



We need to talk about nitrogen

A call to protect Wales'
internationally important wild
flora and fungi from air pollution

Rhaid i ni. Siarad am nitrogen

Galwad i ddiogelu fflora
a ffyngau gwylt Cymru
sydd o bwys rhwngwladol
rhag llygredd aer



Executive Summary

Air pollution is now one of the primary causes of wildlife loss and environmental degradation in Wales. Unprecedented concentrations of nitrogen have built up in the atmosphere, due to ammonia (NH_3) and nitrogen oxide (NO_x) emissions from intensive farming practices and fossil fuels. This report focuses on the less well-known issue of ammonia pollution arising from intensive farming.

What goes up...

Excess nitrogen in the atmosphere is deposited into nature, disrupting ecosystems and making it impossible for many species to survive; more than two-thirds of wild flowers, as well as many lichen and other fungi, cannot tolerate high nitrogen levels. In particular, rising ammonia emissions from the expansion of intensive chicken units are thought to be directly damaging many of Wales' most valuable and sensitive wildlife and habitats.

In Wales, 89% of sensitive wildlife habitat is suffering from excessive nitrogen levels.

Rates of nitrogen deposition vary across the country. The sources can be local or national as nitrogen is transported long distances in the atmosphere. Even

in upland areas, such as Snowdonia and the Brecon Beacons, nitrogen deposited in rain is damaging wild plants and fungi and their fragile ecosystems.

Despite these impacts, up to 95% of ammonia emissions – from farm animals and fertilisers – are unregulated in Wales. Only the most intensive pig and poultry farms require a permit, accounting for an estimated 5% of Welsh ammonia emissions.

Current initiatives are welcome but inadequate; emissions continue to rise, wildlife species and habitats are already becoming degraded and people's health continues to suffer. Legally-binding air quality and biodiversity targets for 2020 are likely to be missed in Wales and the UK as a whole.

Public Service Boards, the Welsh Government and its agencies have a legal duty to:

1. cut ammonia emissions significantly and quickly,
2. restore wildlife species and habitats,
3. protect public health.

A range of cost-effective solutions is available to policy-makers and farmers – putting these into practice would also help to meet government targets on public health, water quality, natural resources and climate change. With new policy and legislation being developed in preparation for leaving the European Union, this is a critical opportunity to take action.

Government action is needed now to safeguard the magnificent and unique diversity of Wales' wild plants and fungi for the benefit of future generations.

Crynodeb Gweithredol

Erbyn hyn, llygredd aer yw un o brif achosion colli bywyd gwylt a diraddio amgylcheddol yng Nghymru. Mae crynodiadau uwch nag erioed o nitrogen wedi cranni yn yr atmosffer, oherwydd allyriadau amonia (NH_3) ac ocsid nitrogen (NO_x) o arferion ffermio dwys a thanwyddau ffosil. Mae'r adroddiad hwn yn canolbwytio ar broblem sy'n llai cyfarwydd sef llygredd amonia sy'n deillio o amaethu dwys.

Rhaid i'r hyn sy'n mynd i fyng...

Mae nitrogen dros ben yn yr atmosffer yn cael ei ddyddodi i fyd natur, gan darfu ar ecosystemau a'i gwneud yn amhosibl i lawer o rywogaethau oroesi; ni all mwy na dwy ran o dair o flodau gwylt ynghyd â chennau a ffyngau lu eraill oddef lefelau nitrogen uchel. Yn arbennig, credir bod allyriadau amonia cynyddol o ehangu nifer yr unedau ieir dwys yn niweidio'n uniongyrchol fywyd gwylt a chynefinoedd mwyaf gwerthfawr a sensitif Cymru.

Yng Nghymru, mae 89% o gynefinoedd bywyd gwylt sensitif yn dioddef yn sgil lefelau nitrogen gormodol.

Mae cyfraddau dyddodi nitrogen yn amrywio ar draws y wlad. Gall y ffynonellau fod yn lleol neu'n genedlaethol gan fod nitrogen yn cael ei gludo dros bellteroedd maith yn yr atmosffer. Hyd yn oed yn yr ucheldiroedd fel Eryri a Bannau Brycheiniog, mae

nitrogen sydd wedi'i ddyddodi yn y glaw'n niweidio fflora a ffyngau gwylt a'u hecosystemau bregus.

Er gwaethaf yr effeithiau hyn, mae hyd at 95% o allyriadau amonia – o anifeiliaid fferm a gwrteithiau – heb eu rheoleiddio yng Nghymru. Dim ond ar y ffermydd moch a dofednod dwysaf y mae trwydded yn ofynnol, sef y ffermydd sy'n gyfrifol am tua 5% o allyriadau amonia Cymru.

Mae'r mentrau presennol i'w croesawu ond yn annigonol; mae allyriadau'n dal i godi, mae rhywogaethau bywyd gwylt a chynefinoedd eisoes yn cael eu diraddio ac mae iechyd pobl yn parhau i ddioddef. Mae targedau ansawdd aer a bioamrywiaeth cyfreithiol-rwym ar gyfer 2020 yn debygol o gael eu methu yng Nghymru a'r DU yn ei chyfanrwydd.

Mae dyletswydd gyfreithiol ar Fyrddau Gwasanaethau Cyhoeddus, Llywodraeth Cymru a'i hasiantaethau i:

1. torri allyriadau amonia'n sylweddol ac yn gyflym,
2. adfer rhywogaethau bywyd gwylt a chynefinoedd,
3. diogelu iechyd y cyhoedd.

Mae amryw o atebion costeffeithiol ar gael i wneuthurwyr polisi a ffermwyr – byddai rhoi'r rhain ar waith hefyd yn helpu i gyrraedd targedau'r llywodraeth o ran iechyd y cyhoedd, ansawdd dŵr, adnoddau naturiol a newid yn yr hinsawdd. Gyda pholisi a deddfwriaeth newydd yn cael eu datblygu wrth baratoi i adael yr Undeb Ewropeaidd, dyma gyfle hollbwysig i weithredu.

Rhaid i'r llywodraeth weithredu'n syth i ddiogelu amrywiaeth odidog ac unigryw planhigion a ffyngau gwylt Cymru er budd y cenedlaethau i ddod.

Impacts on wildlife and habitats

Wales boasts a rich tapestry of landscapes from coastal cliffs and sand dunes to sunlit meadows and ancient woodlands. These are home to an extraordinary and internationally-important diversity of wild flowers, mosses, waxcaps, lichens and hundreds of other fungi and plant species, which are the life-support for all Wales' wildlife and people.

Yet nitrogen deposition is changing the ecological functioning of our natural environment and the essential diversity of species. It causes nutrient enrichment (eutrophication), acidification and direct damage from toxicity.

More than two-thirds of our wild flowers, as well as many lichen and other fungi, cannot tolerate high nitrogen levels. They become less able to compete with more robust species, such as nettle, cleavers and hemlock, which thrive in nitrogen-enriched soils. In extreme cases, high

concentrations of ammonia gases directly affect plant health, bleaching leaves and causing plants to be less vigorous and die.

In Wales, the most recent data shows that:

- **89%** of sensitive wildlife habitat has excessive nitrogen levels (Hall *et al*, 2017)
- **94%** of habitat in European-protected Special Areas of Conservation (SAC) has excessive nitrogen levels (for at least one species or habitat 'feature') (Hall *et al*, 2017)
- **71%** of SACs have ammonia concentrations above the critical levels (Hall *et al*, 2017)
- Nitrogen deposition is having (or likely to have) an adverse impact on **58%** of habitat or species 'features' on European-protected sites.
- The European-protected features most frequently affected are dry heaths, marsh fritillary butterfly and Western acidic oak woodland (NRW, 2015b).

In woodland at Coedydd Llawr y Glyn SAC, scattered trees are covered with excess algal growth, which experts believe is a result of ammonia damage from nearby farms. Trees on other parts of the site are covered in healthy lichens.

Yn ACA Coedydd Llawr-y-Glyn, mae ambell goeden yma ac acw wedi'i gorchuddio â gormodedd o dyfiant algaidd, sydd, yn marn yr arbenigwyr, o ganlyniad i ddifrod gan amonia o ffermydd gerllaw. Mae coed yn rhannau eraill o'r safle dan orchudd o gennau iach.



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Effeithiau ar fywyd gwylt a chynefinoedd

Gall Cymru ymfalchö yn nhapestri cyfoethog ei thirweddau, o glogwyni arfordirol a thwyni tywod i ddolydd heulog a choetiroedd hynafol. Mae'r rhain yn gartref i amrywiaeth ryfeddol o bwys rhwngwladol o flodau gwylt, mwsoglau, capiau cŵyr, cennau a channoedd o rywogaethau ffyngau a phlanhigion eraill, sef y system cynnal bywyd i holl fywyd gwylt a phobl Cymru.

Eto mae dyddodi nitrogen yn newid gweithrediad ecologol ein hamgylchedd naturiol a'r amrywiaeth hanfodol o rywogaethau. Mae'n achosi cyfoethogi maethynnau (ewtroffigedd), asideiddio a difrod uniongyrchol yn sgil gwenwyndra.

Ni all mwy na dwy ran o dair o'n blodau gwylt, yn ogystal â chennau a ffyngau lu eraill, oddef lefelau nitrogen uchel. Dõnt yn llai abl i gystadlu â rywogaethau gwytnach fel danadl poethion, llau'r offeiriad a chegid sy'n ffynnu mewn priddoedd sydd wedi'u cyfoethogi â nitrogen. Mewn achosion eithafol, bydd crynodiadau uchel o nwyon amonia'n effeithio'n uniongyrchol ar iechyd

planhigion, gan gannu dail a pheri i blanhigion wani a marw.

Yng Nghymru, mae'r data diweddaraf yn dangos bod:

- Lefelau nitrogen gormodol mewn **89%** o gynefinoedd bywyd gwylt sensitif (Hall ac eraill, 2017)
- Lefelau nitrogen gormodol mewn **94%** o gynefinoedd mewn Ardaloedd Cadwraeth Arbennig (ACA) a warchodir yn Ewropeaidd (ar gyfer un rhywogaeth neu 'nodwedd' cynefin fan leiaf) (Hall ac eraill, 2017)
- Crynodiadau amonia uwchlâu'r lefelau critigol mewn **71%** o ACAau (Hall ac eraill, 2017)
- Dyddodi nitrogen yn cael (neu'n debygol o gael) effaith andwyol ar **58%** o wahanol 'nodweddion' cynefin neu rywogaeth ar safleoedd a warchodir dan Ewrop).
- Mai'r nodweddion yr effeithir arnynt amlaf yw rhosydd sychion, glöyn byw brith y gors a choetir derw asidig y gorllewin (CNC, 2015b).



Nitrogen deposition is damaging pristine habitats, driving species such as the Marsh fritillary butterfly (*Euphydryas aurinia*) closer to extinction.

Mae dyddodi nitrogen yn peri difrod i gynefinoedd dilychwin, gan yrru rhywogaethau fel glöyn byw brith y gors (*Euphydryas aurinia*) yn nes at ddifodiant.

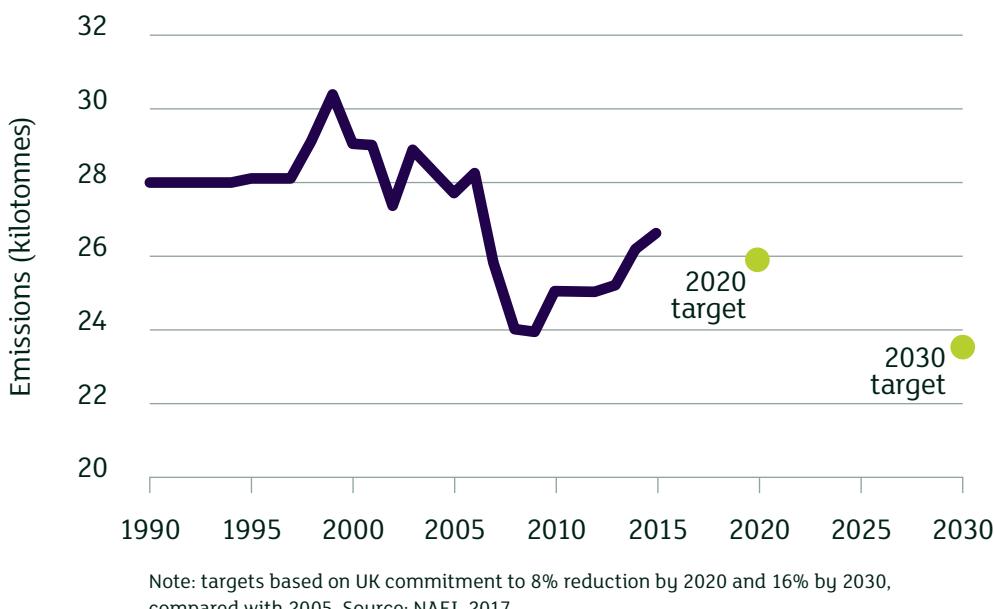
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Below the radar: ammonia

All pollutants have declined in Wales in recent decades with one exception: ammonia, a colourless gas with a distinctive smell. This compound of nitrogen and hydrogen (NH_3) stands out for the lack of progress since 1990, even bucking the trend with a gradual increase in emissions since 2008 (see graph). This is partly due to greater use of urea-based fertilisers, which are linked to higher emissions (NAEI, 2017:32).

At the current rate, Wales will fail to cut 8% of emissions by 2020 and 16% by 2030 (compared with 2005), as required by the UK's legally-binding targets under EU and international law. Emissions could even exceed the 1990 baseline, causing even greater damage to wildlife, people and our climate.

Trends in ammonia emissions in Wales, 1990 to 2015 (with targets to 2030)



Ammonia damages public health

The extent of ammonia's impacts on public health has only come to light in recent years. As a result, it is not properly reflected in mainstream policy and strategies on air quality. Yet ammonia causes significant health impacts by contributing to the formation of fine particulate matter ($\text{PM}_{2.5}$). It has been estimated that cutting ammonia emissions by 50% could prevent around 250,000 deaths attributable to air pollution around the world each year (Pozzer *et al*, 2017).

Ammonia and climate change

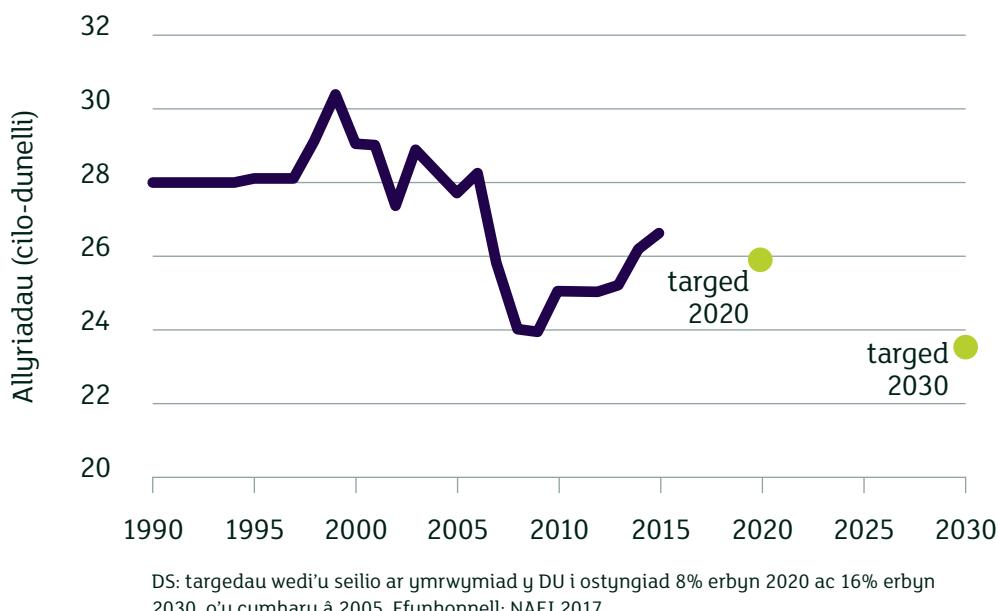
Ammonia is partly converted to nitrous oxide (N_2O), a greenhouse gas **300 times more powerful** than carbon dioxide (CO_2). Action to tackle ammonia emissions will also reduce methane (CH_4), CO_2 , and N_2O emissions (Sutton *et al*, 2011).

O dan y radar: amonia

Mae pob llygrydd wedi gostwng yn sylweddol yng Nghymru yn ystod y degawdau diwethaf gydag un eithriad: amonia, nwyr di-liw gydag oglau arbennig. Mae'r cyfansoddyn hwn o nitrogen a hydrogen (NH_3) yn amlwg iawn o ran y diffyg symud ymlaen er 1990, hyd yn oed yn mynd yn groes i'r duedd gyda chynnnydd graddol mewn allyriadau er 2008 (gweler y graff). Mae hyn yn rhannol oherwydd mwy o ddefnydd o wrteithiau seiliedig ar wrea a gysylltir ag allyriadau uwch (NAEI, 2017:32).

Ar y gufradd bresennol, bydd Cymru'n methu torri 8% o allyriadau erbyn 2020 ac 16% erbyn 2030 (o'u cymharu â 2005), fel sy'n ofynnol o dan dargedau cyfreithiol-rwym y DU o dan gyfraith yr UE a chyfraith ryngwladol. Gallai allyriadau hyd yn oed fynd yn fwy na llinell sylfaen 1990, gan achosi mwy byth o ddifrod i fywyd gwylt, pobl a'n hinsawdd.

Tueddiadau mewn allyriadau amonia yng Nghymru rhwng 1990 a 2015 (gyda thargedau hyd at 2030)



Mae amonia'n niweidio iechyd y cyhoedd

Dim ond yn ystod y blynnyddoedd diwethaf y mae hyd a lled effeithiau amonia ar iechyd y cyhoedd wedi dod i'r golwg. O ganlyniad, nid yw'n cael ei adlewyrchu'n iawn mewn strategaethau a pholisi prif ffrwd ar ansawdd aer. Ac eto mae i amonia effeithiau sylweddol ar iechyd drwy gyfrannu at ffurfio deunydd gronynnol main ($\text{PM}_{2.5}$). Amcangyfrifir y gallai torri allyriadau amonia 50% atal tua 250,000 o farwolaethau y gellir eu priodoli i lygredd aer ar draws y byd bob blwyddyn (Pozzer ac eraill, 2017)

Amonia a newid yn yr hinsawdd

Mae amonia'n cael ei droi'n rhannol yn ocsid nitrus (N_2O), nwyr tŷ gwydr sydd **300 o weithiau'n fwy pwerus** na charbon deuocsid (CO_2). Bydd gweithredu i fynd i'r afael ag allyriadau amonia hefyd yn lleihau allyriadau methan (CH_4), CO_2 ac N_2O (Sutton ac eraill, 2011).

On that farm

Farming is the dominant source of ammonia emissions in Wales – 86% in 2015 – but only an estimated 5% of farm emissions come under direct regulation; those from the largest pig and poultry units. Manure from beef and dairy cattle account for more than half of farm emissions, but are unregulated.

More recently, the striking expansion of poultry units has become a major cause for concern due to the direct impact of emissions on nearby wildlife sites. The Welsh poultry industry has become highly concentrated and commercialised with just two companies accounting for half the sector – 3.9 million birds across 33 sites – through contracts with local farmers. Industrial scale units now dominate and 99.9% of eggs are produced in units with more than 10,000 birds.

In some areas, clusters of poultry units have developed but, as each unit holds fewer than 40,000 birds, an environmental permit is not required. As a result, they can have a greater impact than larger units that are required to meet more stringent environmental standards. For example, depending on housing and management, 12,000 free-range laying hens can have a greater impact than 80,000 meat birds. The cumulative emissions and other pollution from clusters of units can cause significant damage to local wildlife, watercourses and people (NRW, 2015a).

In Powys, 107 planning applications for units holding 3.2 million birds were submitted between mid-2015 and March 2018. During this time, 74 were approved and only one refused, with the remainder awaiting a decision. If all these applications are approved, poultry numbers at any one time in Powys will increase from 1.4 million in 2007 to approximately 7.4 million (CPRW 2018).

Current regulation requires:

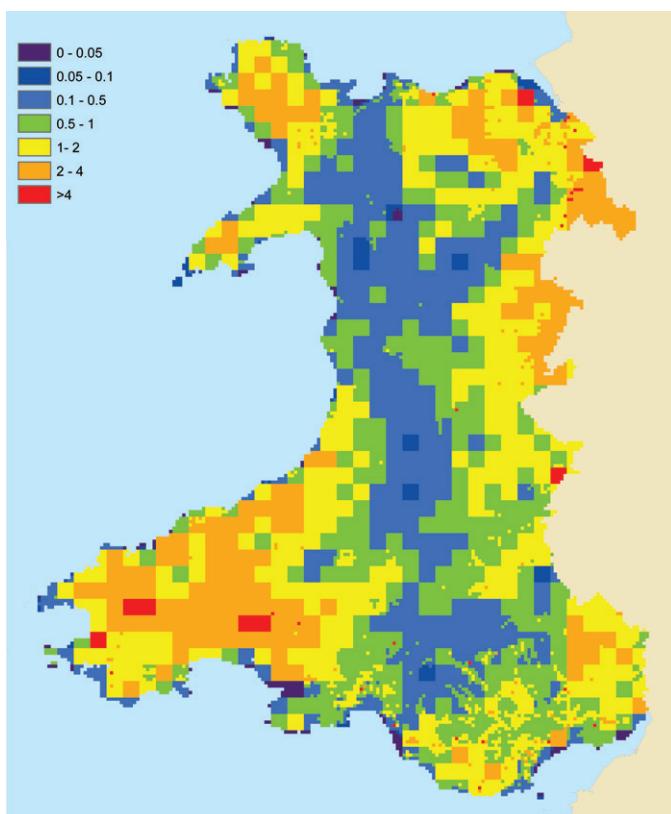
- Livestock units with more than 2,000 pigs or 40,000 poultry to have an environmental permit and meet operating standards specified under EU Directive 2010/75.
- New farm developments to gain planning permission from the local planning authority; an Environmental Impact Assessment should be carried out if there are likely impacts to wildlife and the environment.

- Manure, slurry and fertiliser management to follow cross-compliance rules for farm payment schemes in Nitrate Vulnerable Zones. These rules are designed to reduce water pollution and do not necessarily reduce ammonia emissions.

Government has relied largely on voluntary measures by farmers to cut ammonia (and greenhouse gas) emissions. Methods such as slurry store covers, improved housing floor systems and efficient field application can dramatically reduce ammonia and nitrous oxide emissions. Higher standards for waste management in animal housing improves air quality, water quality, animal welfare and conditions for farm workers, as well as wider benefits for people and wildlife.

Yet the lack of overall progress since 1990 and the current trend of rising ammonia emissions show that this voluntary approach has failed. Government intervention is needed to strengthen regulation, monitoring and enforcement, as well as providing advice and support to farmers.

Map of ammonia emissions in Wales in 2015 (tonnes), showing high emissions in intensively farmed lowland areas / Map o amonia yng Nghymru yn 2015 (tunelli) sy'n dangos allyriadau uchel mewn ardaloedd lawr gwlad sy'n cael eu hamaethu'n ddwys.



Y fferm ffactor

Ffermio yw prif ffynhonnell allyriadau amonia yng Nghymru – 86% yn 2015 – ond amcangyfrifir mai dim ond 5% o allyriadau fferm sy'n cael eu rheoleiddio'n uniongyrchol, sef y rhain o'r unedau moch a dofednod mwyaf. Tail o wartheg eidion a godro sy'n gyfrifol am fwy na hanner yr allyriadau fferm, ond nid ydynt yn cael eu rheoleiddio.

Yn fwy diweddar, mae'r twf trawiadol mewn unedau dofednod wedi dod yn destun pryder sylweddol oherwydd effaith uniongyrchol yr allyriadau ar safleoedd bywyd gwylt gerllaw. Mae'r diwydiant dofednod yng Nghymru wedi dod yn hynod ddwys a masnachol gyda dim ond dau gwmni'n gyfrifol am hanner y sector – 3.9 miliwn o adar ar draws 33 o safleoedd – drwy gontactau gyda ffermwyr lleol. Bellach, unedau ar raddfa ddiwydiannol sydd i'w gweld yn bennaf ac mae 99.9% o wyau'n cael eu cynhyrchu mewn unedau sydd â thros 10,000 o adar.

Mewn rhai ardaloedd, mae clystyrau o unedau dofednod wedi datblygu ond, gan fod pob uned yn dal llai na 40,000 o adar, nid yw trwydded amgylcheddol yn ofynnol. O ganlyniad, gallant gael mwy o effaith nag unedau mwy o faint sy'n gorfol cyrraedd safonau amgylcheddol mwy llym. Er enghraifft, gan ddibynnu ar y cytiau a rheoli, gall 12,000 o ieir maes sy'n dodwy gael mwy o effaith na 80,000 o ieir bwyta. Gall yr allyriadau cronus a llygredd arall o glystyrau o unedau achosi niwed sylweddol i fywyd gwylt, cyrsiau dŵr a phobl yn lleol (CNC 2015a).

Ym Mhowys, cyflwynwyd 107 o geisiadau cynllunio ar gyfer unedau'n dal 3.2 miliwn o adar rhwng canol 2015 a mis Mawrth 2018. Yn ystod y cyfnod hwn, cymeradwywyd 74 a dim ond un a wrthodwyd, gyda'r gweddill yn aros penderfyniad. Os bydd yr holl geisiadau hyn yn cael eu cymeradwyo, bydd niferoedd dofednod ym Mhowys ar unrhyw adeg yn cynyddu o 1.4 miliwn yn 2007 i tua 7.4 miliwn (CPRW 2018).

Mae rheoleiddio ar hyn o bryd yn gofyn:

- Bod gan unedau da byw sydd â mwy na 2,000 o foch neu 40,000 o ddfednod drwydded amgylcheddol a'u bod yn cyrraedd safonau gweithredu a bennir o dan Gyfarwyddeb 2010/75 yr UE.
- Bod datblygiadau fferm newydd yn cael caniatâd cynllunio gan yr awdurdod cynllunio lleol; dylid cynnal Asesiad o'r Effaith Amgylcheddol os bydd effeithiau tebygol ar fywyd gwylt a'r amgylchedd.
- Bod rheoli tail, slyri a gwrtraith yn dilyn rheolau trawsgydymffurfio ar gyfer cynlluniau taliadau fferm mewn Parthau Perygl Nitradau. Bwriad y rheolau hyn yw lleihau halogi dŵr ac nid ydynt o anghenraig yn lleihau allyriadau amonia.

I raddau helaeth mae'r Llywodraeth wedi dibynnu ar fesurau gwirfoddol gan ffermwyr i dorri allyriadau amonia (a nwyon tŷ gwyr). Gall dulliau fel gorchuddion storfeydd slyri, gwell systemau lloriau siediau a thaenu'n effeithlon ar y caeau leihau allyriadau amonia ac ocsid nitrus yn ddramatig. Mae safonau uwch ar gyfer rheoli gwastraff mewn siediau anifeiliaid yn gwella ansawdd yr aer, ansawdd y dŵr, lles anifeiliaid ac amodau i weithwyr fferm yn ogystal â sicrhau buddion ehangach i bobl a bywyd gwylt.

Eto mae diffyg cynnydd cyffredinol er 1990 a thuedd bresennol yr allyriadau cynyddol yn dangos bod yr ymagwedd wirfoddol yma wedi methu. Rhaid wrth ymyrraeth gan y Llywodraeth i gryfhau rheoleiddio, monitro a gorfodaeth yn ogystal â darparu cyngor a chymorth i ffermwyr.

With new policy and legislation being developed in preparation for leaving the European Union, this is a critical opportunity to take action.

More robust and effective action is required by the authorities to provide a regulatory framework with adequate resourcing, monitoring and enforcement to deliver results quickly and at the necessary landscape scale.

Local authorities can make better use of existing regulations to protect wildlife. In 2018, Carmarthenshire County Council refused permission for a unit of 32,000 chickens due to concerns that ammonia emissions would damage internationally-important lichens at the nearby Dinefwr Estate SSSI.



For further background information and references, see the report 'We need to talk about nitrogen', published in March 2017 by Plantlife on behalf of the Plant Link UK network and available at <http://www.plantlife.org.uk/our-work/policy/nitrogen>

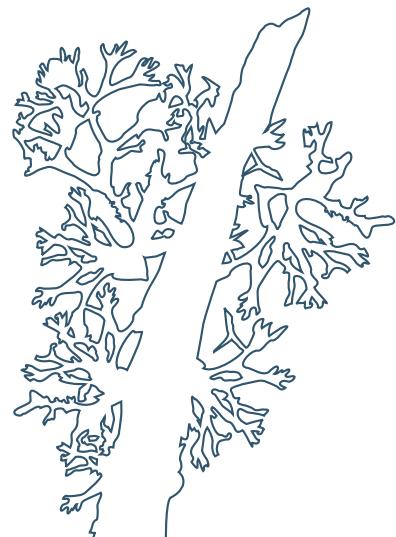
Gyda pholisi a deddfwriaeth newydd yn cael eu datblygu wrth baratoi i adael yr Undeb Ewropeaidd, dyma gyfle hollbwysig i weithredu.

Mae angen gweithredu cadarnach a mwy effeithiol gan yr awdurdodau i ddarparu fframwaith rheoleiddio gyda digon o adnoddau, monitro a gorfodaeth i sicrhau canlyniadau'n gyflym ac ar y raddfa dirwedd angenrheidiol.



Gall awdurdodau lleol wneud gwell defnydd o reoliadau sydd eisoes ar gael i warchod bywyd gwylt. Yn 2018, gwrthododd Cyngor Sir Caerfyrddin ganiatâd i uned o 32,000 o ieir oherwydd pryderon y byddai allyriadau amonia'n niweidio cennau o bwys rhynghwladol ar SoDdGA Stad Dinefwr gerllaw.

Am fwy o wybodaeth gefndir a chyfeiriadau, gweler yr adroddiad 'We need to talk about nitrogen', a gyhoeddwyd ym mis Mawrth 2017 gan Plantlife ar ran rhwydwaith Plant Link UK ac sydd ar gael ar <http://www.plantlife.org.uk/our-work/policy/nitrogen>



Recommendations to the Welsh Government:

- Establish statutory targets for reducing ammonia emissions and restoring protected wildlife sites in line with EU Directives and UNECE Gothenburg Protocol commitments;
- Integrate ammonia into the Welsh Government air quality strategy and the Welsh Air Quality Forum's activities, including annual reporting and awareness-raising through www.welshairquality.co.uk
- Establish an air quality reporting mechanism, overseen by Public Service Boards (PSBs) and NRW, to demonstrate compliance with the duty enshrined in the *Environment (Wales) Act 2016* to seek to "maintain and enhance biodiversity" and "promote the resilience of ecosystems";
- Strengthen regulation for agricultural businesses, with adequate funding and support to enable compliance and enforcement. Tighter air quality screening thresholds were introduced in 2017 but further strengthening is required to:
 - Regulate wastes from intensive farming operations (currently exempt);
 - Lower the threshold for environmental permits for poultry units from 40,000 birds;
 - Require environmental permits for other emissions sources, particularly large and indoor cattle units;
- Support monitoring and data analysis to understand the environmental impacts of nitrogen deposition and the benefits of cutting nitrogen emissions, including continuation of Plantlife's CENNAD lichen apprenticeship scheme, the OPAL Air Survey and other citizen science;
- Support Site Nitrogen Action Plans and other initiatives such as the Dynamic Dunescape partnership project and Western Atlantic Oak Woodlands, to understand and reduce nitrogen deposition impacts on threatened habitats through restoration, stakeholder engagement and citizen science;
- Provide resources and other support for NRW and PSBs to ensure effective enforcement of existing legislation, regulation and reporting mechanisms.

Recommendations to Natural Resources Wales:

- Develop an integrated strategy to reduce air pollution, water pollution and greenhouse gas emissions from farming, including joined-up training and advice for farmers and targeted incentives where appropriate;
- Increase capacity, training and resources for permitting and advisory staff in NRW and local authorities to implement the 2017 screening thresholds and other regulations;
- Incorporate nitrogen deposition levels and impacts into monitoring, assessment and management of Sites of Special Scientific Interest;
- Prioritise resources to enable prompt and full delivery of NRW's Natura 2000 Thematic Action Plan on Air Pollution: Nitrogen Deposition, including Site Nitrogen Action Plans (SNAPs), building on progress made in some areas.

Recommendations to Public Service Boards and local authorities:

- Identify and deliver a "Shared Outcome" between NRW and local authorities under the *Well-Being of Future Generations (Wales) Act 2015* and the Environment Act biodiversity duty. This should enable collaborative working through the permitting and planning processes, in order to minimise emissions, while recognising the importance of sustainable farming to the rural economy;
- Increase capacity, training and resources for permitting and advisory staff to minimise emissions by ensuring compliance with applicable legislation and regulation, including the 2017 screening thresholds and guidance on cumulative impacts of farm clusters;
- Support the delivery of Site Nitrogen Action Plans on sites in their area, by facilitating the engagement of local stakeholders including the farming community.

Argymhellion i Lywodraeth Cymru:

- Pennu targedau statudol ar gyfer lleihau allyriadau amonia ac adfer safleoedd bywyd gwylt gwarchodedig yn unol â Chyfarwyddebau gan yr UE ac ymrwymiadau Protocol Gothenburg UNECE;
- Integreiddio amonia i strategaeth ansawdd aer Llywodraeth Cymru a gweithgareddau Fforwm Ansawdd Aer Cymru, gan gynnwys adrodd blynnyddol a chodi ymwybyddiaeth drwy www.welshairquality.co.uk
- Sefydlu mecanwaith i adrodd am ansawdd aer, wedi'i oruchwyllo gan Fyrddau Gwasanaethau Cyhoeddus ac CNC, er mwyn dangos cydymffurfiaeth â'r ddyletswydd a ymgorfforir yn *Neddf yr Amgylchedd (Cymru) 2016* i geisio "cynnal a gwella bioamrywiaeth" a "hyrwyddo cydnerthedd ecosystemau";
- Cryfhau rheoleiddio i fusnesau amaethyddol, gyda digon o gyllid a chefnogaeth i alluogi cydymffurfio a gorfodaeth. Cyflwynwyd trothwyon sgrinio ansawdd aer tynnach yn 2017 ond mae angen cryfhau ymhellach er mwyn:
 - Rheoleiddio gwastraff o weithrediadau ffermio dwys (sydd wedi'u heithrio ar hyn o bryd);
 - Gostwng y trothwy ar gyfer trwyddedau amgylcheddol i unedau dofednod o 40,000 o adar;
 - Mynnau trwyddedau amgylcheddol ar gyfer ffynonellau allyriadau eraill, yn enwedig unedau mawr a than do i wartheg;
 - Cefnogi monitro a dadansoddi data i ddeall effeithiau amgylcheddol dyddodi nitrogen a buddion torri allyriadau nitrogen, gan gynnwys parhad cynllun prentisiaethau cennau CENNAD Plantlife, Arolwg Aer OPAL a chynlluniau gwyddoniaeth y dinesydd eraill
 - Cefnogi Cynlluniau Gweithredu Nitrogen Safleoedd a mentrau eraill megis prosiect partneriaeth *Dynamic Dunescape* a Choetiroedd Derw Gorllewin yr Iwerydd i ddeall a lleihau effeithiau dyddodi nitrogen ar gynefinoedd mewn perygl drwy eu hadfer, ymgysylltiad rhanddeiliaid a gwyddoniaeth y dinesydd;
 - Darparu adnoddau a chymorth arall i CNC a Byrddau Gwasanaethau Cyhoeddus i sicrhau bod y ddeddfwriaeth, rheoliadau a mecanweithiau riportio presennol yn cael eu gorfodi'n effeithiol.

Argymhellion i Cyfoeth Naturiol Cymru:

- Datblygu strategaeth integredig i leihau llygredd aer, llygredd dŵr ac allyriadau tŷ gwydr o ffermio, gan gynnwys hyfforddiant cydgysylltiedig a chyngor i ffermwyr a chymeliadau wedi'u targedu lle bo'n briodol.
- Cynyddu capaciti, hyfforddiant ac adnoddau ar gyfer staff caniatáu a chyngori yn CNC ac awdurdodau lleol i roi trothwyon sgrinio 2017 a rheoliadau eraill ar waith;
- Ymgorffori lefelau ac effeithiau dyddodi nitrogen wrth fonitro, asesu a rheoli Safleoedd o Diddordeb Gwyddonol Arbennig;
- Blaenoriaethu adnoddau i alluogi rhoi Cynllun Gweithredu Thematig Natura 2000 CNC ar Lygred Aer: Gwaddodi Nitrogen ar waith yn brydlon ac yn gyflawn, gan gynnwys Cynlluniau Gweithredu Nitrogen Safleoedd ac yn adeiladu ar y cynnydd a wnaed mewn rhai meysydd.

Argymhellion i Fyrddau Gwasanaethau Cyhoeddus ac awdurdodau lleol:

- Adnabod a sicrhau "Canlyniad a Rennir" rhwng CNC ac awdurdodau lleol o dan *Ddeddf Llesiant Cenedlaethau'r Dyfodol (Cymru) 2015* a dyletswydd fioamrywiaeth Deddf yr Amgylchedd. Dylai hyn alluogi cydweithio drwy'r prosesau caniatáu a chynllunio, er mwyn lleihau allyriadau wrth gydnabod pwysigrwydd ffermio cynaliadwy i'r economi wledig;
- Cynyddu capaciti, hyfforddiant ac adnoddau ar gyfer staff caniatáu a chyngori i leihau allyriadau drwy sicrhau cydymffurfiaeth â deddfwriaeth a rheoliadau perthnasol, gan gynnwys trothwyon sgrinio 2017 a chanllawiau ar effeithiau cynyddol clystyrau fferm;
- Cefnogi cyflwyno Cynlluniau Gweithredu Nitrogen Safleoedd yn eu hardaloedd, drwy hwyluso ymgysylltiad rhanddeiliaid lleol gan gynnwys y gymuned ffermio.

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Lichens have historically been used as indicators of clean air but high nitrogen levels are destroying some of Wales's internationally-important communities of lichens, mosses and liverworts.

Yn hanesyddol mae cennau wedi cael eu defnyddio fel dangosyddion o aer glân ond mae lefelau nitrogen uchel yn dinistrio rhai o gymunedau Cymru o gennau, mwsoglau a llysiâu'r afu sydd o bwys rhyngwladol.

We are Plantlife Cymru

Wild flowers, plants and fungi are the life support for all Wales' wildlife and their colour and character light up our valleys, mountains and coastline. But without our help, this priceless natural heritage is in danger of being lost.

From the open landscapes of our nature reserves to the corridors of the Senedd, we raise their profile, celebrate their beauty and protect their future.

Ni yw Plantlife Cymru

Blodau gwylt, planhigion a ffyngau sy'n cynnal bywyd gwylt Cymru ac mae eu lliw a'u nodweddion yn goleuo ein dyffrynnnoedd, mynyddoedd ac arfordir. Ond heb ein help, mae'r dreftadaeth naturiol amhrisiadwy hon mewn perygl o gael ei cholli.

O dirweddau agored ein gwarchodfeydd natur i goridorau'r Senedd, rydym yn codi eu proffil, dathlu eu harddwch a gwarchod eu dyfodol.

This report is endorsed
by / Arnodir yr
adroddiad hwn gan:



Patron: HRH The Prince of Wales

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Plantlife is a charitable company limited by guarantee, company no. 3166339.

Registered in England and Wales, charity no. 1059559.
Registered in Scotland, charity no. SC038951

ISBN 978-1-910212-62-2
June 2018

designbyStudioAde.com
Printed by Ripe Digital
on chlorine-free, acid-free
FSC Certified® paper