themed edition includes a rich mix of subjects including sea slugs, seals and seabirds – not necessarily selected for the alliteration. There's also the discovery of a new bristleworm, *Uncispio reesi*, which has been named after Ivor Rees, a long term supporter and contributor to *Natur Cymru*. Congratulations Ivor!

In keeping with the principle that we should cover all species, it is good to see slime moulds in the magazine for the first time. I enjoyed the article by Bruce Ing but I was also fortunate to meet him and record an item for the Radio Wales *Country Focus* programme. Bruce answered the "So what?" question with many reasons why we should cherish slime moulds as organisms that feed on bacteria: "Maybe we could develop a medically friendly strain to eat the bacteria that have developed immunity to antibiotics. It's difficult to develop resistance to something that's eating you. The challenge will be making sure the slime moulds don't go on to eat the patient!"

If, having read Bruce's article, you are still unsure as to what you should be looking for, try taking a look at the Natur Cymru YouTube channel to see Bruce describing different species at Loggerheads Country Park. Other films relevant to this edition include a dredger sustainably harvesting 20 tons of mussels from the Menai Strait and John Clark of the RSPB explaining the seabird tracking project, on a beautiful Bardsey day.

***Huw Jenkins***
***Rheolwr Marchnata*** **Natur Cymru** ***Marketing Manager***

Dyw arlunwyr, mwy na chyfranwyr eraill i *Natur Cymru*, ddim yn cael eu talu ond mae diweddglo hapus i stori glawr rhifyn yr hydref. Cysylltodd tanysgrifiwr o Sir Benfro gyda Paul Burgess, yr arlunydd, a phrynu'r gwreiddiol o *Bridge over the River Wye*. Mae ein clawr diweddaraf, *Bass in the Kelp*, gan David Miller, a, rhag ofn fod mwy nag un tanysgrifiwr yn dyheu amdano, rwy'n falch o allu dweud ei fod ar gael fel print argraffiad cyfyngedig.

Y môr yw thema'r rhifyn hwn ac mae'n cynnwys cymysgedd gyfoethog o destunau gan gynnwys malwod y môr a morloi – ac nid o angenrheidrwydd am eu cyflythreniad. Mae'n sôn hefyd am ddarganfod mwydyn gwrychog newydd *Uncispio reesi*, sydd wedi'i enwi ar ôl Ivor Rees, cefnogwr brwd i *Natur Cymru*. Llongyfarchiadau, Ivor!

Gan gadw at yr egwyddor y dylen ni sôn am bob rhywogaeth, mae'n braf gweld y ffwng llysnafedd yn y cylchgrawn am y tro cyntaf. Rwy wedi mwynhau erthygl Bruce Ing ac roeddwn i hefyd yn ffodus i'w gyfarfod a'i recordio ar gyfer eitem ar raglen *Country Focus* Radio Wales. Atebodd Bruce y cwestiwn "Pam ddylen ni?" gyda nifer o resymau pam y dylen ni gofleidio'r ffwng llysnafedd fel organeb sy'n bwyta bacteria: "Efallai y gallen ni ddatblygu straen meddygol gyfeillgar i fwyta'r bacteria sydd wedi datblygu imiwnedd i wrthfiotig. Mae'n anodd datblygu imiwnedd i rywbeth sy'n eich bwyta. Yr her fydd gwneud yn siŵr nad yw'r ffwng llysnafedd yn bwyta'r claf!"

Os, ar ôl darllen erthygl Bruce, rydych yn dal yn ansicr beth ddylech fod yn chwilio amdano, cymerwch bip ar sianel YouTube Natur Cymru i weld Bruce yn disgrifio'r gwahanol rywogaethau ym Mharc Gwledig Loggerheads. Ffilmiau eraill sy'n berthnasol i'r rhifyn hwn yw carthwr yn cynaeafu'n gynaliadwy 20 tunnell o gregyn gleision o Afon Menai a John Clark o'r RSPB yn egluro'r prosiect tracio adar y môr ar ddiwrnod hudolus ar Enlli.

# FIFTY YEARS AGO

## The progress of dairy farming in Wales?

SOME EFFECTS OF THE DUMPING OF MILK ON MOORLAND VEGETATION

W. A. Cadman and E. H. Chater

In the spring of 1956 and again in 1957, large quantities of skimmed milk were dumped on the top of the hill known as Trichrug (1,100 ft.), some five miles east of Aberayron. The effect of this dumping was as follows.

First the ground tended to absorb the milk, but very quickly pools formed. The milk soon flowed freely over the surface of the ground, finding its own way down the natural hollows and water-courses, thus forming 'flushes' of milk. In places the milk ran underground and came to the surface in the form of small 'springs' at a lower level on the hillside.

*Nature in Wales*, Volume 7 number 4, Winter 1961

This article from *Nature in Wales* goes on to describe how the "pools, flushes and springs of milk" killed the vegetation but grasses, where the milk was less concentrated, reached heights of up to three feet. Birds, attracted by the maggots and invertebrates feeding on the decomposing milk, are thought responsible for the introduction of water starwort.

Looking now at Trichrug there is no sign of the event. By 1961 the Forestry Commission was planting conifers and since then large tracts have been harvested and replanted. There is little left of the heathland surveyed by Cadman and Chater and no sign of the changes wrought by the milk.

***HILARY KEHOE explores the changing fortunes of milk production in Wales, which is driven by economies of scale with fewer farmers, cows and dairies. Is there a viable future for multipurpose cows and small producers?***

### Drinka pinta milka day

But changes in the industry that produced the milk have been dramatic. In 1956, when the *Drinka pinta milka day* slogan was introduced, there were 24,460 milk producers in Wales. The Milk Marketing Board (MMB) bought all the milk at a set price and dairying was hard but profitable work.

Shorthorn heifers

Huw Jenkins

Welsh Black cattle are hardy enough for the uplands

Owie 'Bryn Eithin', an 81 year old farmer from Llanllechid in Snowdonia, recalls: "Everyone around here, fifteen farms or more, was milking by hand. We had shorthorns, others milked Welsh Blacks and some farms had Ayrshires, there wasn't a Friesian to be seen. Every farm had ten or twelve cows, filling two or three churns of milk a day for the lorry to collect at the farm gate."

The shorthorns, described as "a mighty army, the most universally popular of all British breeds"[1] were a dual purpose cow, able to milk on poorer upland pastures and produce calves for meat. But their yields, as with the Welsh Blacks, were low at an average 200 gallons (900 litres) per cow per lactation.

### Friesians and Holsteins

The ubiquitous Friesian ousted the traditional breeds in the 1960s. Like many of his neighbours, Owie switched to milking the higher yielding cows by bucket machine and in the 1970s installed a bulk tank when churn collections stopped. However, he found it hard to make it pay and gave up in 1978.

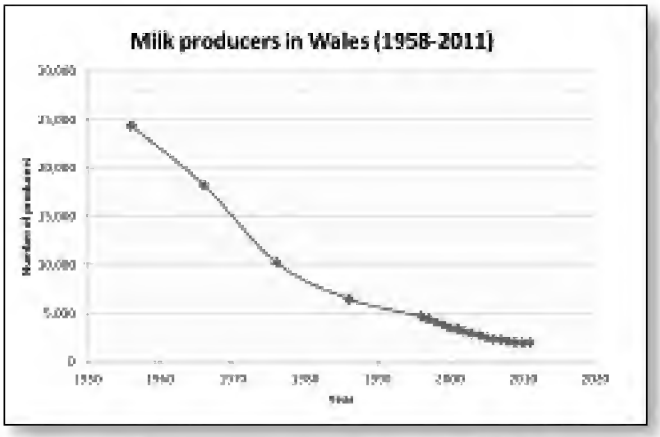
Genetic 'improvements' continued with the introduction of the Holstein which now makes up 95% of the UK dairy herd. Holsteins can produce over 10,000 litres of milk but this requires large amounts of high protein concentrates and only lasts for an average of two and a half lactations due to the stress on the cow's body.

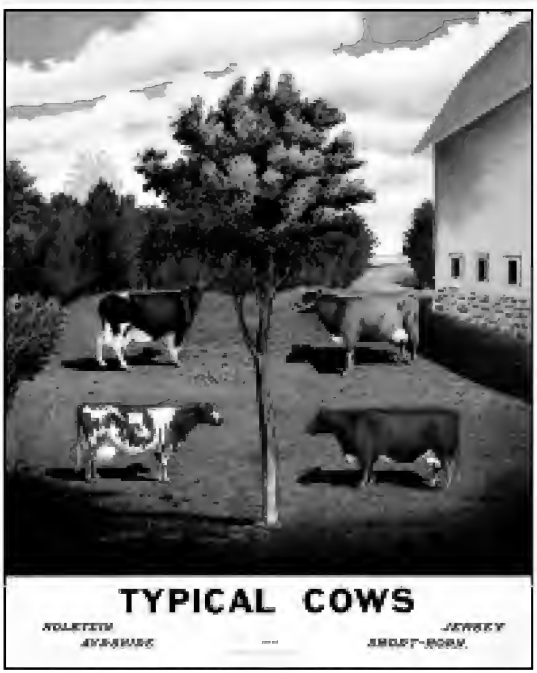
Dairy farmers are pouring out of the industry: in the past ten years the number of milk producers in Wales has halved to 1,916 – 92% down from the 1950s. Today there is just one dairy farm in the Llanllechid area but Owie reckons that, with 120 Holsteins, it produces more than double the milk from all the others put together in the old days.

Milk dumping didn't stop in 1957: it has been a way for farmers to register their protest all over the world, though they are more environmentally aware and more careful where they put it now. In 2009 German and French farmers poured a token 2 litres of milk into the river Rhine before discharging 175 tons of milk onto fields to demonstrate against low prices. UK farmers protested similarly against the supermarkets and creameries in the 1990s and 2000.

I haven't been able to confirm the culprit or the reason for the dumping which coincided with the peak of the 1950s foot and mouth epidemic; maybe that had something to do with it? By then the nearby Felinfach creamery, opened in 1951, was processing 50,000 gallons of milk a day.

A newspaper article in 1983, entitled *Half a century on the milky way*, celebrated 50 years of the MMB. It described how the creamery could now handle over 200,000 gallons of milk per day, brought in by a fleet






of tankers, to produce 5 tonnes of butter an hour, from the continuous butter maker, with the rest being converted into skimmed milk powder. The plant closed in 2007 because it was making a loss, superseded by super creameries like Wiseman's, who supply 30% of the UK's bottled milk and sold their billionth bottle of milk this year. Industrial 300+ cow dairies also use economies of scale to increase their margins.

### Hope for the future

However, there is movement in the other direction and some farmers are finding ways to stay in the business they love. Sam and Rachel Holden, who farm near Tregaron in mid-Wales, make Hafod Cheddar from their 65 organic Ayrshire cows (*Natur Cymru 33:4*). The farm lost money for ten years before they decided to add value to their produce by developing the cheese, which now sells throughout the UK. The Ayrshires have lower yields than Holsteins but are more sustainable. They eat less, make better use of forage, stay in the herd for five or six lactations, and produce the perfect milk for the cheese.

The *Nature in Wales* article finishes by wondering how the planted conifers will respond to the milk flushing and says "There is no doubt, however, that much benefit could accrue from the controlled application of unwanted skimmed milk to properly selected land." Small scale producers recognise the value of surplus whey as a fertiliser to improve their pastures. Sam Holden considers it an imporant part of his organic farming system and says "The Environment Agency allows us to spread our surplus whey on a 30 acre area of the farm. If it leaves the farm it becomes industrial waste but we can spread it as a by-product. We mix it with an equal volume of grey water to prevent the acidity from scorching the grass and killing earthworms, and it benefits the grass growth."

Nowadays we don't *drinka pinta milka day:* the average consumption is just over half a pint and falling, but we eat more yogurt and increasing amounts of cheese. We are not self-sufficient in dairy produce so there is a future for our Welsh dairy farms, and for the enterprising farmers, working towards a sustainable dairy business, who know what milk does to the grass and where to put it to best use.

***Hilary Kehoe*** *is grazing coordinator for Pori Natur a Threftadaeth and the Anglesey Grazing Animals Partnership: 07726 358228*
*agap@widlifetrustswales.org*

**Reference:** Rogerson, Sydney & Tunnicliffe, Charles (1951) *Both Sides of the Road*.

James Wilson


# Mariculture of mussels

***If you were able to design the optimum natural environment for large scale production of mussels you could not do better than copy the Menai Strait. HUW JENKINS experiences at first hand the ebb and flow of mussel harvesting on board the Mare Gratia.***

Mussels used to conjure in my mind a picture of a red and white gingham tablecloth, dining al fresco at a quayside bistro in Brittany. But now I see storm clouds and feel the wind and rain lash me as I sail into the Menai Strait on board the *Mare Gratia*, a mussel dredger. Protected by Anglesey, the sheltered aspect of these waters gives local producers a competitive advantage: when bad weather forces dredgers to moor up in ports around Europe, the Menai Strait fleet is in big demand. Another major facet is the huge tidal flow which generates an abundant source of food for filtering.

My ticket for being on board this exclusive cruise was to make a film commissioned by the Welsh Government to help explain ecosystems. Eventually this will illustrate a case study to promote the Natural Environment Framework but in the meantime it can be enjoyed on the Natur Cymru YouTube channel www.youtube.com/user/NaturCymru

"Mussels have been harvested here since Roman times but for the past 40 years or so we have been farming them – it's mariculture," said

James Wilson, managing director of Deep Dock Ltd which owns the dredger, and a member of the Bangor Mussel Producers Association. The association, or fishery, harvests 10,000 tonnes of mussels a year – over 50% of the UK's farmed production and five times the annual British consumption! In October 2010 they were awarded the Marine Stewardship Council (MSC) ecolabel, a certificate with global recognition for a sustainable and well managed fishery – the first enhanced fishery in the world to receive this award.

### Mussel care

Most of the seed mussels (spat) are sourced from afar, typically from the northern end of Morecambe Bay, and brought back to the Menai Strait where they are laid down on the sea bed. To begin with they are placed near the shore where the emphasis is on growing the thickness of the shell. The next year they are moved into deeper water, where they can filter and feed for longer, and in the final year to beyond the tidal zone where they can feed non-stop, bulking up prior to harvest.

Starfish are a major predator and can have a drastic effect on mussel stocks. It there is a significant infestation, the mussels are dredged and re-laid above the low water mark so that seagulls can feast on the starfish.

### The process

I was welcomed on board the smart-looking dredger for a day's harvesting and met the crew of five: the skipper, three deckhands and an engineer. Before entering the bridge I noticed everyone took off their boots and padded around on the plush carpet in their socks. It was more akin to a cruise ship than a working vessel, with spacious cabins below. We drank our coffee and chatted until it was time to start dredging.

The dredger slowed and two large nets were lowered, one on either side. We sailed in a very specific line with close attention to the sea chart on the computer. After 10 to 15 minutes it was time to haul in the nets and the skipper flicked tiny hydraulic control levers to manipulate cables on pulleys above

Huw Jenkins

Starfish prey on mussels

the bridge. The port side net was lifted and dunked in the water a couple of times to flush out the mud. Then the deckhand connected a cable to the base of the net and the whole thing was swung above a hopper and the mussels released before the net was returned to the sea. A minute later the process was repeated on the other side.

Dredging causes minimal impact to the sea bed because as the mussels filter they excrete waste and faecal matter which accumulates as a thick layer of 'mussel mud' and this is what the nets are dragged through. Obviously the process does release a huge amount of sediment which has a knock on impact elsewhere.

Water flushed the mussels from the hoppers onto a conveyor belt in the middle of the ship, carrying them upwards to where another deckhand removed unwanted things, such as wriggling flatfish, which were swiftly returned to the sea. From this point the mussels were funnelled into huge sacks in the hold, each containing up to 1,250 kg. The first sack to be filled was considered low grade and would go for processing as mussel meat because the shells were encrusted with too many barnacles.

And so the cruise continued. In the space of three hours we had harvested 20 tonnes of mussels and it was time to head back ashore.

### Water purity

With such a bumper crop of rich protein on our


Rohan Holt

Port Penrhyn dock (top) and Bangor Pier

doorstep you'd expect us north Walians to look like mussels but alas the entire harvest travels 14 hours by road to Holland for processing and onward distribution throughout Europe. A Dutch juggernaut was forklift-loaded with the big white sacks of mussels and a pallet of local lobsters and crabs was squeezed on at the end.

The British public is not particularly adventurous when it comes to eating fishy things, unless covered in batter and preferably wrapped in newspaper. The Europeans on the other hand are comparatively prolific mussel eaters, with the Dutch liking them big (60 per kilo) whereas the French like them small (90 per kilo).

The reason for sending the mussels to Europe is down to a combination of us not eating enough and the water not being pure enough. Waters in the Menai Strait are classified as grade B: in fact there are no shellfish waters around the coast of England and Wales which achieve the grade A status from which mussels can be sold immediately. The only places in Britain with grade A waters are in Scotland.

Grade A means that there are less than 230 *Escherichia coli* per 100 grams of flesh. *E.coli* is a bacterium found in the faeces of all warm-blooded animals and is used as an indicator of how much faecal pollution (human sewage or animal waste) mussels have been exposed to in the harvesting area. The eastern, Bangor end of the Menai Strait comes close to this standard with an average of 300 over recent years[1], in contrast to 613 at the western, Caernarfon end. Compared to other areas of the north-west coastline this is tantalisingly close to the standard; Porthmadog 1,291, Aberdyfi 2,940 and Barmouth 2,768.

The standard for grade B, a big step down from A, requires 90% of sampled molluscs to contain less than 4,600 and 10% of samples to not exceed 46,000! These can be sold for human consumption only after purification in an approved plant, after relaying in an approved class A relaying area, or after an approved heat treatment process. Just up the coast in Conwy, where mussels are harvested by more labour intensive and traditional means, the average *E.coli* count has been 2,116. Here they have their own treatment plant suitable for comparatively low scale production where they process 200 to 400 tonnes a year.

### Phenomenal filtering

Mussels constantly filter water in their search for food and students at Bangor University recently conducted an experiment to calculate how much per day. The experiment involved connecting a condom to the shell to hold the filtered water ready for measuring. I'm not sure how much per mussel but the calculation was that the population could in theory filter all the water passing through the Menai Strait.

### Research projects

Having a formalised research plan was a condition of the MSC certification and a draft version of this can be viewed on the association's highly informative website www.menaimusselmen.com. The plan contains over a dozen research projects covering a wide range of subjects including water quality (unrelated to the MSC standard), ecosystem effects and non-native species. Amongst the 'non-native species projects' is a review of the code of good practice which has been in place since 2008 and was drawn up by CCW and the fishermen. The main goal of the code is to prevent or limit the spread of eight species including the slipper limpet (*Crepidula fornicata*) which arrived in the Menai

Huw Jenkins

Dripping mussel mud

Strait in 2006 threatening the mussels and a whole host of marine creatures for which this area is protected.

It is thought the slipper limpets were contained within a batch of seed dredged from the English Channel but fortunately the invasion was repelled – one of the rare occasions of invasive species being eradicated in the marine environment, through dredging the affected area and then smothering any remaining limpets with a dense layer of mussels from an unaffected area. Apparently the limpets can't dig themselves out once smothered!

The code of good practice identifies red, amber and green zones with varying degrees of conditions governing the dredging of mussels and measures for cleaning equipment depending upon their distance from invasive species. The red zone covers a radius of 10 km from the problem area and has very strict conditions, amber is from 10 to 50 km whilst green is over 50 km.

In the Menai Strait we have a world class operation with the forces of nature giving us competitive edge. For this story to have a happier and more sustainable ending we need to convince Britons to eat more mussels. To my mind they are the food of the Gods and you can't have too much. Also, either we need to achieve grade A water status, which might be difficult with an ever expanding population, or else establish a local processing plant so we don't drive mussels to Europe and back.

***Huw Jenkins** is the marketing manager for* Natur Cymru *and a community reporter for Radio Wales. He gives talks to groups and societies across north and mid Wales in return for them buying subscriptions to Natur Cymru.*

1. Taking the average for the last 5 years of each of the 8 zones within the eastern Menai Strait. Statisitics held on the Cefas website www.cefas.defra.gov.uk

## Fferm danfor y Fenai

Cynaeafir 10,000 tunnell o gregyn gleision, sef hanner cyfanswm cynnyrch y DU, yn y Fenai bob blwyddyn – tipyn mwy nag sy'n cael eu bwyta ym Mhrydain! Mae'r arfer o'u cynaeafu yn y Fenai yn dyddio nôl i oes y Rhufeiniaid ond dim ond ers 40 mlynedd y maen nhw wedi cael eu ffermio'n fasnachol yma. Bellach mae'r bysgodfa wedi ennill statws 'cynaliadwy'. Mae niferoedd anferth o gregyn gleision yn y Fenai – gallent hidlo holl ddŵr y Fenai mewn un diwrnod!

Nid menter leol yw hon. Daw'r had o Fae Morcambe a chânt eu symud yn raddol o fan i fan yn y Fenai er mwyn sicrhau'r cyflyrau bwydo gorau iddynt wrth dyfu. Os oes gormod o sêr môr yn eu hysglyfaethu caiff y cregyn eu carthu a'u taenu uwchben y llinell drai fel y gall y gwylanod loddesta! Draw i Ewrop wedyn yr aiff y rhan fwyaf o bob haliad – yn rhannol oherwydd bod mwy o archwaeth at gregyn gleision yno, ond hefyd oherwydd nad yw'r dŵr yn ddigon glân yma i'r cregyn gael eu gwerthu'n uniongyrchol heb eu trin ymhellach.

Mae statws cynaliadwy'r bysgodfa yn golygu bod gan y cwmni gynllun i gynnal prosiectau ymchwil ar ansawdd dŵr ac effeithiau ecosystem ac i adolygu cod ymddygiad sy'n canolbwyntio'n bennaf ar reoli rhywogaethau estron - yn enwedig y brennig tramor. Llwyddwyd i atal y rhywogaeth hon rhag lledaenu drwy garthu'r ardal a effeithiwyd a thagu'r rhai oedd ar ôl dan haen drwchus o gregyn gleision o ardal lân.

All photos: CCW/Skomer MNR

# The sea slugs of Skomer

## ...they're slugs, Jim, but not as we know them...

Sea slug *Acanthodoris pilosa*

***Skomer recently celebrated its 20th anniversary as Wales' only statutory marine reserve, but what have CCW's team at the reserve been up to in that time?* PHIL NEWMAN *draws out Skomer's underwater world from the shadow of the island's more celebrated profile as a hotspot for birds.***

The small team of diving marine biologists employed by the Countryside Council for Wales (CCW) to manage Skomer Marine Nature Reserve (MNR) carries out a wide range of work. Much of it has parallels with National Nature Reserve management on land and involves implementing and enforcing byelaws and codes of conduct, raising public awareness to marine conservation, and maintaining visitor facilities such as the exhibition centre in Martins Haven and the visitor moorings in North Haven. Weekend boat patrols are carried out through the summer months to ensure visitors are aware of the MNR and the sensitivity of some of its areas. The weekend work also allows staff to maintain more than 20 years of recording recreational and commercial use of the MNR.

### Marine abundance

As well as recording people and their activities there is also a comprehensive programme of monitoring and surveillance. A wide range of marine organisms, from higher vertebrates like Atlantic grey seals to the microscopic invertebrates of the plankton, come

Pink sea fan *Eunicella verrucosa*

Ross coral *Pentapora foliacea*

under the MNR spotlight. Many are colonial organisms that are slow-growing and fragile, and often species that are more associated with the warmer waters of the south-west of Britain or even the Mediterranean. The same Gulf Stream waters that benefit the local agricultural industry keep the waters off the Pembrokeshire coast warm enough to support them this far north. Examples include the pink sea fan (*Eunicella verrucosa*), which is a Biodiversity Action Plan species and one of the UK's few protected seabed species, and the Ross coral (*Pentapora foliacea*). Both are colonial organisms made up of hundreds if not thousands of individual polyps. The sea fans at Skomer are known to be slow-growing with growth rates in larger colonies (up to 70cm wide) of less than 5mm per year. The Ross coral colonies (not true corals, but sea-mats or bryozoans) can grow up to 1m wide and provide complex structures used as refuges by other small and juvenile organisms. Ross coral colonies are, however, very fragile and easily damaged, whether it be by a boat's anchor, a lobster pot or even a diver's fin. No-anchoring codes of conduct, as well as a prohibition on mobile fishing gears, are in place to minimise impacts.

### Volunteer divers

Other species studied by the MNR team include seaweeds, sponges, cup corals, red sea fingers (*Alcyonium glomeratum*) and yellow trumpet anemones (*Parazoanthus axinellae*). Some species require more intensive effort to assess their populations effectively and for these we make use of teams of volunteer divers. There are four projects:

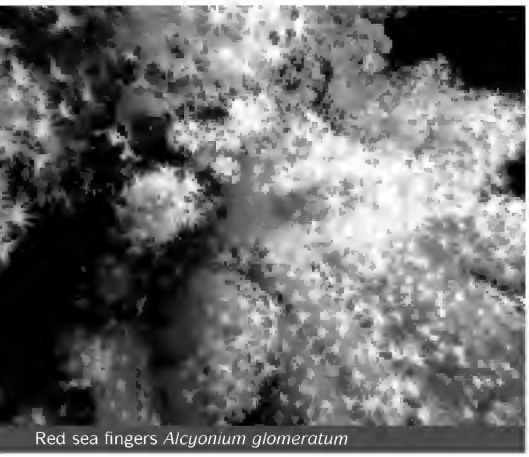
- territorial fish populations (especially the wrasse species)
- sea urchins and starfish (urchins are the main 'grazing' organism in the MNR, feeding almost indiscriminately on anything growing on rock surfaces)
- eel grass (*Zostera marina* – a true flowering plant not a seaweed)
- king scallops (*Pecten maximus* – protected from any form of fishing within the MNR).

One project is carried out each year on a rolling four-yearly programme and is open to divers, regardless of their marine biological skills, who have reached a specified level of progression in their sport.

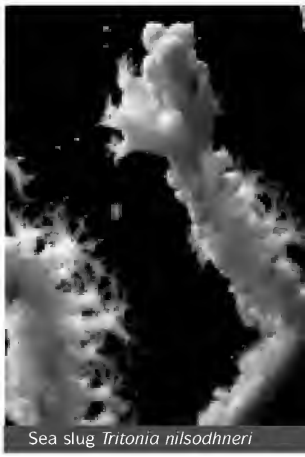
In order to better understand fluctuations in the species' populations, MNR staff also carry out environmental data recording. This includes seawater quality measurements, including temperature, salinity, pH and even water clarity, together with weather data provided by an automatic weather station – one of a network maintained by CCW as part of their Climate Change Network.

### Sea slugs

The richness of the seas around Skomer and the Marloes peninsula is evident through the statistics


Red sea fingers *Alcyonium glomeratum*


*Flabellina pedata*


Sea slug *Tritonia nilsodhneri*

generated by the MNR team. About 200 Atlantic grey seal pups are born here each year, and there are around 100 species of sponge, over 250 species of seaweed and in 2010 alone 55 species of sea slugs or nudibranchs (bare-gills). The total species list for sea slugs at Skomer now stands at 72, including nationally rare and scarce species. This is two thirds of the total for the whole of the UK, which is all the more remarkable when you consider that the area of seabed in the MNR represents less than 0.01% of UK territorial waters. Because of the importance of sea slugs at Skomer we survey for them every four years, involving as many of our volunteer divers as we can muster.

Sea slugs are a good example of the way that the species monitoring projects can give an insight into the general 'health' of the MNR, as these animals depend on a wide range of other seabed species not only for food but also as a substrate for laying eggs. In fact it is the presence of particular prey species that triggers metamorphosis from the swimming larval stage into the crawling adult. Hence the assumption that if many species of sea slugs are present then all their supporting fauna and flora are available too.

Some sea slugs can be several centimetres in length, whereas others may be smaller than a grain of rice. Quite often the only clue to a sea slug's presence is its eggs. Usually laid in ribbons or rosettes, the shape of the egg mass can help identify the species that laid them.

**Feeding habits**

The type of marine life the sea slug is feeding on can also be an important identifying feature as many are very specific in their tastes. One example is the sea fan sea slug *Tritonia nilsodhneri*, which feeds on the pink sea fan and is superbly camouflaged.

Many sea slugs feed on hydroids, usually concentrating on one particular species. Hydroids use stinging cells to capture prey and one group of sea slugs, the *Aeolidacea* (from Aeolis the Greek wind god, perhaps from the 'windswept and interesting' appearance of sea slugs in this group), put these stinging cells to good use by being able to pass them intact through their digestive system and store them in the tips of cerata on their backs. Stored in this way the stinging cells provide an effective deterrent to predators with the bright colours of the cerata providing fair warning. *Flabellina pedata* is a good example of this group and their colouration.

Another group, the *Doridacea* (Doris was a mythical Greek sea nymph), is quite different in appearance and can be distinguished by the rosette of branched gills surrounding the anus. The sea lemon (*Archidoris pseudoargus*), which can sometimes be found in rock pools, has this typical body form as does *Acanthodoris pilosa*.


Nudibranch eggs

Other sea slugs feed on specific anemones, sponges, sea squirts and sea mats, but a few have more unusual diets, such as *Favorinus blianus* that feeds on the eggs of nudibranchs and *Facelina annulicornis*, that eats other Aeolid sea slugs. Other sea slug diets include fish eggs, barnacles and there is even a species that specialises in the free-floating ocean wanderers, goose barnacles (which live attached to floating debris) and the 'by-the-wind sailor' *Velella velella*, an organism related to, but less ferocious than, the Portuguese man-o-war.

### Marine twitchers

Although related to the land slugs, their marine counterparts have proved rather more endearing to those fortunate to be able to see them in their natural setting. Indeed, many divers are now in danger of turning into marine 'twitchers', eagerly peering at tiny camouflaged shapes on hydroids, bryozoans and sponges and reaching for their identification books as soon as they get back to the beach.

From a marine conservation perspective this is infinitely preferable to the old, and thankfully largely outdated, image of the diver with goody bag and crab hook interested in nothing more from the underwater environment than a free meal!

***Phil Newman*** *is Skomer Marine Nature Reserve Officer for the Countryside Council for Wales and has worked at the MNR for 20 years. He is also a director of NATUR, the Welsh Institute of Countryside and Conservation Management.*

**Further reading**

Skomer Marine Nature Reserve Nudibranch Diversity Survey 2010, CCW Regional Report CCW/WW/10/11

Skomer Marine Nature Reserve Project Status Report 2010 CCW Regional Report CCW/WW/10/8

## Cydweithio ar gofnodion gwarchodfa forol Sgomer

Cofnodir pobl a'u gweithgareddau yn ogystal â'r bywyd gwyllt – o blancton microsgopig i forloi llwyd – yng ngwarchodfa forol Sgomer. Cesglir data hefyd am yr amgylchedd, boed yn dywydd neu'n dymheredd dŵr môr. Mae Llif y Gwlff yn golygu bod nifer o rywogaethau cytrefol y warchodfa, fel y cwrel Ross, yn fwy nodweddiadol o ddyfroedd cynnes de-orllewin Prydain neu Fôr y Canoldir. Gall plymwyr ein helpu i gofnodi, waeth beth fo'u cefndir mewn bywydeg morol. Mae prosiectau i hel data am boblogaethau pysgod tiriogaethol, draenogiaid a sêr môr, gwellt y gamlas a chregyn bylchog yn gofyn am gryn gymorth gan wirfoddolwyr. Maen nhw hefyd yn ein helpu i gofnodi môr-wlithod.

Mae 72 math o fôr-wlithod yn nyfroedd Sgomer. Maen nhw'n ddibynnol ar rywogaethau eraill ar wely'r môr sy'n fwyd iddynt ac yn cynnig mannau i ddodwy. Yn wir, presenoldeb un math o brae sy'n achosi'r newid o larfa i oedolyn. Ar fwydlen gwahanol rywogaethau mae anemonïau, sbyngau, chwistrellau, wyau pysgod a hyd yn oed slefrod môr. Os oes nifer o fôr-wlithod yn bresennol, gellir cymryd bod y creaduriaid a'r planhigion sy'n eu cynnal hefyd yn bresennol ac felly maen nhw'n arwydd da o iechyd yr ecosystem.

All photos: ©RSPB Andy Hay

# Seabird tracking from Bardsey

Black-legged kittiwakes

*It's comparatively easy to monitor birds on land: tracking them in the air and at sea presents a whole new set of challenges, but the reward is a greater understanding of bird behaviour and of ecosystem functioning as a whole.* ***JOHN CLARK*** *outlines some of the techniques.*

Across the UK the RSPB has been focusing on the foraging behaviour of seabirds as a valuable indicator of marine ecosystem functioning, and to identify potential interactions with marine developments. With support from an Environment Wales biodiversity grant, the RSPB was able to employ two research assistants on Bardsey Island in 2011, to track breeding seabirds in their search for food.

Our team deployed lightweight GPS tags on 57 individual birds from two species; black-legged kittiwake and razorbill. Of these, 31 were recaught and the data downloaded, which is a high recapture rate for these species. These tags give the location of a bird to an accuracy of 5 to 15 metres, and were set to record once every 100 seconds. This provides extremely detailed tracks of individual bird's movements at sea. Within the track it is easy to differentiate between those areas where the bird has a slower passage time and / or increased turning frequencies, and those areas with faster and more directional travel. The latter is representative of transit to, from and between foraging areas and the former is either the bird sitting on the water, or actively foraging. Dive

loggers were also deployed on 22 razorbills to obtain information on dive depth and frequency.

Using seabird tracking data from Bardsey and other colonies around the UK, the RSPB is identifying the locations where behaviour typical of foraging occurs. Combined with data on benthic habitat and other environmental factors (e.g. physical oceanography), statistical techniques can then be applied to infer connections between foraging and the marine environment. This process has resulted in a valuable foraging / habitat association model.

As well as giving us valuable insights into our seabirds' habits, the 'product' of this tracking work will inform developers and Government(s) on renewable energy development, marine spatial planning, fisheries management, and identification of Marine Protected Areas (MPA).

The GPS tracks show us where the birds went, but the critical question is why. The relationship between habitat type and foraging behaviour can be inferred from the shape and speed of the track. Habitat, such as the surrounding subtidal sandbanks of the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC), often influences the type and reliability of prey. This is particularly important when seabirds are under pressure to feed themselves and their chicks. Another important factor for breeding seabirds is to balance travel to and from the colony with foraging in the most productive areas. Understanding how far and how often individual birds will travel provides a valuable insight into energy expenditure and the overall health of a colony.

### Razorbills

The RSPB has experience of tracking seabirds on a number of colonies around the UK as part of the FAME (Future of the Atlantic Marine Environment) project and Bardsey has provided an insight into the variation in foraging behaviour. In particular, the site has been valuable for obtaining results from razorbills, which are often a more challenging species to capture. Large numbers of razorbills breed around boulders at the base of the sea cliffs on the east coast of the island. By carefully moving through the boulder fields, birds nesting under and between the rocks can be quickly captured by hand. This method causes very little disturbance, and allows adults to be released back to specific locations to be with their eggs and chicks.

In 2011 the razorbills that were tagged on Bardsey typically fed to the west, within about 40km of the island, which was far less than the distance measured at some other colonies in the UK. Those that stayed away from the island overnight tended to rest on the water, drifting for many kilometres in the Irish Sea with the ebb and flow of the tides. Dive depths were usually less than 15 metres, relatively

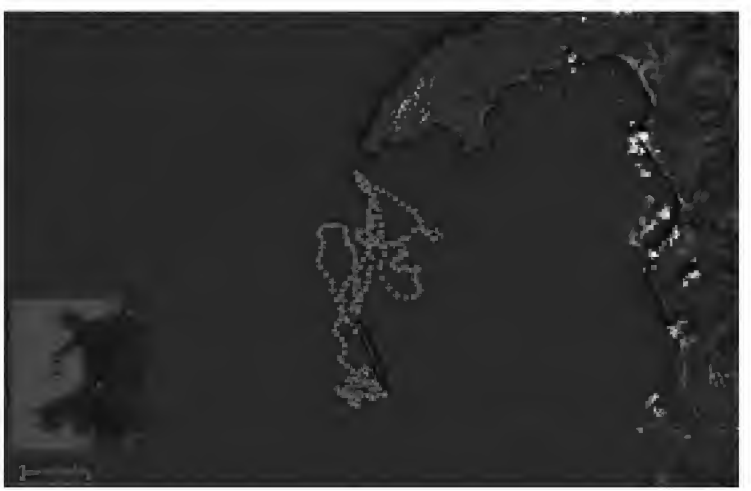

Razorbills

**Example track - razorbill**
The tag records one position every 100 seconds: where the points are close together the bird is moving slowly, and where the points are far apart it is flying between areas. This razorbill left the colony about 8pm and flew 23km to the southwest before landing on the water an hour later. Over night it drifted with the tide, a total of 13km (the 'J' shaped loop in the track). At dawn (about 3am), it began foraging, mixing short search flights with diving, no deeper than 5m, still transported by the tide. By 6am it had started a rapid return flight to the colony, as shown by the greater spread of points in the upper track.

shallow compared to razorbills from other colonies. These shallower dives and relatively short distances travelled suggest that the razorbills on Bardsey find it easier to find food than at other places in the UK, at least in the year that the study was running.

### Kittiwakes

In comparison, tracked kittiwakes foraged in all directions within 40 km of Bardsey Island, which again is much less than the maximum foraging distance measured for this species at other study sites. Typically the birds flew direct from the colony until encountering a potential prey patch, where their track became tightly sinuous as they searched for food, before flying on to a new patch or back to the colony. Like the razorbills, at night the birds would rest on the water drifting with the tides. The use of the tide in this way was seen quite often in seabirds from Bardsey in 2011.



**Example track - kittiwake**
This kittiwake left the colony just before 6pm and flew south for 30km before starting an intensive search for food (cluster of dots at southern point). As darkness fell (after 10pm) it landed on the water and spent the night drifting with the tide until dawn (4am) when it began a searching flight en route to the colony. Later in the morning it made a shorter (22km) trip to the southeast in a figure of eight shape.

### Turn of the tide

On the whole, Welsh seabird colonies are not displaying the dip in productivity recorded from areas in the North Sea, and biometrics from birds tracked at Bardsey indicate that these Welsh seabirds are in good condition at the moment, but it is important to keep monitoring them so that we can detect any changes early.

Tracking data from Bardsey is contributing towards the FAME project. This wider study is being delivered by partners, including the RSPB, from the Atlantic-facing countries in Europe, and represents one of the largest seabird tracking datasets in the world.

With an increase in offshore development, this data

is valuable in assessing potential impacts, as well as helping define the most important foraging areas for seabirds, and how best to manage these marine areas. The RSPB is working with the UK governments to look at the best ways to ensure seabirds are protected at all stages of their lifecycle, and how measures such as protected sites and marine spatial planning may help to achieve this.

We are running a campaign to show public support for MPAs to protect seabirds. If you would like to support our campaign, please sign our online pledge, or visit our website for more ideas on how you can step up for nature **www.rspb.org.uk/marinepetition**.

*__John Clark__ is marine policy officer for RSPB Cymru. Bardsey Island is a National Nature Reserve: for details on how to visit, see page 45.*

**Acknowledgements:**
The RSPB would like to thank Environment Wales, for receipt of a Biodiversity Grant to support this project. Liz Mackley and Jenni Taylor were responsible for collecting the data in 2011, and the project was managed by Ellie Owen, with support from Alistair Moralee. We would also like to thank the Bardsey Bird and Field Observatory Trust for vital support throughout the field season, and to acknowledge the Bardsey Island Trust and the Countryside Council for Wales.

## Dilyn adar môr Enlli

Bu ymchwilwyr yr RSPB yn dilyn siwrneiau bwydo gwylanod coesddu a llursod oddi ar Enlli yn ystod haf 2011. Pwrpas y gwaith oedd casglu gwybodaeth am ddulliau bwydo mewn perthynas â chynefin er mwyn gallu deall effeithiau posib datblygiadau yn y môr. Bu'r gwaith yn arbennig o bwysig o ran dysgu mwy am llursod. Roedd yr adar yn teithio 40km o'r ynys (siwrneiau llai nag mewn rhannau eraill o'r DU) Roeddent hefyd yn plymio i ddyfnderoedd llai ac yn gwneud mwy o ddefnydd o lif y llanw nag mewn mannau eraill yn y DU. Oherwydd bod yr ymdrech i fwydo yn llai mae'r adar hyn yn gwneud yn dda iawn.

Mae'r wybodaeth yn cyfrannu at brosiect i gasglu data tracio o holl wledyddd Ewrop sy'n wynebu'r lwerydd, Mae'r wybodaeth y ddefnyddiol i asesu ardrawiadau posib ac i ddiffinio ardaloedd bwydo pwysicaf ar gyfer adar môr. Mae gofid nad yw'r Llywodraeth yn blaenoriaethu adar môr wrth ddewis ardaloedd morol i'w gwarchod ar lefel y DU ac Ewrop. Bwriada'r RSPB gynnal ymgyrch i ennyn cefnogaeth y cyhoedd i newid hyn.

Richard Outram

# Cwm Idwal – drwy lygaid warden

*Mae'r berthynas rhwng warden a gwarchodfa natur yn un arbennig iawn. Dros gyfnod o ugain mlynedd mae Gwarchodfa Natur Genedlaethol Cwm Idwal wedi bod yn ail-gartref bron i* ***HYWEL ROBERTS****, sydd wedi gweld a dysgu llawer o ganlyniad i'r newidiadau sydd wedi bod ar droed yn y Cwm...*

Cwm Idwal oedd y Warchodfa Natur Genedlaethol gyntaf i gael ei dynodi yng Nghymru. Gwnaed hynny gan y Warchodaeth Natur nôl ym 1954. Hawdd yw i mi gofio'r dyddiad gan mai hon oedd blwyddyn fy ngeni ac felly mae'n anorfod fy mod yn edrych ar hanes rheolaeth y safle hwn ochr yn ochr â hanes fy ngyrfa innau!

Sefydlwyd Cwm Idwal yn Warchodfa Natur Genedlaethol oherwydd y cyfoeth o nodweddion naturiol, megis ffurfiau daearegol a geomorffolegol, planhigion prin a chymunedau o blanhigion mynyddig nodedig.

Etifeddais drefn o reolaeth a sefydlwyd gan y Warchodaeth Natur – corff a ddilynwyd maes o law gan y Cyngor Gwarchod Natur, ac yna'r Cyngor Cefn Gwlad (CCGC). Er i brydles 99 mlynedd gael ei chytuno gyda'r Ymddiriedolaeth Genedlaethol, sef perchennog y tir, nôl ym 1954 roedd yna eraill â diddordeb yn y safle hwn. Roedd gan ddwy fferm hawl i bori defaid ar y mynydd

ac roedd hyn yn cael effaith andwyol ar ddatblygiad naturiol y llystyfiant. Â hwythau heb fodd i reoli patrwm a phwysau'r pori, yr unig beth y gallai'r cyrff cadwraeth ei wneud oedd gwylio'r safle a monitro'r newid yn y llystyfiant.

Mi roedd yna gyfleoedd wrth gwrs, i ddangos y nodweddion arbennig i ymwelwyr drwy gyfrwng teithiau tywys a llyfryn gwybodaeth cynhwysfawr. Dros y blynyddoedd bûm yn cyd-gerdded a thrafod gydag amrywiaeth helaeth o grwpiau ac unigolion, o fyfyrwyr ysgol a choleg i arbenigwyr byd-enwog. Daeth enwau enwogion y gorffennol, fel Adam Sedgwick, A.C.Ramsay a Charles Darwin, yn fyw drosodd a thrachefn wrth i mi egluro pa mor allweddol oedd nodweddion Cwm Idwal i ddatblygiad syniadau'r bobl hyn ynglŷn â sut ffurfiwyd y Ddaear.

Dysgais fod arbenigwyr yn gymysg â phobl gyffredin ar y safle ac nad oes modd gwahaniaethu rhyngddynt ar yr olwg gyntaf – ac mae hyn wedi bod yn addysg dda i mi. Rhaid dewis geiriau yn ofalus wrth siarad gyda chriwiau; unwaith, cefais fy nghywiro'n ddistaw bach gan ddaearegwr enwog am wneud camgymeriadau wrth geisio dehongli daeareg Cwm Idwal i ddyrnaid o naturiaethwyr! Roeddwn yn anghywir ynglŷn â'r dyddiad y ffurfiwyd yr haenau craig sy'n cynnal y planhigion arctic-alpaidd. Fel dywedodd rhywun unwaith, 'mountains are great levelers of people'! Ni wyddoch pwy sy'n sefyll nesaf atoch ar y mynydd – mae athrawon ac arbenigwyr enwog yn edrych yr un fath â dringwyr eraill ar y mynydd yn eu dillad mynydda. Y neges glir i bob arweinydd yw bod angen trosglwyddo ffeithiau cywir i bob ymwelydd, o ddisgyblion ysgol cynradd i'r arbenigwyr gwyddonol.

Toc ar ôl i mi lanio yng Nghwm Idwal roedd rhaid i mi ail-sgwennu cynllun rheolaeth y safle yn dilyn trefn newydd y CMS (y 'Countryside Management System'). Rhaglen gyfrifiadurol gynhwysfawr yw hon bellach. Dyma'r newid mwyaf a brofais, o ran dull o weithio, ers dechrau fy ngyrfa fel rheolwr gwarchodfa natur. Mi ddylai fod yn haws, yn enwedig dros amser ac wrth i staff symud swyddi, i gael gafael ar gofnodion o'r cyfrifiadur nac o lyfr nodiadau maes. Ond mae llwyddiant CMS yn ddibynnol ar ansawdd a chywirdeb y wybodaeth sy'n cael ei mewnbynnu, ac ar gysondeb yn y drefn o gynllunio'r gwaith rheolaeth a monitro'r safle. Mae llawer o waith i'w wneud o hyd ar hyn, gan fod cymaint o wahanol agweddau ar reolaeth safle fel Cwm Idwal, o ofalu am y bywyd gwyllt a'r ddaeareg i warchod buddiannau'r cyhoedd ac estyn cyfleoedd iddynt fwynhau a gwerthfawrogi'r lle.

Wrth weithio ar adolygiad y Cynllun Rheolaeth, hawdd oedd gweld nad oedd rheolaeth y safle yn berffaith o bell ffordd. Nid oedd unrhyw fai ar gyn-reolwyr y safle na'r cyd-reolwyr, sef Yr Ymddiriedolaeth Genedlaethol (perchnogion y tir), ac Awdurdod Parc Cenedlaethol Eryri (gan fod y safle o fewn ffiniau'r Parc), na'r ffermwyr oedd â hawl pori ar gyfer cannoedd o ddefaid.

Hywel Roberts

Tir sydd heb ei ffensio erbyn hyn, ond a arferai fod yn dir pori caeedig: mae geifr wedi rhwygo'r rhisgl oddi ar ambell goeden • A former grazing exclosure, now unfenced: goats have stripped the bark from some of the trees.

CCGC/CCW

Tormaen yr eira *Saxifraga nivalis* • Snow saxifrage

Dros y blynyddoedd, ac ers y dynodiad ym 1954, gwnaed y gorau posibl o fewn cyfyngiadau cyllid, staff a sgiliau. Oherwydd prinder adnoddau canolbwyntiodd y gwaith rheolaeth ar ddatblygu a chynnal llwybrau o amgylch Llyn Idwal a'r Ro (y sgri enfawr ym mhen gorllewinol y Cwm), yn bennaf er mwyn diogelu nodweddion y safle. Er enghraifft, gwellwyd y llwybr er mwyn ceisio sicrhau y byddai cerddwyr a dringwyr yn osgoi peri niwed damweiniol i blanhigion bach prin fel y tormaen siobynnog (*Saxifraga cespitosa*) a thormaen yr eira (*Saxifraga nivalis*), wrth grwydro i'w dewis-leoedd yn y cwm. Nid yw gwelliant y llwybr wedi atal botanegwyr brwd rhag chwilota ac edmygu'r planhigion, a gallaf ond obeithio bod y garfan hon yn parchu'r ffaith fod y planhigion hyn mewn cyflwr bregus iawn, ac yn hawdd eu disodli o'r graig. Crëwyd llwybr arall ar hyd ochr y farian gyfochrog, er mwyn diogelu cyflwr y nodwedd ddaearegol hon o Oes yr Ia, sy'n llawer mwy o faint, ac sy'n ymddangos yn llawer mwy gwydn na'r planhigion arctig-alpaidd. Tan yr 1980au 'roedd ymwelwyr yn cael eu hannog i gerdded ar grib y farian er mwyn edmygu'r nodwedd, ond roedd hyn yn achosi erydiad a fyddai yn y pen draw wedi peri difrod sylweddol. Rhaid cofio nad pwysau pobl yn unig oedd yn cyfrannu at yr erydiad; roedd y tywydd garw ynghyd â'r pwysau pori trwm dros y blynyddoedd yng Nghwm Idwal hefyd wedi gwneud y ddaear yn fregus iawn.

Ond, ac efallai yr un mor bwysig â diogelu nodwedd rewlifol, 'rydym wedi sicrhau bod o leia' un o 'filwyr Prydain' yn parhau i gysgu yn ei fedd, gan fod chwedloniaeth yn sôn mai beddau milwyr Prydain yw'r marianau cyfochrog!

Nepell o'r farian mae ardal o tua 400msq wedi ei chau rhag pori ers y 1970au. Codwyd ffens o gwmpas y darn yma o dir a thrawsblannwyd plu'r gweunydd er mwyn sefydlogi mawn noeth a'i arbed rhag llithro i mewn i Lyn Idwal. Erbyn hyn mae yma orchudd trwchus o rug (*Calluna vulgaris*) a grug cyferbynddail (*Erica tetralix*), gydag ambell goeden criafol (*Sorbus aucuparia*), bedw (*Betula pendula*) ac eithin mân (*Ulex gallii*). Ar y tir mawnog rhwng y marianau gwelir hefyd blu'r gweunydd (*Eriophorum angustifolium*) a rhagor o rug cyferbynddail. Yn y mawn ceir gweddillion coedlannau hynafol sydd wedi eu cadw rhag pydru - yn dystiolaeth gadarn bod y Cwm wedi ei orchuddio gan goed filoedd o flynyddoedd yn ôl, cyn dyfodiad Dyn, ac efallai cyn newidiadau hinsawdd hanesyddol.

Mae'r llain hon o dir yn dangos newidiadau llawer mwy amlwg na'r ddwy lain gaeëdig arall yn y Cwm. Mae'r ddwy lain arall, sy'n mesur 25 x 25m, yn rhan o gyfres a sefydlwyd yn y 1960au i ymchwilio effaith gwahanol lefelau o bori ar wahanol lystyfiant. Y ddau fath o lystyfiant dan sylw yw tyfiant ar dir o natur galchog (neu lai sur na'r cyffredin yn y mynydd) a thyfiant ar dir sur. Yn anffodus, cefais wybod gan fy

CCGC/CCW

Tormaen siobynnog *Saxifraga cespitosa* • Tufted saxifrage

rhagflaenydd yng Nghwm Idwal, Iorwerth Ellis Williams, nad oedd y lleiniau tir hyn wedi osgoi dylanwad pori yn gyfan gwbl. Daeth ffermwr y Cwm ato un diwrnod a dweud wrtho ei fod yn ddiolchgar iddo am ddarparu lle ardderchog i gadw'r meherin am ychydig ddyddiau! Er hyn, ac er eu maint bach, mae'r lleiniau 'di-bori' wedi dangos y potensial i wella cyflwr y llystyfiant (o ran byd natur) dros y Cwm ac yn ehangach drwy ucheldir Eryri. O achos ei maint mae'r llain tir rhwng y mariannau yn dangos datblygiad llawer gwell o lystyfiant naturiol y mynydd, ac yn rhoi gwell argraff o'r hyn a allai fod yn bosib dros weddill y Cwm. Wrth blygu yn eich cwrcwd o fewn llain y marian, yng nghanol yr haf, hawdd yw dychmygu eich bod yng nghanol Cwm llawn grug a lliwiau cyfoethog, gydag ambell goeden fechan fan hyn a fan acw. Darlun o'r hyn allai fod gyda pharhad y prosiect presennol i reoli nifer y defaid.

Yn nechrau'r 1990au, gyda dynodiad Eryri fel Ardal Cadwraeth Arbennig ('Special Area of Conservation'), trwy ddeddfwriaeth Ewropeaidd, ac yn sgil ymddeoliad un o'r ffermwyr oedd â hawl pori yn y Cwm, daeth cyfle i CCGC brynu'r hawl pori. Gweledigaeth Dr Barbara Jones, ecolegydd yr ucheldir o fewn CCGC ar y pryd, oedd y prosiect, ac mae wedi bod yn brofiad cyffrous gweld y newidiadau sydd wedi digwydd, a gobeithio fydd yn parhau i ddigwydd, yn sgil y prosiect hwn.

Nod y prosiect yw gwella cyflwr y cymunedau a'r rhywogaethau mynyddig, ac yn enwedig y gymuned Arctic-Alpaidd, sydd ar ei ffin mwya' deheuol ym Mhrydain yn Eryri, ac sydd dan fygythiad oherwydd effaith newid yn yr hinsawdd. Rhai o'r rhywogaethau prin a bregus 'rwyf wedi eu gwylio, a'u cofnodi dros y blynyddoedd yw'r tormaen porffor (*Saxifraga oppositifolia*), brwynddail y mynydd (*Lloydia serotina*), thormaen yr eira (*Saxifraga nivalis*), a tormaen siobynnog (*Saxifraga cespitosa*). Yn ôl fy nghofnodion i mae cyflwr y ddwy rywogaeth olaf wedi dirywio yn arw dros y blynyddoedd diwethaf. Er enghraifft mae tormaen yr eira wedi lleihau mewn nifer, o 15 planhigyn gydag 1 blodyn yn 2000, i 3 planhigyn gyda 2 flodyn yn 2011, mewn un lleoliad, ac o 85 planhigyn gydag 1 blodyn i 6 planhigyn gydag 1 blodyn yn 2011. Gallaf ond obeithio bod ffynhonnell o hadau yn parhau yn y pridd, a bod planhigion eraill efallai'n bodoli ar y clogwyni uwch,

Hywel Roberts

Nid yw'r bryncyn bach ar y dde wedi'i bori er 1987, ac nid yw'r tir sydd wedi'i ffensio wrth droed y bryncyn wedi'i bori er 1970. Ar y tir blaen, mae pori wedi'i wahardd er 1998.
The mound on the right has not been grazed since 1987, and the fenced area at its foot not since 1970. In the foreground, grazing has been excluded since 1998.


CCGC/CCW

Tormaen porffor *Saxifraga oppostifolia* • Purple saxifrage

fel Clogwyn y Geifr, uwchben y lleoliad hysbys presennol o boptu'r Twll Du.

Dim ond trwy wylio, cofnodi, a lleihau dylanwadau andwyol y gallwn ddarganfod sut i sicrhau dyfodol y nodweddion hyn.

Er bod y niferoedd uchod yn awgrymu tranc a dirywiad ym mhoblogaeth rhai o'r rhywogaethau pwysicaf, mae gobaith bod y prosiect i wared pori o'r Cwm yn dwyn ffrwyth ar ôl dros 10 mlynedd - erbyn hyn mae'r grug yn taflu gwawl porffor dros y cwm yn yr haf. Dengys fy nghofnodion bod y gawnen ddu (*Nardus stricta*) a oedd yn cynrychioli 65% o'r llystyfiant mewn mannau, wedi ei ddisodli gan rug (*Calluna vulgaris*),a oedd yn anweledig ar ddechrau'r cyfnod ond sydd rŵan yn cynrychioli 80% o'r llystyfiant yn yr un lleoedd. Caiff y patrwm hwn ei ail-adrodd mewn sawl man ar draws y safle a gwelir bellach rhai rhywogaethau nad oeddent yn cael cyfle cynt i flodeuo, fel llafn y bladur (*Narthecium ossifragum*). Hefyd mae'r pwysau pori ysgafnach yn helpu lledaenu poblogaethau planhigion arbennig sy'n tyfu ar y silffoedd creigiog ar glogwyni uchel fel Clogwyn y Geifr. Mae'r casgliadau hyn o lysiau blodeuog tal ar silffoedd craig yn un o nodweddion pwysicaf y safle. Ymhlith y gymuned hon o blanhigion mae mantell Fair (*Alchemilla glabra*). Fe fydd yn ddiddorol gweld dros y blynyddoedd pa gymuned fydd yn ffynnu ar waelod y clogwyni – a fydd y llysiau blodeuog tal yn lledaenu o'r clogwyni uwch neu a fydd llwyni corachaidd y grug yn lledu o'r llechweddau islaw? Mae un dylanwad negyddol iawn i'w ystyried yn y darlun cyfan, sef effaith y geifr gwyllt ar y llystyfiant. Nid oes llawer o blanhigion llysieuol y silffoedd creigiog yn llwyddo i flodeuo ar hyn o bryd – os ydym am newid hyn rhaid rheoli'r geifr. Nid mater hawdd yw gwneud hyn gan fod y geifr yn cael eu gweld fel un o nodweddion hynod Eryri, ond maent yn bygwth nodweddion eraill cynhenid a phwysicach. Rhaid anelu felly at ddileu'r boblogaeth o eifr gwyllt o'r Cwm; mater dadleuol yw hyn ond credaf bod modd ennill tir os gwnawn ni lwyddo esbonio'n eglur pam fod hyn mor angenrheidiol, o safbwynt y bywyd gwyllt sydd mor bwysig mewn cyd-destun Cymreig ac Ewropeaidd.

Mae'n deg cydnabod nad yw pawb yn hollol fodlon ar fabwysiadu dull gwahanol o reoli'r Cwm. Mae'n gwyrdroi'r ffordd 'draddodiadol' o amaethu'r ucheldir ac mi allai hefyd olygu bod nodweddion daearegol pwysig, fel y marianau yn diflannu o'r golwg dan dyfiant grug. Mae'n bosib y byddai rhai rhywogaethau ar eu colled yn y cwm pe bai'r lefel pori'n gostwng. Mae'n ymddangos, er enghraifft, nad oes cymaint o gnwpfwsoglau yn y borfa erbyn hyn ac nid yw'n hawdd bellach dangos y tri math


CCGC/CCW

Adeiladu llwybr troed • Footpath building

gwahanol o gnwpfwsogl *Huperzia selago*, *Lycopodium clavatum* a *Diphasiastrum alpinum* i grwpiau o fyfyrwyr. Hefyd mae newid wedi digwydd yn nifer rhai o adar y mynydd. Ond tybed a yw hyn yn adlewyrchu tueddiadau a dylanwadau ehangach, sydd tu hwnt i'n rheolaeth yma yng Ngogledd Cymru? Un aderyn sydd efallai yn gweld gwahaniaeth oherwydd newidiadau i'r drefn reolaeth yw'r frân goesgoch – anaml y byddaf yn gweld yr adar hyn yn yn ymweld â'r Cwm i fwydo rŵan. Mae angen porfa fer ar y rhywogaeth hon er mwyn i'r adar fwydo ar drychfilod yn y pridd. Gyda chynnydd yn uchder a thrwch y borfa nid yw hyn yn bosibl rhagor. Ond yr ateb i'r rhai sydd yn pryderu am 'golli' rhai rhywogaethau yw eu bod yn parhau yn niferus ar dir mynydd cyfagos, ble mae'r pori yn dal i gynnal llystyfiant byr.

Fel y gwelwch, mae gwarchodfeydd natur – ynghyd â'r bobl sy'n eu rheoli - yn newid yn gyson dros amser. Mae'r profiad o reoli Cwm Idwal wedi bod yn fraint i mi, ac mae wedi rhoi cyfle i mi ddysgu a datblygu fel unigolyn yn ogystal â rhoi cyfleoedd i mi rannu gwybodaeth a phrofiadau gydag eraill.

***Hywel Roberts*** *yw Uwch Reolwr Gwarchodfeydd CCGC ar warchodfeydd Gogledd Eryri (Yr Wyddfa, Cwm Idwal a Cwm Glas Crafnant, a Coedydd Aber).*

Hywel Roberts

## Cwm Idwal – through a warden's eyes

Wardens and their reserves enjoy special relationships. Over 20 years as a reserve warden for Cwm Idwal, Hywel Roberts has seen numerous changes in the landscape as well as shifts in management approaches. Constraints in terms of resources and skills meant that the role of environmental agencies, in the past, was largely confined to that of observer and monitor. Proactive management was mainly confined to managing the few key access routes around the Cwm and ensuring that climbers and walkers avoided causing accidental damage to the fragile Arctic-alpine plants. However, recent opportunities have enabled more radical interventions to take place, including reducing grazing pressure across the Cwm in order to help the vegetation develop more freely. In turn, the changes within the Cwm have helped Hywel develop and learn as an individual, and share his knowledge with others.

Mandy McMath

# Seals of Wales

***How many? What type? Where do they go? What problems do they face? How do you recognise them? These and many more questions are considered by MANDY MCMATH, who has been studying our seals for many years.***

The vast majority of seals seen around Wales are grey seals (*Halichoerus grypus*), with a few harbour or common seals (*Phoca vitulina*) just visiting from Irish colonies. The biology, life-history and movements of grey seals in Wales have long been of interest. From the late 1940s onwards much work was done at Skomer, Ramsey and other parts of Pembrokeshire. Several reports on seals were published in *Nature in Wales*, the forerunner of *Natur Cymru*. Notable from this time were the writings on seals by the renowned Pembrokeshire naturalist Ronald Lockley, while the excellent *New Naturalist* volume on British Seals by H.R. Hewer was based in part on studies in Pembrokeshire, as was a later book by Sheila Anderson. Over several seasons moulting pups on Ramsey were weighed and tagged by Hewer. Recoveries showed how widely the young seals disperse, several being found in Brittany and in the west of Ireland, with one even getting to the north

coast of Spain. In recent years similar wide patterns of dispersal have been shown by some Welsh seals equipped, as moulted pups, with satellite tracking devices by the Sea Mammal Research Unit. Tracking shows that they initially move short distances or, when first at sea, may be carried back and forth by tidal currents before travelling much further away. For example, one born on the Skerries off north Anglesey went to southeast Ireland before continuing south to Brittany and back to Cornwall in the first winter. Outside the breeding season the mature seals also disperse more widely. Before the early 1950s seals were seldom seen near Hilbre Island in the river Dee. John Craggs and other researchers showed how numbers built up using the sand banks in Liverpool Bay to haul out, and by 2000 there were sometimes over 500 counted.

Around the British Isles there are three somewhat separate grey seal populations, although there is some mixing of the juveniles. The Welsh seals belong to a south-western group which has slightly differing breeding habits from those in Scotland and on North Sea coasts. In Wales up to 40% of pups are born on boulder beaches at the back of sea caves, with most of the remainder in coves or gullies often with little space above the reach of waves on spring tides. Mothers, pups and attendant bulls spend more time in the shallow water than other populations. Pups

Mandy McMath

from about five days old can be seen swimming and playing in the water, on their own or with their mother, but rarely with other pups. This may be an advantage in that the pups are experienced swimmers, perfectly at home in the water by the time they are weaned – or earlier if sea conditions require them to swim sooner. The breeding season in Wales is earlier in the autumn than further north. Nevertheless, pup mortality in a cove on Ramsey, where space is restricted, was about twice that on a low lying Orkney island. Recent genetic work supports conclusions, from the behavioural differences, that the south-western group of seals is relatively distinct.

**Weight at weaning is vital**

A very important finding from the early weighing and tagging work was that the weight seal pups reach before weaning, moulting and going to sea independently, is crucial to their survival. There is a high natural mortality rate in the first year of around 50%, and at weaning few pups below a critical weight of around 40kg ultimately survive. Pups underweight at weaning are likely to be disproportionately represented amongst those brought into seal sanctuaries. There is some recent evidence that pups at places where suckling is frequently interrupted by visitors on coastal paths grow more slowly and are weaned at lower weights. Nevertheless, by judicious field craft it is possible to get into positions to observe and enjoy the activity of the seals and their pups without disturbing them.

Mandy McMath

Pup moulting the white coat and beginning to show the pelage pattern it will have for the rest of its life.

Comprehensive direct counts of all the adult seals around Wales would be very difficult. The numbers at some haul-outs, particularly during the annual moult, only give indications of change. It is slightly easier to count numbers of the white coated pups, though even this can be quite challenging on the Welsh coast where they are mainly born in small coves and caves. Counting white coated pups from the air, as used for those on islands off Scotland and northwest Ireland, is clearly impracticable. The most frequently used method for estimating total seal populations is by a complex process of extrapolation from the numbers of pups. The single pups are weaned in only about 18-25 days, so the spread of birth dates requires several counts or allowance for those not encountered on a single site visit. From mortality rates of different age classes and life-tables, allowances can be made for the probable numbers of immature animals and for the mature cows not giving birth. Using the ratio of bulls to cows in various age classes, these can be added to give whole population estimates within margins of error.

The first reasonably complete census of grey seal pups in Wales was undertaken in 1977 by Sheila Anderson. A west Wales pup census was also undertaken between 1993 and 1995 as part of an Interreg project with southeast Ireland, but north Wales was not included. Nearly 90% of the pups in the Interreg project area were in west Wales. The west Wales / southern Irish Sea population was estimated to be around 5000-6000. Extrapolations from pups born in Llŷn and Anglesey would add only a few hundred to that overall figure. At Skomer Marine Nature Reserve pup production and survival to weaning has been monitored for many years, and indicates that the population is now stabilising rather than continuing to slowly increase after the end of millennia of human exploitation. Monitoring of other key sites identified from the west Wales census confirms this trend.

**Pelage patterns**

The old saying that "a leopard does not change its spots" also applies to seals. Once the pups have moulted their initial white coat they maintain the same complex and individually distinct patterns of light and dark patches of their pelage (fur) for the rest of their lives. This means that individuals can be recognised, particularly from the markings on their head and neck, which can be photographed even when the seals are bobbing about in the sea. This helps to understand movements, behaviour and ultimately the dynamics of whole populations. In grey seals pelage patterns are most obvious on the cows, which normally have dark patches of differing shapes and sizes on a lighter grey background. Digital photography, with some computerised adjustment to allow for slight differences in head orientation, allows matching to be made using photo-identification catalogues. A seal that happened to be photographed as a juvenile on Bardsey in the summer of 1985 has subsequently been matched to a mother that has given birth to pups on the same

Mike Alexander

Ivor Rees

Mandy McMath

'Hammerhead' as a juvenile in 1985 and a breeding adult at Bardsey in 2010

island over a run of recent years, including 2011. Code numbers are used in the catalogue, but names based on patch shapes can help when viewing them – the Bardsey seal is called "Hammerhead" from a patch of this shape on the neck. Grey seals are relatively long-lived and she must now be about 27 years old. The bulls (males) are generally darker with some lighter spots on a dark background and when fully mature may be virtually black, so individuals are rarely matched using the current computerised software: however it is possible to recognise individual males by eye. At Skomer drawings of wounds and scars over several decades allowed individual bulls to be followed over time.

**No place like home**

From the photographic records it is apparent that individuals often repeatedly return to the same favoured haul-out sites after fishing trips that may last several days. There is some movement between haul-outs in Wales and Ireland. Satellite tracking shows that individuals will travel 50 to 100 miles to favoured grounds. Photo-id has shown that many experienced cows return year after year to pup not just at the same coves, but sometimes at more or less the same spots in the coves. Studies around parts of Wales have now been going just long enough for young seals first photographed as moulted pups to be returning to breed. Some of these have been observed with their own pups quite near to where they were born themselves.

Fur becomes worn, so for seals the period of the moult is one of the milestones in their annual cycle. At this time they tend to stay out of the water more and group together on certain islets such as Ynys Dulas, off the east coast of Anglesey or on the West Hoyle Sandbank off the Dee. In Wales the moult takes place from December to April, with the cows moulting earlier than bulls. The yearlings do not moult in their first winter, so their fur can get so worn that they appear very pale and sometimes

## Monitro morloi llwyd Cymru

Bu pobl yn astudio morloi Cymru ers y 1940au. Dysgwyd bod morloi ifanc Môn yn symud mor bell â Chernyw a Llydaw yn ystod eu gaeaf cyntaf. Tu allan i'r tymor magu mae'r oedolion hefyd yn symud ymhellach. Mae morloi llwyd Cymru yn rhan o grŵp morloi de-orllewin Prydain. Mae eu tymor magu'n gynharach a genir lloi ar gefn traethau caregog mewn ogofâu neu mewn cilfachau. Mae'r mamau, y lloi a'r teirw yn treulio mwy o amser yn y dŵr bas nag y mae poblogaethau eraill.

Mae pwysau lloi cyn dyfnu'n dylanwadu'n fawr ar eu gallu i oroesi. Bydd tua 50% yn marw yn y flwyddyn gyntaf. Mae peth tystiolaeth bod aflonyddiad gan bobl ar lwybrau arfordirol yn effeithio ar dwf morloi ifanc. Anodd fyddai cyfri holl forloi Cymru ond drwy broses fathemategol gymhleth amcanwyd yn 1993-95 bod 5000-6000 morlo yn ne-orllewin Cymru - gyda rhai cannoedd yn ychwanegol yng ngogledd Cymru. Mae'r boblogaeth Gymreig nawr yn sefydlogi wedi canrifoedd o ecsploetio.

Gellir adnabod morloi unigol oherwydd y patrymau ar eu cotiau sy'n aros yn gyson drwy eu hoes. Mae hyn yn ein helpu i ddeall eu symudiadau, eu hymddygiad a deinameg y boblogaeth gyfan. Dysgwyd bod un morlo ar Enlli yn 27 oed a bod unigolion yn teithio 50-100 milltir i'w hoff leoedd halio!

Mike Alexander

brownish like harbour seals.

In spite of over 70 years of studies of Welsh seals there is always more to learn. Technologies open new avenues for insights about populations as a whole, and improved understanding about the detail of social interactions and site dependency. Spotting seals brings pleasure to many visitors to the Welsh coast, and who knows what value they add to the economy.

***Mandy McMath*** *is Senior Marine Vertebrate Ecologist at Countryside Council for Wales*

*Do you have slides and photographs from decades ago that might match with seals still around today? If you have past images of seals with recognizable pelage patterns we will be pleased to try to match them.*
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**Acknowledgements**
In a short article it is not possible to take note of the wide range of studies of Welsh Seals by others. Regarding my own photo-id studies, thanks are due to many colleagues in and outside CCW who have helped, particularly Toby Oliver and Tom Stringell. Several friends have helped complete the article.

**Further reading**

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# Smelt

## *a little known marine migrant*

European smelt *Osmerus eperlanus*

***Humble cousins of the more famous salmon and sea trout, European smelt used to be a common sight in Welsh rivers but numbers are sadly much reduced.* IAN MCCARTHY *reports on their status and an exciting attempt to captive-breed them at Bangor University.***

Wales is home to several majestic migratory freshwater fish species – the ocean-going 'king of fish', the Atlantic salmon *Salmo salar* and its cousin the sewin or sea trout *Salmo trutta*, which is held in particular affection in Wales as an economically valuable sport fish and a cultural icon. However, there is another freshwater fish that can be found in Welsh waters, a distant cousin of the Salmonid which is also a sea-going migrant. This is the Brwyniad Conwy or European smelt, *Osmerus eperlanus* (also known as the sparling in Wales and Scotland). Unfortunately far less is known about smelt, but this is changing with growing interest in, and research on, this elusive member of the Osmeridae.

The European smelt is not to be confused with the sand smelt *Atherina prebyter*. Superficially they look very similar but there are several clear differences. Firstly, *O. eperlanus* are often known as 'cucumber smelt' for an obvious reason – they smell very strongly of cucumber! – and secondly, they have a fleshy adipose fin on their backs between the

dorsal fin and the tail. In addition, adult *O. eperlanus* usually attain a size of 20-25cm, although smelt from some UK rivers can grow as large as 30cm. Adult sand smelt are usually 15-20cm.

### Distribution

Migratory smelt populations can be found on the Atlantic seaboard of north-west Europe from northern France and the British Isles as far north as the White Sea in Russia (including the Baltic). Its native distribution used to extend further south to northern Spain but these southerly Spanish and French populations are now thought to be extinct. Around the UK smelt populations have been recorded from the Tamar in Cornwall to as far north as the Tay in northeast Scotland. Their distribution in Wales, as far as we know, is restricted to two rivers in the north – the Conwy and the Dee.

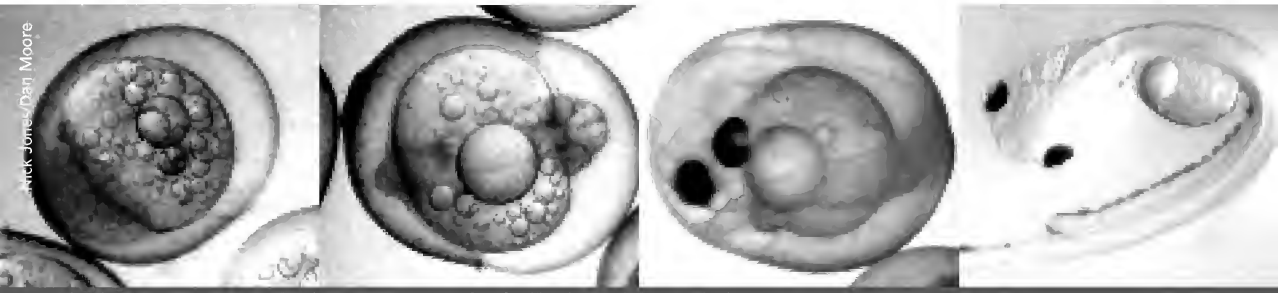
We understand the ecology and life cycle of smelt in general but the specifics are less well known. Adult smelt will return to spawn in March-April in freshwater, just above the head of tide on clean rivers. For example, the Conwy smelt spawn in the vicinity of Trefriw and Llanrwst; the spawning grounds on the Dee are not known but are upstream of Chester. Smelt are thought to return to their natal river to spawn, although the degree of fidelity may not be as strong as found in salmon and sewin. Where several rivers are in close proximity, e.g. in Morecambe Bay (Kent, Leven, Wyre & Lune) or in the Thames estuary (Thames, Lee, Medway & Swale), there may be some degree of smelt straying between these rivers, and one should view them as one population/stock rather than as separate ones (as one would with salmonids). We hope that a study on the genetics of European smelt, currently being completed at Bangor University, may shed some light on this question.

### Spawning

Smelt will run up rivers to spawn in small shoals: anecdotal evidence tells of seabirds following, and feeding on shoals of smelt as they migrate up the Conwy towards Trefriw and Llanrwst in the early spring. The eggs are small (around 1mm in diameter compared to the much larger salmonid eggs at 5-7mm) and they are extremely sticky. There is no excavation of a spawning nest, the eggs are released by the female into the water and fertilised by the male who lies alongside her. Due to their stickiness, eggs will quickly attach onto any suitable substrate (clean gravel, stones or macrophytes) and thus avoid being washed out. The egg stage is short (dependent on temperature, but usually 3-4 weeks in the wild) and once the larvae hatch they do not spend any time in fresh water but immediately are washed downstream into the estuary to complete the larval stage and to start feeding on small zooplankton in the water column. The juveniles also remain in the estuary feeding on larger zooplankton. As the smelt grow into adulthood, it is thought that they feed on small crustaceans and fish, both in the estuary of their natal river and in local coastal waters. They are not thought to undertake any large-scale oceanic migrations like salmon, nor extensive coastal water

Colin Bean

The sparling or European smelt



Jack Jones/Dan Moore

The developmental stages showing the egg 1 day after fertilisation and the developing embryo at 6, 10 and 16 days. Hatching occurred on days 16 and 17

migrations like sewin. Maturing adults will return to the outer part of the estuary during the winter before undertaking their spawning migration in the spring. The communal spawning run will usually take place over a few nights.

### Fishing

Historically, smelt numbers throughout the UK supported small scale commercial fisheries but, as a result of overfishing, pollution and habitat disturbance, populations have declined and in some cases become extinct. In the past smelt were caught in both the Conwy and the Dee. William Houghton, naturalist and clergyman, noted in his 1879 book *British Freshwater Fishes* that "the finest smelts I ever see come from the Conwy, where they grow to a length of ten to twelve inches [25-30cm]; but the specimens exposed for sale in the fish-shops are much smaller". Within living memory there was a smelt fishery on the Conwy, although fishing has not been conducted since the early 1990s. The historical record for smelt fishing on the River Dee is even older, with Thomas Pennant recording in his 1776 book *British Zoology* that smelt were abundant and there was a regular fishery. In recent years smelt have been caught not just for human consumption but as bait for pike fishing in some UK rivers, e.g. in the Wash and the Thames, which has further contributed to their decline.

### Current status

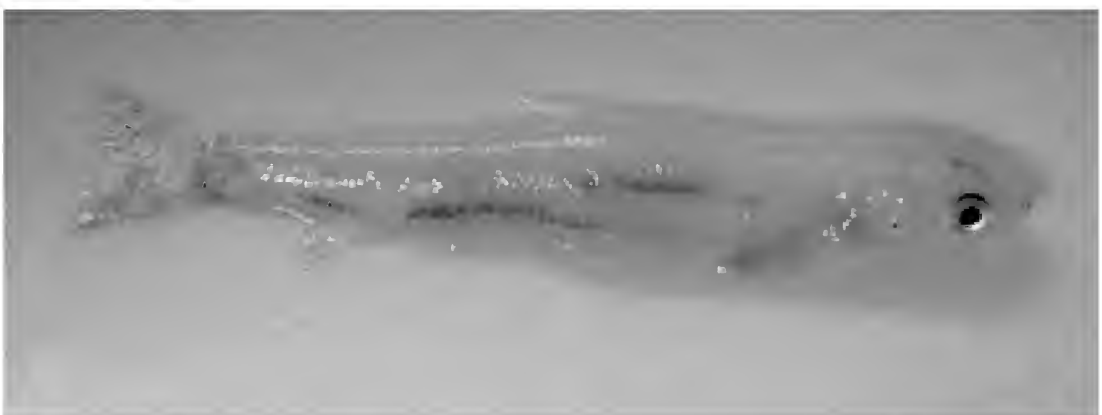
Unfortunately the story of smelt in the UK is one of decline from health and abundance before the Industrial Revolution to its present status. Prof. Peter Maitland of the Fish Conservation Centre in Scotland has written two reviews outlining the distribution, decline and current status of smelt[1, 2]. In the UK 52 estuarine or tidal river systems (comprising at least

Paul Brazier

Conwy Estuary

Nick Jones/Dan Moore

Smelt larva with *Artemia* (live zooplankton food) present in the gut 58 days after hatching



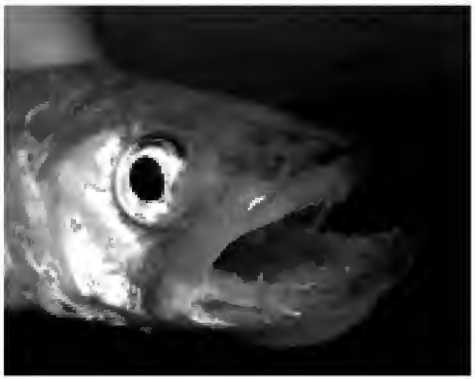
7 month old juvenile fish (190 days after hatching)

26 populations) are known to have contained smelt at one time, but many of these are now extinct. Currently there are three populations in Scotland, possibly ten in England (we do not know for sure) and the Conwy and Dee populations in Wales.

It is difficult to judge the current status of the fish in the Conwy and Dee. They have a dispersed and patchy distribution in the marine environment and their spawning migration into freshwater occurs over a few days – both of these factors make catching the fish difficult. They are not fished commercially or recreationally, and scientific survey work by the Environment Agency and Bangor University is limited by budgetary and logistical constraints. As a result, our knowledge of the Welsh smelt is limited to the occasional record. Adult smelt are sometimes caught on the smolt trap on the Dee at Chester, and single adult fish have been caught during field work by Bangor University in both river estuaries in 2011. In addition, smelt larvae were caught by the University during a survey of fish larvae in the Conwy in 2004, but very few caught in a subsequent survey in 2006/07. Thus, although it is likely that the Conwy and Dee populations persist, we do not know their current status except to say that they are rare.

### Current research

The decline in smelt has prompted their inclusion on the UK BAP priority species list: however, they are not afforded any legal protection under national or international legislation. We have a particular



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interest in smelt at Bangor University and there are two research projects currently underway:

*1. Population of genetics of the European smelt*
This PhD project, currently in the final stages of writing up, is the first study of the genetics for this species across Europe and will provide fundamental information on population structure which will inform conservation and management policies.

*2. Developing hatchery rearing techniques for European smelt*
We are currently 12 months into a 30 month project which is developing culture techniques to rear smelt in captivity. This research is part of a much larger project called SEAFARE (Sustainable and Environmentally Friendly Aquaculture for the Atlantic Region of Europe) funded by the European Union Interreg IVb Atlantic Area programme. The project aims to develop rearing techniques so that in future, should stock enhancement or translocation programmes be deemed necessary, the knowledge and methodologies will already be available for implementation. In March 2011 smelt eggs were obtained from the River Cree (in south-west Scotland) where a translocation conservation programme is being conducted by the Galloway Fisheries Trust. These eggs have been hatched in Bangor and the smelt reared through the larval stage, and we currently have 4-6cm juveniles. This is the first time that European smelt have been successfully reared in captivity. We aim to grow these fish through to adulthood to see if we can get the fish to mature and breed.

***Ian McCarthy*** *is a Senior Lecturer in Fish Biology in the School of Ocean Sciences at Bangor University and is available to give talks to angling clubs, wildlife trusts and natural history societies about smelt, charr and sea trout. 01248 382862 or email i.mccarthy@bangor.ac.uk*

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## Datgelu dirgelwch y brwyniad

Mae brwyniad Conwy yn perthyn o bell i'r eog a'r sewin ond mae'n bysgodyn dipyn llai cyfarwydd. Yng Nghymru mae ond i'w ganfod ar afonydd Conwy a'r Ddyfrdwy. Gor-bysgota, llygredd a diflaniad cynefin sy'n cyfrif am ddirywiad y rhywogaeth ac nid yw'n cael ei warchod yn gyfreithiol.

Daw'r oedolion nôl o'r môr yn y gwanwyn i silio yn yr afonydd, ond nid yw eu ffyddlondeb at afon enedigol ddim mor gryf ag yn achos yr eog. Bydd yr wyau'n glynu at gerrig neu blanhigion, ond ar ôl deor ymhen 3-4 wythnos cânt eu golchi gyda'r llif i'r aber. Dydyn nhw ddim yn mudo'n bell, fel yr eog a'r sewin. Daw'r oedolion nôl i'r aberoedd yn y gaeaf cyn nofio i fyny'r afonydd, tu hwnt i'r llanw, i fridio.

Nôl yn 1879 roedd William Houghton, clerigwr a naturiaethwr, yn canmol brwyniad Conwy a chofnododd Thomas Pennant, yn 1776, bod brwyniad yn doreithiog ac yn cael eu pysgota'n rheolaidd ar yr afon Ddyfrdwy.

Anodd yw gwybod union statws y brwyniad yng Nghymru heddiw. Oherwydd bod y pysgod ar wasgar pan maent yn y môr a'r mudo gwanwyn yn digwydd dros ychydig o ddiwrnodau mae'n anodd eu dal. Tebyg eu bod yn brin iawn. Mae gwaith ymchwil ym Mangor yn edrych ar eneteg a strwythur poblogaeth brwyniad Conwy a hefyd ar ddatblygu technegau i'w magu mewn caethiwed.

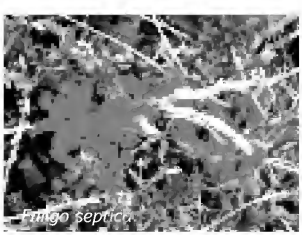
Alain Michaud

# Slime moulds in Wales

An uncommon inhabitant of mossy rocks in the ravines of Snowdonia, *Lepidoderma tigrinum*

***Slime moulds are mysterious creatures whose behaviour would not be out of place in science fiction.* DR BRUCE ING *introduces us to their complex lifecycle, highlighting hot spots in Wales.***

Rod Gritten



*Fuligo septica*

Walk through any wood in Wales and you will be surrounded by some of the most magical creatures on earth, yet, without careful searching, you will not see them. They are very small, ephemeral, often brightly coloured, and they live in dark, damp places, on dead wood, on trunks of living trees, in leaf litter and among the mosses on wet rocks. At certain times in their lives they move through the soil or rotten wood and they are key players in the recycling of phosphate in the soil. They are called slime moulds, an undeservedly unattractive, and inaccurate, name.

The largest class of these is the myxomycetes, a group of some 800 species, many of which are found worldwide. They look like miniature mushrooms – only a few millimetres high – when mature, but more like egg-yolk at the creeping stage of their life cycle, or simple amoeba-like cells at an earlier stage. They are not fungi but are more closely related to the amoeboid protozoans. The history of their study has seen a range of names reflecting the original uncertainty of their taxonomic position.

They have been *Mycetozoa*, a name coming back into use, which translates as fungus-animals; *Myxogastres*, which reminds us that only a century ago they were included with the gasteromycete fungi; and *Myxomycetes*, or slime fungi, under which they are still usually listed. The use of the electron microscope has shown us that their cell structure, notably the kind of mitochondria in their cells, links them with protozoans rather than fungi, and modern molecular studies confirm this position. However, at no stage of their existence are they slimy so we need a new name to replace *slime fungi*.

### But they're not slimy

What we usually find in the woods are the spore-producing bodies which in the simplest forms are stalked blobs. These liberate spores, which are typically wind-dispersed. In a number of forms beetles and flies may aid dispersal, and in the minute species which live in the bark of living trees there is good evidence that they are carried by mites and need to pass through the gut before they are able to germinate. Some of the larger species may also have their spores splashed out of the fruit bodies by rain drops. The spores germinate on damp wood or soil and release a flagellate cell which swims around in wood or soil moisture feeding mostly on bacteria, eventually forming large clones of identical cells. If the moisture level drops the cells may lose their flagella, become amoeboid and crawl rather than swim!

Cells may pair up and fuse in a variety of reproductive strategies, some of which allow for genetic exchange, while others simply ensure progression to the next stage of the cycle. This is the formation of a large cell with numerous, identical nuclei, often several millions of them. The structure, which we call a *plasmodium*, is able to move across surfaces, and through micropores in the substrate, and continues to engulf bacteria, yeasts, protozoa and even some fungal tissues, including mushrooms! When the food supply begins to wane the plasmodium migrates to the surface of the wood, litter or soil and converts into the fruiting body. The nuclei from the plasmodium, after a reduction


Huw Jenkins

Bruce Ing, up close and personal with a slime mould

division, become the nuclei of the spores, which are usually thick-walled and long-lived. The usual fruit body is a stalked sporangium but in many species the stalk does not develop and the spore case rests on the substrate.

### It may not be porridge

Where the plasmodium is large there may be a colony of sporangia of similar size, mostly maturing at the same time. However, in some forms, the whole of the plasmodium converts into a single, complex mass, often several centimetres across, and very different from the sporangiate forms which are often only a few millimetres in extent, and often no more than one or two millimetres tall. The largest species, aptly called *Brefeldia maxima*, emerges from the base of a stump like a mass of cold, white porridge, but after a day or two this becomes a sooty mass of black spores. This species is becoming more common in north Wales and a specimen at the Loggerheads Country Park near Mold was found to be one metre square. The plasmodium had been 2cm thick so it is probable that the mass of the plasmodium, a single multinucleate cell, was about 20kg!

Myxomycetes are essentially woodland organisms but a significant number occur in grassland, sand dunes, heathland, wetlands and on herbivore dung. In the American deserts an interesting group occurs on and inside rotting cacti and some of these are also found where cacti are naturalised in the Canary Islands and the Mediterranean region. Suffice it to say these are not found in this habitat in Wales! In

Rod Gritten

*Leocarpus fragilis*

Alain Michaud

The common litter myxomycete *Craterium minutum* (1 mm tall)

high mountains, where snow lies long into the spring, a community survives under the blanket provided by the snowpack and emerges onto the vegetation when the snow melts. In the Alps, and Scotland, this is mostly in May. In the European mountains there are some 60 species found only in this habitat: over 20 of these have been found in Scotland, but, alas, none have been seen in Snowdonia, where the snow does not usually lie for long enough.

An unlikely, and very extreme habitat, is the exposed bark of living trees. Here a large ecological group has evolved, often with a life cycle lasting days rather than months or years. The species involved are mostly very minute, barely visible to the naked eye and often as small as 0.04 mm high. The bark of trees dries out quickly and so a resting stage is probably the norm for these species. When it rains the bark, and especially the mosses growing on it, absorbs water and the bark myxomycetes burst into growth, often reaching the spore stage in 24 hours. We can easily find them by collecting bark and keeping it moist in a Petri dish and examining it under a stereomicroscope every day. These bark species are found everywhere trees grow and several species are so common that almost any tree sampled will produce them, even in city centre parks. In the most favourable areas, such as the moist, mild, clean woodlands of Snowdonia, they are especially abundant and diverse.

The oak woodlands of Snowdonia are rich in all ecological groups of myxomycetes, being mild and humid for much of the year, with plenty of fallen wood and leaf litter. Several are also characterised by block scree of boulders covered with the most wonderful mosses and liverworts and these are the home of some of the most spectacular species of slime moulds in Britain. A distinct myxomycete community has been recognised on bryophytes on rocks in ravines, by waterfalls and in Atlantic woods on the extreme western margins of Britain and Ireland. A group of six or seven species is associated with the cyanobacterium *Nostoc*, in what may turn out to be a kind of lichen relationship. The ravine woodlands of the Vale of Ffestiniog, the Conwy Valley, near Llyn Trawsfynydd and in the Dolgellau area, form the global headquarters for this association, which includes the bright red species *Diderma lucidum*, described from Dolgarrog in 1840. Apart from a few sites in Wales, Scotland, England and the Irish Republic, it is otherwise known only from Japan.

### Really Welsh slime moulds

Only two other species have been described originally from Wales. *Licea microscopica*, as its name suggests, is a very minute species found on the blackish-green film of cyanobacteria on elder bark. It was first found near Cardiff in 1975 and for many years was thought to be rare. Now that we look at elder bark regularly it appears to occur practically everywhere in Britain and is known from several other countries! *Licea erddigensis* was first found by the author in 1999 on the bark of a sycamore in Erddig Park, near Wrexham.

Huw Jenkins

*Mucilago crustacea*

It has since been found in more than twenty British counties and in Germany and Ireland.

A few species are known in Britain only from Wales. *Diacheopsis depressa* and *D. synspora* are both globally very rare, and both found by Andrew and Janet Graham on trees on their farm at Llanuwchllyn near Bala: they are otherwise known from India and Japan, respectively. *Licea nannengae* is a rare species found on tree bark and was collected by the author near Newtown, Powys – it is otherwise known from Spain, Switzerland and Ireland. *Macbrideola synsporos* was collected from bark of a living alder by the author from the lakeside at Bala: it is otherwise known from France, Greece, Spain, Turkey and the U.S.A. Similarly, *Paradiacheopsis acanthodes*, has only been found on bark in Britain from Merioneth and Denbigh: it has been found in a few European countries but is always very rare. A number of other species, especially those associated with damp, mossy woodland, are far more frequent in west Wales than in most parts of England, although they do also occur in the Lake District and western Scotland. Climate is an important factor!

For its size Wales is richly endowed with slime moulds. The mild, moist climate and the great variety of geology and vegetation are the major reasons for this treasure. Fortunately at least one site has been recognised as an important slime mould locality, namely the ravine of the Afon Pumryd at Llanymawddwy, near Dolgellau, which is a SSSI.

***Bruce Ing*** *is Professor of Environmental Biology at the University of Chester and has been studying myxomycetes since 1957.*

**Further reading**

Ing, B. 1999. *The myxomycetes of Britain and Ireland.* Slough, Richmond Publishing (reprint due soon!)

## Rhyfeddodau anweledig

Llwydni llysnafeddog. Creaduriaid anweledig coedwigoedd llaith Cymru. Mae hanes eu henwau'n adlewyrchu'r ansicrwydd ynglŷn â'u perthynas â'r drefn dacsonomegol – ond mewn gwirionedd maen nhw'n perthyn yn agosach i brotosöaid amoebaidd na ffyngau, Ond dydyn nhw ddim yn llysnafeddog. Mae angen delwedd newydd arnyn nhw!

Mân greaduriaid y goedwig, diferion glaw a gwynt sy'n helpu lledaenu sborau llwydni llysnafeddog; mae'r gell a ollyngir o bob sbôr yn nofio mewn lleithder yn y pren neu mewn pridd ac yn bwydo ar facteria nes ffurfio clonau o gelloedd tebyg. Mae'r celloedd yn paru ac ymdoddi drwy wahanol ddulliau nes creu un gell anferth gyda lluoedd o fywynnau - y 'plasmodium', sy'n gallu llusgo ar draws arwynebedd a thrwy dyllau bychain gan lyncu bacteria ac ati wrth fynd – a symud wedyn at wyneb y pridd neu'r pren pan fydd bwyd yn brin, er mwyn ffrwytho.

Mae'r creaduriaid rhyfeddol hyn i'w cael ym mhob rhan o'r byd – y tu mewn i gacti sy'n pydru, o dan eira yn yr Alpau ac ar risgl coed byw mewn llefydd fel Eryri, Mae cylch bywyd y math olaf yn fyr iawn a'r rhywogaethau'n bitw. Pan fydd y rhisgl a mwsoglau'n amsugno dŵr ar ôl glaw gallant ddatblygu i fwrw sborau o fewn 24 awr!

Mae llethrau sgri Cymru yn gynefin i lwydni llysnafeddog hynodaf Prydain. Mae ambell fan, fel ceunentydd coediog dyffryn Trawsfynydd ac ardal Dolgellau, yn ganolbwynt byd eang i gasgliad o rywogaethau anghyffredin. O ystyried ei maint mae Cymru'n cynnal cyfoeth rhyfeddol o lwydni llysnafeddog ; yr hinsawdd fwyn, laith a'r amrywiaeth wych o ddaeareg a llystyfiant sy'n gyfrifol am hyn.

## The advantages of grazing

One of the biggest challenges facing any woodland owner or manager when restoring an open habitat is not the initial work to clear the site of unwanted vegetation but the on-going management to maintain and improve conditions. Often natural regeneration of trees and scrub can quickly undo the good work and compromise the restoration.

Forestry Commission Wales (FCW) is undertaking projects to restore and create a range of open habitats throughout Wales. Faced with the problems of ongoing management of some of these sites, the introduction of grazing animals is proving to be an effective way of managing regrowth and helping to restore the habitats, historic landscapes and heritage sites.

Grazing animals can stop vegetation from getting too rank, prevent the build-up of a dense litter layer, and slow down the tendency to scrub over. Their dung and bare hoof-prints provide micro-habitats for certain invertebrates and plants. Mechanical treatments to manage the unwanted vegetation can be costly and provide no financial return whereas grazing can in some cases be leased out to provide income and give owners more options for their livestock. It is an attractive option for woodland owners and managers looking to improve the open habitats in their woods.

Iolo Lloyd

Welsh Blacks in the Hafren Forest

**Stanner Rocks**

As part of a management plan agreed by FCW and CCW, Herdwick sheep and Welsh mountain ponies have been introduced to manage the vegetation on Stanner Rocks, an SSSI near New Radnor. This is the only location in Britain where the winter-flowering Radnor lily (*Gagea bohemica*) has been found, along with a number of other unusual plants including spiked speedwell (*Veronica spicata*) and sticky catch-fly (*Lychnis viscaria*). The plants flourish here: the relatively arid rocky outcrops and thin soils create a marginally suitable environment for a selection of wild plants that more typically would grow in northern Mediterranean regions.

The management plan identified the need to fell blocks of non-native trees and to manage the undergrowth in order to provide more light and encourage species such as the Radnor lily to flourish. Grazing was introduced in two separated areas to help control the more rampant vegetation.

**Hafren Forest**

In Hafren Forest near Staylittle, Powys, Welsh Black cattle are being used to graze an area which has been recently cleared of trees. By managing the scrub and keeping areas of the forest open, the cattle are creating favourable terrain for the rare nightjar (*Caprimulgus europaeus*), as well as ideal hunting habitat for owls and other raptors. The cattle are being contained within a 40 hectare area which is part of a joint wetland management project with the Montgomery Wildlife Trust and Environment Agency Wales. The cattle, which are suited to the tough upland conditions, are owned by a local farmer who is developing an organic meat business and hopes to use these kinds of conditions to give a distinct flavour to the meat they produce.

**Hafod Estate**

Sheep and cattle are being used to restore the historic landscape of the

Hafod Estate in the Ystwyth Valley. The estate is recognised as one of the finest examples in Europe of a 'Picturesque Landscape'. It was created by Thomas Johnes (1748-1816) and included woodlands, open land and gardens. Restoration has been underway since 1990.

Over the last five years the restoration of former pastures, which had been planted with trees, has been progressing. Initial plans to clear all of the former pastures had to be curtailed when it was recognised that removing the trees was the easy part – after the initial clearance it quickly became apparent that natural regeneration of trees and scrub cancelled out the work. It was obvious the pastures could not be restored without the continued removal of this vegetation and grazing would be an effective way of achieving this.

Initially sheep and Welsh Black cattle were used: now Highland cattle graze the areas all year round. They are well suited to the environment and although grazing has only been in place for about four years the results are already becoming apparent.

**Beacon Hill**

Welsh mountain ponies are being used to help manage Beacon Hill which has been transformed into the largest lowland heath in Monmouthshire over the last six years as tree cover has been cleared away. Since 2010 ponies have grazed the heathland, which is a favourite area for the endangered nightjar as well as other rare birds like the tree pipit (*Anthus trivialis*), brambling (*Fringilla montifringilla*) and redpoll (*Carduelis cabaret*). Gwent Wildlife Trust, who prepared the management plan for Beacon Hill, has registered the site as one of its listed nature reserves in Gwent.

Some interesting plants found on the restored heathland include climbing corydalis (*Ceratocapnos claviculata*), lousewort (*Pedicularis sylvatica*) and heath milkwort (*Polygala serpyllifolia*). Along the track leading to the heathland are plants such as bee orchid (*Ophrys apifera*) and fairy flax (*Linum catharticum*).

**Clocaenog Forest**

One of the longest continuing grazing projects on FCW land began in 2004. Przewalski horses, from the Welsh Mountain Zoo in Colwyn Bay, were introduced to graze an area in Clocaenog Forest called the Enclosures, which is a scheduled ancient monument. The site was once a Neolithic/Iron Age settlement with livestock enclosures where animals were held overnight or during the seasonal movement of grazing regimes.

The horses, which are themselves internationally endangered, are part of a European Endangered Species recovery programme. Their adaptability and resilience in harsh conditions make them the ideal grazing animal to keep the site clear of scrub, develop and maintain the vegetation structure and improve biodiversity. They help to manage the site and protect the ancient monument from scrub development which might allow the root systems to affect the stratification of the archaeological features.

***Iolo Lloyd***
*Forestry Commission Wales conservation manager*
*Iolo.lloyd@forestry.gsi.gov.uk*

*In 2004, in recognition of his idea to introduce Przewalski's horses to Clocaenog Forest, Iolo was presented with Forestry Commission's Millennial Bowl made from 2,000-year-old oak. The prize is awarded annually to a member of staff who has made an outstanding contribution to preserving the archaeology in Welsh Assembly Government woodlands.*

Iolo Lloyd

Przewalski horses in Clocaenog Forest

## Conserving traditional orchards in Wales

After the rich harvest of autumn, winter signals a quieter time for Wales' orchards but brings with it an ideal opportunity to contribute to a national project that will safeguard these traditional wildlife havens.

The People's Trust for Endangered Species (PTES) is calling for volunteers to help survey the country's orchards as part of their nationwide project to promote the conservation of traditional orchards. An inventory of traditional orchards in England has recently been completed and, having secured funding from the Countryside Council for Wales (CCW) and the Esmée Fairbairn Foundation, PTES now wants to extend this work and recruit volunteers to help complete a vital inventory of traditionally managed orchards in Wales.

Existing data about the amount of traditional orchard habitat remaining in Wales is out-dated and incomplete. Through a painstaking analysis of aerial photographs, covering millions of hectares of the Welsh countryside, PTES will locate traditional orchards and train local volunteers to help survey the orchards on the ground, recording the species, age and condition of the fruit trees.

PTES aims to deliver a comprehensive national inventory in Wales, due for completion by the end of 2012, that incorporates the condition, age, boundaries and management status of each traditional orchard. The data collected will underpin the conservation of this threatened habitat, as well as raise awareness about the importance of traditional orchards in the ecological landscape.

Fruit and vines have been grown in the UK since the Roman occupation and traditional orchards represent a much loved part of our British heritage, offering a great range of fruit, places of tranquillity and clues to our past culinary tastes and culture. Characteristically traditional orchards consist of a low density of trees set in pasture. They are cultivated using low-intensity methods such as the absence of pesticides and the use of grazing animals instead of herbicides and man-made fertilisers.

Traditional orchards are hotspots for biodiversity and support a wide range of plants and wildlife, including many species which are rare or scarce, such as the noble chafer beetle. These wildlife refuges are becoming increasingly rare due to the intensification of agriculture, pressure from land development, and economic competition in a global market with an increase of imported fruits, all of which are putting the already endangered species they support under even greater threat. Traditional orchards also conserve local varieties of fruit, including the Denbigh Plum or apples such as Marged Nicolas and Pig yr Ŵydd (Goose's Beak) from Carmarthenshire.

Orchards have declined by over 60% in the last 50 years – in some areas habitat has been recorded as

PTES

declining by between 1-2% per year. With this loss of habitat we also face losing rare fruit varieties, traditions, customs and knowledge, in addition to the genetic diversity represented by at least 1800 species that are associated with traditional orchards. It is therefore vital to secure the help of volunteers and orchard owners to inventory the remaining orchards in Wales.

This project championed by PTES is part of a wider collaboration of UK conservation organisations and this information will be made available to the Traditional Orchard Habitat Action Plan (HAP) group and other BAP groups (including birds, bats, lichens and fungi), conservation organisations, policy makers, local authority planners and anyone with an interest in traditional orchard habitat.

To volunteer for the PTES traditional Welsh orchards mapping project, or if you are an orchard owner or manager, please contact Anita Burroughs, Orchard Project Officer on 020 7498 4533 or e-mail anita@ptes.org

*Anita Burroughs*

### First Welsh Countryside and Coastal Management Fair

On a glorious late September day the Llanerchaeron Estate in Ceredigion provided the perfect backdrop to the first ever Welsh Countryside and Coastal Management Fair, organised by NATUR. Around 450 people came to see 55 exhibits and hear fascinating lectures on challenging subjects such as managing underwater nature reserves, woodlands, cultural features, and future landscapes. There were walks and talks for people interested in learning about bats, fungi and lichens, amongst other things. There was even a field trip to a nearby National Trust nature reserve.

There are hundreds of people across Wales working professionally for the good of our natural environment. NATUR's goal was to celebrate and enhance this vital profession by bringing together our field of work in a one-day fair.

Through the fair NATUR was able to facilitate training, highlight sustainable methods of management and the role of Wales' environment to the Welsh economy, and raise awareness of countryside techniques, equipment, furniture and machinery.

The exhibitors made a fantastic effort to display interesting and engaging subjects, with displays on habitats and species, archaeological resources, education, access and recreation, computer technologies, machinery and traditional skills, livestock management, and even the building of a sustainable timber house, Tŷ Unnos.

Feedback so far has overwhelmingly been that although the visitor numbers from the general public were a little disappointing, the event itself was a fantastic opportunity for networking and learning, and that the contacts people made were very useful indeed. Exhibitors said that they would love to see the fair repeated next year, and would like to see the event expanded to cater for other areas of interest and to allow other organisations to participate.

As many people pointed out, this event is unique: no other events that we know of specifically target environmental management professionals, attempting to showcase this vital work to a wider audience. So the overall conclusion has been that the fair was a success and is something that should be built upon in the future.

I would like to add my own personal thanks to all exhibitors and speakers, the National Trust at Llanerchaeron, and the hardworking volunteers who set everything up and took it all down again at the end. Thanks also to Mike Alexander who conceived the idea in the first place and convinced the rest of us to give it a go.

For a taste of the day visit the Natur Cymru blog.
**http://naturcymru.blogspot.com/2011/10/natur-fair-2011.html**

***Mike Howe** is a director of NATUR*

### Natural Environment Framework

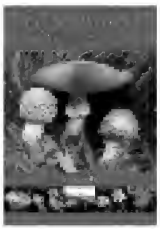
*Natur Cymru* readers may be aware of the Welsh Government's Natural Environment Framework (NEF), which will have far-reaching and long-lasting consequences for how the nature and landscape of Wales is managed and cared for. NATUR published a response to the initial consultation: an abbreviated version appeared in the December 2010 issue of *Natur Cymru*. The government is launching a Green Paper on the framework early in 2012. We urge all *Natur Cymru* readers and anyone with an interest in the wildlife of Wales to read this. It can be viewed on the government website, **www.wales.gov.uk/living-wales**. NATUR has published an interim comment, which is available for download from the NATUR website. There will also be a seminar on NEF early in 2012; keep an eye on the website for details.

NATUR is the professional institute for all those who manage, conserve and promote the living and cultural environment of land and sea in Wales and provides:

- Professional status
- Resources, mentoring and support
- Free entry and discounts for selected events and courses
- Opportunities to share skills and experience

Contact Marie Madigan, 07837 419995 / marie@natur.org.uk or **www.natur.org.uk**

# Green **Bookshelf**



*Fascinated by Fungi*
***Pat O'Reilly***
***First Nature 2011***
***433 pages***
***£24.99***

A refreshingly light-hearted introduction to a fascinating and vast subject, this is a tour de force, a tremendous achievement in bringing this extraordinary kingdom to life. To give one example, a chapter is devoted to fungal forays, photography and food. I don't recall reading about these matters anywhere else, and certainly not with the same brio and style: there are pages under the headings *Hedgehogs on Toast*, *Chanterelle Quiche*, *Parasol Schnitzel* and *Ceps Risotto*.

Perhaps this is the hallmark of this substantial book: it is marinated in enthusiasm. I reach for culinary metaphors because I first became seriously interested in fungi when I discovered the joys of mycophagy, to use the posh word for mushroom-eating. I then started to read around the subject, discovering no end of extraordinary facts: in an oak wood, the oldest organism may not be the arching tree above you, but the honey fungus at your feet; if all the spores of a giant puffball, which can reach 1.5 metres in diameter, grew, puffballs could occupy every inch of the planet in a generation; many flowers in a hay meadow depend on the nutrient-recycling efforts of fungi for survival; and so on.

*Fascinated by Fungi* is about the ecology of fungi, but along the way we learn about species identification, with chapters on Tree Parasites and Grassland Fungi, for example. With its originality, freshness of approach and liveliness of text, I would like to think that *Fascinated by Fungi* will become a classic text, introducing a new generation to the wonders of fungi.

**James Robertson**

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*Rock Tales*
***Chris Fletcher***
***Illustrations***
***Harry Harrison***
***Y Lolfa, 2011***
***72 pages,***
***£6.95***

As a resident of Anglesey with more than a passing interest in the Island's geology, I should begin by complimenting Chris Fletcher upon his *Rock Tales*. In general, outcropping rocks hardly inspire a casual observer, let alone a child, because one piece of weathered rock often looks very much like another. But through his photographs, sketches and diagrams, he succeeds in engaging the reader's interest while managing to avoid much of the baffling language of geology. Likewise, for children probably too young to follow the author's text, the parallel stories and illustrations of the giant Môr and his family, who once roamed among Anglesey's coastline rocks, may inspire the next generation of geologists?

Each section commences with a location map, an aerial photograph, a list of geological features, and their supposed links with the long-gone giants. The additional sketch maps direct readers towards the points of interest although it is left to the parents and their children to actually find them.

From a geological perspective, the author's "Geological History of Anglesey" provides a good summary. It is a pity therefore that two thirds of the book concentrate upon the island's south-west coastline, leaving only one third to cover all the rest of the island. However there is much to claim one's interest in this book. For example, I particularly like the descriptions, sketches and excellent photographs associated with Folds, Folded Schist, Pillow Lavas, Quartz and Jasper, and Limestone.

*Rock Tales* provides an entertaining and useful 'family' introduction to some of Anglesey's very special geology and history, while still being small enough to fit easily into one's haversack.

**Terence Beggs** (GeoMôn Director)

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*History & Mystery*
***Ed. Dr Charles Nelson***
***Society for the History of Natural History 2011***
***200 pages***
***£15.00***

The Society welcomes as members anyone with an interest in the history of natural history in the broadest sense. *History and Mystery* not only celebrates the Diamond Jubilee of the Society but brings to the attention of a wider audience a selection of articles and

notes from the Society's newsletters.

What an amazing publication it has proved to be. To quote from the foreword "If you've ever wondered what Broadwood pianos, criminals, wrapping paper, forged wills, the Secret Service or Blandings Castle have ever had to do with natural history, then read on. Perhaps you've never heard of an elephant collecting geological specimens? Was Sigmund Freud a secret mycologist? You have many gossipy delights in store." Where else might you discover that hippo steak tastes something like okapi, or that Admiral Belcher was the most hated man in the Royal Navy? So why not follow the advice given, to "find a cosy corner, a log fire and a wee dram and settle back to be amused, enlightened and inspired."

I have taken the advice, though without a fire, but the wee dram went down well. One can mention a few of the sections to give a hint of what awaits – Botany & Botanists, Treasures of the Deep, Wild Animals, Obtuse & Furry, Memorials to Naturalists, and Taxation. The Charles Darwin section includes a letter by the late David Stanbury, then resident in Corris, concerning his research into the voyage of the *Beagle*. I wonder what happened to his Darwin papers? Amongst the obituaries one of Joan Morgan, a stalwart of the North Wales Wildlife Trust and indefatigable invertebrate recorder for our predecessor *Nature in Wales*.

Available from the Society c/o The Natural History Museum, Cromwell Road, London, SW7 5BD for a minimum donation of £15 (UK) and £18 (elsewhere) including postage.

**David Saunders**

---

***Blwyddyn Fan Hyn a Fan Draw***
***Iolo Williams***
***Gwasg Gomer 2011***
***£9.99***

Mae'r awdur yn egluro ei fod yn aml iawn yn clywed y frawddeg uchod ar ôl methu a gweld dyfrgi neu aderyn ac ati. Dyna ran o lwyddiant y llyfr i mi, sef ei fod yn fodlon rhannu'r anturiaethau aflwyddiannus, yn ogystal â'r llwyddiannau. Gwna hynny mewn ffordd ddigri ac mae'r cofnodion yn aml iawn yn agos atoch chi ac yn bersonol. Nid rhestr sych o adar a broliant am deithiau tramor a geir yma ond dyddiadur difyr iawn, sy'n agor y drws ar y byd ffilmio rhaglenni natur. Daw yn amlwg faint o waith paratoi, ac yn arbennig faint o waith aros ac eistedd yn amyneddgar sy'n angenrheidiol wrth ddal bywyd gwyllt ar gamera. Cawn fanylion hefyd am ambell joban anoddach na'i gilydd, fel llusgo'i hun wysg ei ochr yn ogof Darren Ciliau. Mae'n cyfaddef: "Petaswn i'n gwybod bod pedair awr o daith yno... a phedair yn ôl, dwi ddim yn sicr y buaswn wedi cychwyn!"

Wrth ei natur, cofnodion cryno o newyddion y dydd ydi dyddiadur, ond roeddwn yn ysu am gael darllen llawer iawn mwy o fanylion am ambell i beth sy'n cael ei dorri yn ei flas. Mi wnes i fwynhau darllen am y dyddiau pan nad oedd yn gweithio, ac mae'r llyfr yn datgelu rhyw ychydig am yr awdur ei hun. Mae'n cyfeirio'n gynnes iawn at deulu, cyfeillion a phobl y mae'n eu cyfarfod, ac mae ei angerdd am fyd natur ei filltir sgwâr yn amlwg. Mae'n cadw cofnod manwl o droad y tymhorau ac mae gwenyn, siff-saff, nythod cynta'r flwyddyn a dyddiad dychweliad gwenoliaid ac ati'n cael lle amlwg.

Mae'r arfer o stwffio deuddydd o wybodaeth dan un pennawd yn chwithig braidd; mae cofnod am un dyddiad yn aml yn dechrau efo rhywbeth fel "Wrth iddi wawrio bore ddoe..." Rhyfedd hefyd ydi'r ffaith nad yw Ebrill yn dechrau tan y 23ain. Cawn luniau o Ynys Sgomer, ond hanes taith i'r Unol Daleithau yn unig a gawn am y mis, er mor hynod ddifyr yw'r cofnodion hynny.

Mae ambell agwedd ar ddiwyg y gyfrol yn siomedig. Byddwn i wedi hoffi gweld mwy o fuddsoddiad mewn lluniau yn hytrach na chlawr caled. Mae'r un lluniau yn ymddangos ar wynebddalen pob mis ac wedyn ar ddiwedd y mis, ac mae llun Shân Cothi – ei gyd-gyflwynydd ar raglen 'Bro'- yn ymddangos yn rhy aml o lawer, ar draul lluniau o fywyd gwyllt neu leoliadau. Llun neu ddau o hoff warchodfa'r awdur fyddai wedi bod yn arbennig o fuddiol, gan iddo gyfeirio'n aml at Ddolydd Hafren.

Llyfr sy'n werth ei gael, ac wedi fy ngadael yn ysu am gael darllen mwy. Byddai'n wych medru darllen colofn ganddo yn Y Cymro, bob yn ail wythnos efo colofn ddifyr Llên Natur gan Duncan Brown efallai, neu mewn blog. Beth amdani Iolo?

**Paul Williams**
www.eingolygfa.com

## Marine Bivalve Shells of the British Isles

**http://naturalhistory.museumwales.ac.uk/britishbivalves/**

Walking along my local Anglesey shoreline I never cease to be amazed by the wide variety of shells, sometimes only pieces of shell, that are revealed by the receding tide. For many years one of my guides to identifying these bivalve shells was the excellent work by Norman Tebble in his book *British Bivalve Seashells*. Good though this book is, it features only common shells collected from the intertidal to the shallow coastal shelf (200m depth). What experts and non-experts needed was a new up-to-date and easy to use identification guide that covered the many habitats and depths that bivalves had conquered.

Molluscan experts, led by Graham Oliver from the National Museum of Wales, Cardiff, have excelled by producing the web-based *Marine Bivalve Shells of the British Isles*. Bivalve taxonomy was crying out for a modern user-friendly guide to bivalve identification. Not only is this a fine taxonomic guide, taxonomy has come of age and entered the 21st century with an online guide to British bivalve shells. Scrolling through the pages of beautifully photographed bivalves you can not fail to be inspired and impressed by the images of the shells from creatures that have been rarely, if ever, seen before.

A helpful tool bar invites you to *browse taxa* and the reader is offered the opportunity to explore the depths of the ocean from the intertidal to the abyssal plain (4000m). One click of the mouse and a myriad of shapes and colours of bivalve shells from a particular depth reveal themselves. An easy to use identification chart provides a detailed description of each species, together with drawings and colour photographs, many displaying juvenile and adult shells and distribution maps. More enquiry leads the reader to the reference to the 'type' description and further publications on the selected organism. As you would expect, for each depth range the bivalves are arranged by superfamily and helpfully there are as many as 100 different shells to a page to allow the reader ready access to a range of bivalves from that particular habitat.



This web-based guide will be invaluable to a wide range of users from the casual observer, to eager school children, undergraduate and postgraduate students, to academics and those involved with the identification of shells in benthic survey collections. I whiled away an hour or so browsing the different habitats and found the guide to be an excellent source of information. If you find an unidentified shell on a shore from the Welsh coastline or anywhere else around Britain then you will definitely want to use this site to help you identify your unknown organism.

Highly recommended.

***Chris Richardson,*** *Head of School of Ocean Sciences and Professor of Marine Biology, Bangor University*

# **Islands** round-up

### More money needed for Skokholm!

The Wildlife Trust of South & West Wales has launched an appeal to complete the purchase and renovation of the buildings on Skokholm. In July 2010 the Wildlife Trust was contacted by Trinity House, owner of the lighthouse at the south-west corner of the island and a significant portion of land around it. Trinity House was in the process of replacing the traditional light with a modern beacon, which would need very little maintenance: the lighthouse and land were therefore up for sale!

The Manx shearwater colony around the lighthouse is the densest across Skokholm and Skomer. The last full island count (in 1998) showed the square hectare of land around the lighthouse contained 2870 burrows. As a result of the high numbers of burrows the soil cap in this area is extremely fragile, and the Trust understandably wanted to own this land, and the lighthouse. The area also contains the densest population of storm petrels on the two islands, with around 650 pairs in the quarry adjacent to the lighthouse. The maritime vegetation on this land is a feature of the SSSI, as are the lichen assemblages.

The appeal total is £250,000 which includes £100,000 for the lighthouse and land, and £40,000 to finish renovation of the farm complex. For further information see **www.welshwildlife.org** or ring 01656 724100.

### Denny Island – a land less known

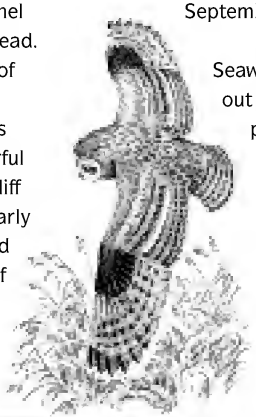
Denny is Monmouthshire's only island, about half an acre in extent and located almost in mid-channel between Magor Pill and Portishead. There is considerable coverage of tree mallow. In the past it has received few visits because of its exposed location and the powerful currents, but recently the Goldcliff Ringing Group has visited regularly to ring seabird chicks. The island usually holds around 60 pairs of cormorants and 20-30 pairs of great black-backed gulls, plus a few other large gulls.

L Maiden

Skokholm lighthouse

### Bardsey – Ynys Enlli

The Bird & Field Observatory recorded a great variety of species this year, starting with a male hawfinch and a hoopoe in early April. The hawfinch stayed a fortnight, visiting feeders in several gardens (see photos in **www.bbfo.blogspot.com**). A Western Bonelli's warbler turned up at the end of April, with quail, golden oriole and woodchat shrike in May. The first of two corncrakes in 2011 was trapped at the end of July, followed by icterine and melodious warblers and two wrynecks in August and September.



Seawatching (looking out across the sea) produced a stream of unusual seabirds, such as 101 sooty shearwaters on September 7th, regular Sabine's gulls, and all four species of skua.

An amazing total of 24 short-eared owls were recorded on October 16th, and the month finished with a spoonbill (last seen here in 1953) and two tiny Pallas's warblers.

*Staying on Bardsey: Observatory bookings 01626 773908; other houses 08458 112233 www.enlli.org*

*Collated by **Geoff Gibbs** with thanks to **Steph Tyler** for the Denny Island information.*

## South Wales Wetlands - for people and wildlife

Wetlands, which include ponds, wet woodland and marsh, are rich with plant species and invertebrates, supporting food chains that other wildlife relies upon. We may easily recognise wetlands for their natural beauty and wildlife value, but they also help maintain environmental quality and benefit local communities as well as biodiversity. Through their natural processes they provide many other knock-on benefits to help support a range of ecosystem services including carbon storage, sediment and nutrient management, and recreation.

In spite of this great potential, many wetlands have been lost, degraded and fragmented because of inappropriate development, pollution and changes in agricultural or other land management practices. However, people are beginning to recognise the benefits of healthy wetlands for their wider value. Wetlands can, if they are in good condition, help buffer against extreme conditions, for example by regulating water flow, acting as a sponge to soak up water and then slowly releasing it back into rivers and streams. Regardless of size and location they can also provide valuable social benefits for local communities, as 'living classrooms' for education and providing opportunities for recreational activities that benefit our mental and physical health.

**Working locally**

At Environment Agency Wales (EAW) we have recently been working with nine local authorities and other local partners on a South Wales Wetlands project to improve the wetland assets of south Wales. This area is one of the most developed parts of Wales, where the natural landscape has become increasingly fragmented and where many smaller wetland areas are gradually disappearing or are in poor condition. The principles behind the project recognise that even small wetlands can have important benefits for local communities and local environmental management as well as for wildlife, and that, through local level action, valuable improvements can be achieved for these.

Working with the project partners, we identified and developed a series of mini-projects to improve the area's overall wetlands resource. We provided £30,000 'seed-corn' collaborative funding along with advice and guidance, and, with help from community groups and other organisations, local authorities have undertaken work at more than 20 sites. Partners have provided additional funds and capitalised on local volunteer action to generate over £20,000 more funding and resources. Through the initiative we expect that 3ha of new and 8ha of restored wetland habitat will be created. Access/dipping platforms at ponds provide 'living classrooms' and safe viewing, acting as an impetus for access improvements to local green spaces: this has enabled local authority partners to secure additional collaborative funding.

All the projects will benefit key species, including great crested newts, bats and otters, and provide other ecosystem services by improving surface water management through de-silting work, scrub clearance and wet woodland creation to encourage waterlogging.

In a relatively fragmented landscape and urbanised part of Wales these mini-projects will improve connections between habitats. This will help increasingly isolated species to move more freely between sites, enabling them to maintain population levels and become more resilient to the effects of climate change.

EAW

Volunteer help is vital

This collaborative approach achieves real benefits for local communities as well as sustaining the biodiversity of these south Wales wetlands.

***Becky Davies***
*Biodiversity Officer, Environment Agency Wales*

## A new species of bristleworm from west of Anglesey

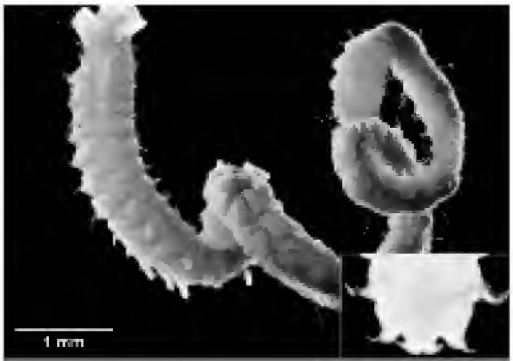
Amgueddfa Cymru-National Museum Wales has been conducting marine seabed surveys around the coast of Wales for over 20 years. In that time, nearly 700 locations have been sampled and new species are still being discovered.

In 2005, the HABMAP project (see box) began with the Museum conducting biological sampling and analysis. The survey yielded a new species of sea spider, *Sericosura conta* from off Arklow; two new species of bristleworm, *Diplocirrus stopbowitzi* (also collected during previous surveys) and *Uncispio reesi*; and a potentially new species of Echiura (spoon worms).

As part of the HABMAP sampling we investigated a newly located gas seep and deep trough region to the west of Anglesey. The habitat turned out to be a stiff boulder clay, a sediment type unlike others we had previously investigated.

Although slender polychaete worms were noticed when the clay was washed and sieved onboard, it was only in the laboratory that they were found to be very special indeed. Many of the small worms present belonged in the Uncispionidae, a polychaete family not previously recorded in the northeast Atlantic. At the time of investigation, Uncispionidae contained only two other species, each described from only a few tiny, poorly preserved specimens – one from three animals off California, the other from a singleton found off Oregon.

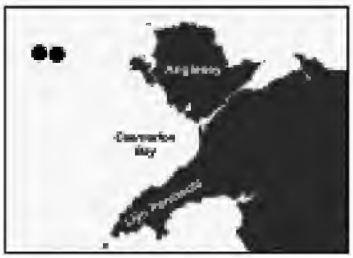
**HABMAP**
The Habitat Mapping for Conservation and Management of the Southern Irish Sea project is an EU INTERREG Ireland-Wales project administered jointly by the Countryside Council for Wales and Trinity College Dublin.



*Uncispio reesi* with inset figure showing close-up of large posterior hooks.

One characteristic of the family is the presence of very distinctive, large, robust hooks on the last two or more segments of the animal. Having several hundred specimens to work with has enabled us to greatly increase our knowledge of their morphology, reproduction and growth. Five samples from two locations west of Anglesey contained nearly all the specimens, with another two fragments found in a single sample off Arklow. The Anglesey samples were variably a mixture of sand, gravel and clay: however the largest concentrations of *Uncispio reesi* occurred in pure boulder clay.

The description of the new species is published in the *Italian Journal of Zoology* as part of the *Proceedings of the 10th International Polychaete Conference* held in Lecce, Italy, in 2010. Discussion with other researchers at the Conference led to an unidentified specimen being sent to us from a survey in Norway. Although posteriorly incomplete and therefore not definitively identifiable, it appeared to be our new species of *Uncispio*, thereby extending its known range outside of the UK.


Location west of Anglesey where *Uncispio reesi* was collected.

The new species is named after Mr Ivor Rees, a long-standing lecturer (now retired) at the School of Ocean Sciences at Bangor University in Menai Bridge, and regular contributor to *Natur Cymru*, whose extensive knowledge of the Welsh marine fauna has been of such help to us during many offshore surveys.

***Teresa Darbyshire*** *is a Marine Research Assistant with Amgueddfa Cymru-National Museum Wales.*

# Hysbysfwrdd / Noticeboard

If you would like your wildlife event to feature on these pages please contact us on 01248 387373 or email info@naturcymru.org.uk (entries may be edited). Please mention Natur Cymru if you attend any of these events.

## Tell us what you would like to see here...

### NATUR

**WELSH INSTITUTE OF COUNTRYSIDE & CONSERVATION MANAGEMENT**
**15 Feb 2012** *Introduction to Management Planning in the Countryside*. A one-day event at Margam Park Discovery Centre, Port Talbot with Mike Alexander.

NATUR publishes quarterly TRAINING BULLETINS which list training and career development opportunities across Wales. You can download the current issue from **http://natur.org.uk/career-development/training-2/**
Or contact Marie Madigan, **07837 419995 / marie@natur.org.uk or www.natur.org.uk**

### Plas Tan y Bwlch, Snowdonia

**COURSES**
**6-8 Feb 2012** *Reducing Risks - Ecosystems and Human Health and Wellbeing in the UK*
**AIM:** To examine the importance of ecosystems and the services they provide to the economy and to society, and to empower participants with the confidence to inform decision-making that maximises biodiversity and ecosystem benefits, while efficiently delivering their own priorities.
**AUDIENCE:** Decision makers from all sectors within public authorities, the business community and non-governmental organisations, from across the UK. For more information contact Julia Korn, CCW Senior Biodiversity Coordinator **j.korn@ccw.gov.uk 01248 387350**

### Field Studies Council

**COURSES 2012 – NEW PROGRAMME AVAILABLE**
The FIELD STUDIES COUNCIL is an independent, environmental educational charity that offers a wide selection of natural history courses for people of all levels. Its network of centres provides day and residential courses for all ages throughout the UK. Courses cover a wide range of topics which include walking, birds, mammals, flowers, trees, invertebrates, habitats and conservation, geology, mosses and fungi.
New brochure online:
**http://view.digipage.net/?userpath=00000645/00015144/00070991/**
To see the full collection of courses please visit **www.field-studies-council.org/naturalhistory** or you can request a free brochure via the website or by contacting the FSC on **0845 345 4071**.

### Aberystwyth University

**LIFELONG LEARNING COURSES**

**AT:** Denmark Farm, Lampeter
**20-22 Apr 2012** *Bird Identification*
**23-25 May 2012** *Field Survey Techniques*
Field surveys and data collection of vegetation, are essential for base-line studies. A valuable skill when seeking employment in the environmental sector.
**26-28 May 2012** *Understanding British Mammals 1: Gnawers, Nibblers & Insect Crunchers*
Species identification including skulls, life cycles, habits and habitats will be covered in the workshops.

**AT:** Centre for Alternative Technology, Machynlleth
**2-4 Mar 2012** *Identifying Mosses, Liverworts & Lichens*
A valuable course for professional development as identification skills with these groups are uncommon in field ecologists.
**2-4 Mar 2012** *Ecology 2*
The underlying principles that control the patterns of distribution of organisms, from bare ground to the patchwork of habitats seen in the local landscape.
**23-25 Mar 2012** *Food Glorious Food*
How the human digestive system works; what nutrients are present in foods; interpret food labelling and achieve a balanced diet.
**13-15 Apr 2012** *Understanding Amphibians*
Species identification including specimens, life-cycles, habits and habitats; distribution and status, including conservation issues and Wildlife Law; Welsh amphibians with an expert ecologist and an interesting venue to explore.
Full details: **Dr Paula Hughes, Aberystwyth University, SELL, Old College, King Street, Aberystwyth, Ceredigion, SY23 2AX 01970 621580 learning@aber.ac.uk**

### Wildlife Trusts Wales

The Wildlife Trusts offer a huge number of events & courses all over Wales. Contact them for a full programme.
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01597 823298
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www.welshwildlife.org
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*Mandy Marsh, Natural England*

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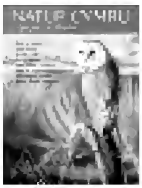

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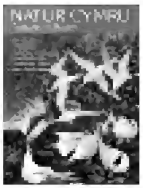

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***Number Rhif 40***

Hywel Roberts

Cwm Idwal

Mandy McMath

Grey seal pup

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