



Briefing Note: Forestry & Water Nodyn Briffio: Coedwigaeth a Dŵr

Crynodeb Gweithredol (Cymraeg yn unig)

Rydym wedi creu'r papur hwn er mwyn rhoi diweddariad ynghylch amryw o faterion sy'n berthnasol i goedwigaeth a dŵr. Mae'r papur yn ymdrin â'n camau gweithredu a'n cynnydd hyd yma o ran Ystâd Goetir Llywodraeth Cymru, yn ogystal â'r rhai sy'n berthnasol i adnoddau coedwigoedd Cymru yn ehangach lle gallwn ddylanwadu ar y rhain. Mae hefyd yn cynnwys ein blaenoriaethau a'n cynlluniau ar gyfer y dyfodol. Oherwydd natur dechnegol y papur hwn, darperir crynodeb gweithredol yn Gymraeg, ond mae'r brif ddogfen ar gael yn Saesneg yn unig yn unol â'n Safonau Iaith Gymraeg.

Mae Deddf Llesiant Cenedlaethau'r Dyfodol (Cymru) 2015 a Deddf yr Amgylchedd (Cymru) 2016 yn trawsnewid y ffordd rydym yn gweithio yng Nghymru. Mae gennym ddyletswyddau newydd o dan y ddwy Ddeddf er mwyn cefnogi'r gwaith o gyrraedd y nodau llesiant drwy reoli adnoddau naturiol yn gynaliadwy. Yn ogystal â chyfrannu at lesiant unigolion, mae coedwigoedd ac adnoddau dŵr yn rhyngweithio, ac mae sawl agwedd ar y gwaith o reoli coedwigoedd yn dylanwadu ar lif, ansawdd a defnydd dŵr. Mae'r papur hwn yn canolbwyntio ar y cydadwaith rhwng y ddau beth. Ein dyhead yw y bydd y papur hwn yn hybu trafodaeth yn fewnol ac yn allanol er mwyn annog pawb yn ehangach i gydweithio er mwyn cyrraedd y nod o reoli adnoddau naturiol yn gynaliadwy a'r canlyniadau llesiant y mae Cymru'n ceisio eu cyflawni.

Mae strategaeth [Coetiroedd i Gymru](#) Llywodraeth Cymru yn cydnabod y rôl bwysig sydd gan goetiroedd a choed o ran cyfrannu at y gwaith o reoli dŵr a phridd. Cyfarwyddeb Fframwaith Dŵr yr UE yw'r fframwaith strategol ar gyfer cyflawni'r gwaith o reoli dŵr yn gynaliadwy yng Nghymru a'r DU. Y nod cyffredinol yw cyflawni "statws da" o leiaf ym mhob corff dŵr. O'r 432 o gyrff dŵr afonydd yng Nghymru a aseswyd bod ganddynt statws cyffredinol llai na "da" yn 2015, nodwyd mewn perthynas â nifer bach ohonynt fod gweithgareddau coedwigaeth yn cyfrannu at y rheswm dros beidio â chyflawni statws da.

Rydym wedi ymrwmo i leihau nifer yr achosion lle nodir coedwigaeth fel rheswm dros fethu, drwy ymdrin ag achosion y methiannau hynny a gwella ansawdd yr amgylchedd. Mae hyn yn bennaf drwy ein gwaith o reoli Ystâd Goetir Llywodraeth Cymru, ond rydym hefyd yn gweithio er mwyn gwella cydymffurfiaeth ar draws adnoddau coedwigoedd Cymru drwy ein rolau a'n cyfrifoldebau eraill – er enghraifft, o ran trwyddedau cwmpo coed, rheoliadau asesu effeithiau amgylcheddol, gweithredu'r cynllun Mynediad, a gwiriadau Glastir (ar ran Llywodraeth Cymru). Mae'r papur yn trafod Safon Goedwigaeth y DU a Chanllawiau Coedwigaeth a Dŵr y DU (UKFWG), asideiddio, adfer mawn dwfn, defnyddio plaladdwyr, newid yn yr hinsawdd, creu coetiroedd, atebion ar lefel dalgylchoedd, a gweithio mewn partneriaeth.

Mae'r materion sy'n berthnasol i goedwigaeth a dŵr ill dau yn cynnig cyfleoedd a risgiau i Cyfoeth Naturiol Cymru, y sectorau coedwigaeth a rheoli tir a dŵr, Llywodraeth Cymru a

phobl Cymru o ran cyflawni'r gwaith o reoli adnoddau naturiol yn gynaliadwy a chyrraedd y nodau llesiant. Mae'r papur yn cloi drwy adnabod blaenoriaethau a chamau gweithredu ar gyfer y dyfodol, ac yn nodi ein bod yn croesawu'r cyfle i weithio gyda'n rhanddeiliaid a'n partneriaid yn ystod y gwaith o ddatblygu cynllun gweithredu newydd.

1. Purpose of the paper

The purpose of this paper is to provide an update on a range of issues relevant to forestry and water, in terms of our actions and progress to date on the Welsh Government Woodland Estate (WGWE) as well as those relevant to the wider Welsh Forest Resource where we can influence these. It also covers our priorities and plans in the future.

The Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 are transforming the way we work in Wales. We have new duties under both Acts to support the achievement of well-being goals through the Sustainable Management of Natural Resources (SMNR) through, for example, the production of Area Statements. Area Statements will help facilitate the delivery of Welsh Government's [Natural Resources Policy](#) at the local level. The Environment Act requires the Statements to include information about the natural resources in that place, the benefits they provide, and the priorities, risks and opportunities that need to be addressed, to achieve sustainable management of them.

Sustainable Forest Management (SFM), in accordance with the [UK Forestry Standard](#) (UKFS), seeks to balance the environmental, social and economic aspects of forestry. SFM is compatible with SMNR and work has already started to better understand whether changes are needed to existing management practices or the regulatory framework to support the delivery of SMNR and maximise the contribution that forestry makes to the achievement of Wales' well-being goals. Trees and woodlands contribute to well-being in many ways. Water resources also contribute directly to well-being and it is the interplay between the two that is the focus of this paper (see Section 2). In other words, how woodlands can be better managed to contribute to SMNR and well-being *directly* (e.g. fibre production, green space for recreation, carbon sequestration) as well as *indirectly* through their influence on water resources (e.g. water quality, water related recreation, mitigation of natural hazards including drought and flooding).

Our aspiration is that this paper will promote discussion internally and externally to facilitate wider cooperation and collaboration to achieve SMNR and the well-being outcomes Wales' seeks.

2. Well-being and natural resources

The contribution that trees and woodlands and water resources make to well-being is explored in detail in [SoNaRR](#) (2016). Woodlands contribute to the functioning of environmental, social and economic systems and well-being in many ways. They help to regulate climate stress at a local level, provide carbon sequestration, safeguard soils, support biodiversity, improve air quality, reduce noise pollution and regulate pests and diseases. They play a major role in pollination, soil formation, nutrient cycling, water cycling and oxygen production, all of which are crucial in supporting our health and well-being. They also provide fibre which supports employment, industry and renewable energy generation, and provide opportunities for education and recreation which supports community cohesion and participation. They are also important elements of our landscape and cultural heritage, contributing to a sense of place and providing space to enjoy nature and tranquillity.

Water resources (freshwater) are an equally vital component of our natural resources and contribute to well-being in many ways. Rivers, streams, lakes and wetlands provide drinking water and contribute to our enjoyment of life through the opportunities they provide for leisure and the appreciation of water in the landscape, and are important for the sustenance of other ecosystems. Freshwater systems help to control runoff from the land to rivers, floodplain inundation, groundwater recharge, and water quality. They are therefore critically important in supporting the functioning of social and economic systems and our ability to adapt to climate change.

As well as contributing to well-being individually, forests and water resources interact and many aspects of woodland management influence water flow, quality and usage. In the context of SMNR and well-being, the interaction includes, for example, how:

- woodlands contribute to flood and low river flow risk management by regulating run-off and baseflows, which has implications for downstream water quality and usage
- woodlands enhance our resilience to natural disasters, such as flooding and drought
- woodlands provide opportunities for recreation (including water related) and enjoyment of the natural world which improves physical health and mental well-being.
- woodlands contribute to flood risk management which has a positive effect on mental health and well-being.

3. Our role and responsibilities

We have many roles and responsibilities with respect to forestry and water, including working as a:

- **Land manager**, with responsibility for managing the WGWE¹ and National Nature Reserves (NNRs) which include areas of woodland. We have a general statutory duty to *'promote in Wales the interests of forestry; the development of afforestation; and the production and supply of timber'*, as well as various nature conservation duties. The WGWE is also dedicated Open Access Land, providing opportunities across Wales for access, and we provide and manage a range of recreational events facilities and trails. We are committed to developing our position including developing and encouraging opportunities for water related recreation on the WGWE, or where blue space can be accessed from WGWE, by working with partner organisations. We have a close working relationship with WG in relation to the WGWE. It is a public asset and is managed to support delivery of the *Woodlands for Wales* strategy (see Section 4.1) as well as other public policy priorities such as the Natural Resources Policy and [Prosperity for All: the national Strategy](#).
- **Regulator**, with responsibility for the control of felling and replanting of woodland, new woodland creation, deforestation, forest tracks and quarries, and tree health in forest situations through the granting of permits and licences, the assessment of compliance, the investigation of potential offences and taking enforcement action. We are the statutory conservation body for designated sites² and are also a regulator under the Habitats Regulations (2010) where forestry/woodland activities may affect European Protected Species. In relation to water, we have a statutory duty under the Water Framework Directive (see Section 3) and responsibilities under the Environmental Permitting Regulations 38 (1)(a) and the Salmon and Freshwater Fisheries Act Section

¹ The WGWE accounts for approximately 40% of the Welsh Forest Resource, and supplies almost 60% of Welsh timber

² SSSI to comply with Countryside and Rights of Ways Act (1981) and CRoW Act; SAC and SPA under EU Habitats and Species Directives.

4 (1). We determine water abstraction and impoundment licences, and have responsibilities in relation to flood risk management.

- **Protector**, we ensure that felling and harvesting operations are undertaken in a safe manner, ensuring spawning gravels for fish are not affected by silt and run off from forestry activities. We also safeguard and protect private and public drinking water abstractions and the water environment, to ensure they are not impacted by felling or harvesting operations.
- **Responder**, in relation to pollution incidents on both land and in water.
- **Advisor / consultation body**, with responsibility for providing statutory and non-statutory advice and guidance across our organisational remit, to Welsh Government, industry and the wider public and voluntary sector. This includes development planning advice, conservation advice for protected sites, forest management and regulatory advice and guidance, remediation of land and legacy sites such as mines, water and waste discharges. We are a consultation body for our own and others programmes, plans and projects in respect of environmental assessments. We also advise on management of species that may be damaging woodlands such as deer, grey squirrels and invasive species.
- **Evidence gatherer**, with responsibility for monitoring our environment, commissioning and undertaking research, combating environmental crime, making evidence-based decisions and being a public records body.
- **Partner / educator / enabler**, with responsibility for managing third party activity on land that we manage. Through our Mynediad (formerly Woodlands and You) framework we encourage individuals, groups and other organisations to use the WGWE for activities, projects, events and learning. We aim to be a catalyst for others' work, helping them to also contribute to well-being goals. For example, we offer advice, guidance, training and resources on woodland based learning, working with Forest School Practitioners and facilitating the Outdoor Learning Training Network which ensures the standards and quality of training for practitioners in partnership with Agored Cymru.

4. Context and background

4.1 Woodlands for Wales Strategy

The Welsh Government's [Woodlands for Wales](#) Strategy (2009³) acknowledges the important role woodlands and trees play in contributing to water and soil management. A [Policy Position on Water and Soils](#), in support of the Strategy, contains an "Agenda for Action" which feeds into a rolling 5-year [Action Plan](#). The water and soil "Agenda for Action" has four main themes:

- Effective implementation of the UKFS Forests & Water and Forests & Soil Guidelines.
- Clear planning and operational guidance to limit the pressures on water and soil resources through restructuring of the current woodland resource.
- Maximise the environmental benefits from targeted and appropriate new trees and woodland creation
- Work with partners to achieve strategic programmes that are appropriate and effective at the local level.

³ The current strategy is to be refreshed.

Indicators are used to monitor and report progress on an annual basis against delivery of the outcomes contained within the Strategy. Two of the 23 indicators⁴ relate directly to water, however they are still in development and no progress has been reported to date.

4.2 Water Framework Directive

The EU Water Framework Directive (WFD) is the strategic framework for achieving the sustainable management of water in Wales and the UK. The overall aim is to achieve at least “good status” in all water bodies - a term that refers both to chemical and ecological quality. Another key requirement is that there must be no deterioration in current water status; this includes the need maintain the quality of water currently classified as “high status”.

We have a statutory duty under the WFD and act as a key delivery partner across the sector. There is a Programme of Measures and some relate to forestry, including a requirement that we deliver a prioritised programme of measures on the WGWE to support delivery of WFD and protected area objectives, and that we continue to improve awareness and implementation of the UKFS and Guidelines across the forest sector.

There were 432 river water bodies in Wales assessed as having less than good overall status in 2015. Of these, 19 river water bodies (c. 4%) have forestry activity assigned as contributing to the reason for not achieving good status, with probable or confirmed certainty (2015 RNAG dataset, cycle 2 baseline, available on Water Watch Wales). In a further 10 water bodies, (8 rivers and 2 lakes), forestry activity is suspected of contributing to the reason for not achieving good status but with less certainty so this requires further investigation. The reason for not achieving good status is principally due to exacerbation of acidification, with pH, fish and sometimes invertebrates the most frequent failing elements. Other threats include sedimentation, pesticides, excessive shading, nutrient enrichment, contamination from fuel oils and barriers to fish migration.

There is a structured and complex programme of monitoring and evaluation linked to implementation of the WFD.

4.3 Other programmes

The strategic WFD issues mirror those in some of our other key programmes of work. For example, there are Thematic Action Plans under the LIFE N2K programme for Wales for “diffuse water pollution” and “manmade changes to hydraulic conditions” which are also major issues for WFD. Our “Agenda for Change” programme is looking at how we work with partners towards achieving sustainable inland fisheries for Wales, which will support wider ecosystem benefits for flora and fauna through the actions of a wide range of stakeholders, and will tackle some of the WFD issues identified in RBMPs. The distribution of these issues will differ across Wales and the priorities and opportunities to design and implement appropriate solutions will need to be reflected within Area Statements.

5. Actions to date

Forests and woodlands cover approximately 15% of the land area of Wales and their management can have a large influence on the quantity and quality of downstream water which affects the health of aquatic ecosystems and the downstream uses of that water for social and economic benefit. Whilst forests can provide mitigation against natural hazards such as drought, flooding and soil erosion, inappropriate forest management can risk

⁴ “Woodlands as a pressure on water” (Indicator 21) and “Woodlands as a solution for water management” (Indicator 22)

environmental harm and have implications for well-being. Consequently, it is important that forest management is carried out in such a way as to minimize impacts on freshwater systems, in line with SMNR principles. We are committed to reducing the number of times forestry is identified as a reason for failure by dealing with the causes of those failures and improving environmental quality. This is primarily through our work managing the WGWE but also in relation to the wider Welsh Forest Resource, through our role as a regulator, advisor, evidence gatherer, partner and enabler (see Section 3).

Our primary focus in relation to management of the WGWE is on improving compliance with the UKFS and the UK Forest and Water Guidelines (UKFWG). The UKFWG explain how the UKFS requirements for water can be met, and cover issues such as silvicultural management, species choice, drainage management, the operation of machinery, pollution control, protection of public water supplies, brash management, use of chemicals fuels and oils, and riparian zone management. Through compliance with the UKFS and UKFWG, we will reduce the number of times that forestry is identified as a reason for failure, and in doing so we will contribute to wider well-being outcomes for Wales by expanding the potential benefits that can be derived from water. This work is routinely undertaken, where opportunities present themselves, as part of our “day job” managing the WGWE. We also have several dedicated work programmes, for example related to acidification⁵, the use of pesticides in forest management, and the restoration of afforested deep peat.

We also work to improve compliance across the Welsh Forest Resources through our other roles and responsibilities, for example in relation to the issue of felling licences, EIA regulations, operation of the Mynediad scheme and Glastir⁶ verification (on behalf of Welsh Government).

Our progress to date (since the formation of NRW in 2013 in most cases) in key areas is detailed in Annex 1. Topics relevant to water and forestry are presented as a “pressure” or a “solution” and there is cross-reference to the WFD programme. However, it should be noted that what constitutes a pressure and what constitutes a solution is not always clear-cut. For example, in the past large wooded debris in watercourses was typically considered a nuisance: a cause of channel instability, a barrier to fish movement, and a hazard that blocks culverts and bridges, and it was removed. However, it is now widely recognised that large woody debris is a vital component of a healthy functioning watercourse, diversifying its structure and the wildlife it supports. It is now increasingly being viewed as an effective form of natural river rehabilitation and flood defence.⁷

6. Outcomes achieved

We are an evidence-based organisation and seek to ensure that claims about improvements and outcomes that have been achieved are supported by evidence. A vast array of water quantity and quality data is collected under the WFD programme, as well as other programmes such as the Acid Waters Network. This data informed the publication of the State of Natural Resources Report ([SoNaRR](#)) and has contributed to a high-level overview of the situation in Wales with respect to Reasons for Not Achieving Good Status (RNAGS).

⁵ where forestry is recognised as a contributing factor (by scavenging atmospheric pollutants and where there is over 30% closed canopy woodland cover

⁶ Glastir is the Welsh Government’s sustainable land management scheme

⁷ See http://www.therrc.co.uk/MOT/References/WT_Fish_live_in_trees_too.pdf

We recognise that there are gaps in our understanding and we hope to address these in the future, subject to available resources (see Section 7). We will also increasingly look to others to support our evidence base, for example by working with partners such as Welsh Water and Afonydd Cymru and utilising the monitoring data they collect.

With respect to our forestry actions, we have a high degree of confidence in claiming that these will be contributing to improved water quantity and quality downstream, as they are driven by compliance with the UKFS and UKFWG, and are based on scientific evidence and up-to-date [forest research](#). These improvements will support delivery of SMNR and the wider well-being outcomes that Wales' seeks.

Data on the number of forestry pollution incidents⁶ is shown in Table 1.

Table 1

Year	Forestry incidents with impacts to water based on WIRS ⁸ data
2010 (from 1 st January)	0
2011	2
2012	7
2013	4
2014	2
2015	2
2016	2
2017 (to 31 st May)	1

Based on WIRS data, the number of forestry incidents is very small compared to the number of agricultural pollution incidents. For example, in 2016 only 2 out of a total of 128 incidents were attributed to forestry⁹.

7. Future priorities and next steps

The issues relevant to forestry and water present both opportunities and risks for NRW, the forestry, land management and water sectors, Welsh Government and the people of Wales, in terms of the delivery of SMNR and the achievement of well-being goals.

In terms of opportunities, the transition from European Union membership presents a very real opportunity to release potential investment flows for woodland management and new woodland creation alongside supporting process improvements in forest regulation, rural development support payments and the stronger development of woodland related Payments for Ecosystem Services (PES) Schemes. These will have knock-on positive impacts on the water environment. One example is the [PESFOR-W](#) project which aims to improve Europe's capacity to use PES to achieve WFD targets & other policy objectives through incentives for planting woodlands to reduce agricultural diffuse pollution to watercourses. We are involved in ongoing discussion with Welsh Government and UK colleagues to inform the debate. In terms of risks, the main one is failure to meet the overarching objective established through the WFD.

Table 2 is a summary of future priorities and actions that we have identified.

⁸ Wales Incident Reporting System (which replaced the former Environment Agency Wales' National Incident Reporting System or NIRS)

⁹ The majority were attributed to agriculture.

Table 2

Action / priority	Benefit	Responsibility	Status
Ongoing work on the WGWE to improve compliance with UKFS and UKFWG ¹⁰ to support delivery of SMNR and the achievement of the Wales' well-being goals (e.g. update of FRPs, river culvert and drain surveys and remedial works, restoration of open habitats etc.)	Ongoing contribution to the improved status of waterbodies in Wales, enhancing their potential contribution to the well-being of Wales.	NRW, in partnership with stakeholders	Ongoing, as opportunities arise during forestry operations. A formal, dedicated programme would require additional funding and resources ¹¹ . However, fast-tracking work may cause more environmental impact so careful consideration is needed.
Publish a position statement on liming.	Our approach will be clearly set out, reducing uncertainty and ambiguity for stakeholders.	NRW, in consultation with stakeholders	Ongoing and work in progress. Due for publication late 2017 / early 2018.
Develop the two outstanding <i>Woodlands for Wales</i> indicators on "Woodlands as a pressure on water" and "Woodlands as a solution for water management"	It will be possible to track progress and trends over time, increasing the evidence base.	WG, in consultation with NRW and other stakeholders	Outstanding (WG to lead)
Work with others to explore "alternative indicators" (other than classification data) that might support better reporting of improvements in environmental quality and well-being outcomes, e.g. "km's of river enhanced", and ensure this links to the production of Area Statements	Improved reporting of outcomes and how these contribute to SMNR and well-being.	NRW with stakeholders, including Dwr Cymru, the Coal Authority, PSBs	Work has commenced and is ongoing.

¹⁰ Forestry Commission are due to publish in Nov/Dec 2017 a Practice Guide on Managing forest operations for water protection

¹¹ Current "ball park" estimates suggest that £30M would be needed to achieve UKFWG compliance in the 22 prioritised water bodies on the WGEWE over a 5-10-year period

Achieve compensatory planting for woodland loss that occurs on the WGWE due to our Energy Delivery Programme.	Multiple well-being benefits associated with woodland creation if located in the right place, and designed in the right way in accordance with UKFS.	NRW, in consultation with others	Active and ongoing. A Woodland Creation Advisor was appointed in March 2017 to facilitate this process and manage a ring-fenced fund ¹²
Develop a policy position for Wales on compensatory planting, beyond what may be required in accordance with planning regulations.	Multiple well-being benefits associated with woodland creation if located in the right place, in accordance with UKFS.	WG, in partnership with NRW and other stakeholders	No current commitment (from WG) or timetable.
Work collaboratively with others, particularly PSBs, to ensure that the well-being benefits associated with woodlands, including those linked to water, are recognised and opportunities to seek improved and wider benefits at the local level are explored.	Will support integrated solutions at an area / local level, working on a collaborative basis.	NRW, PSBs and other stakeholders.	Work has commenced, but more focus is needed to ensure that forestry and water connections are made and sustained.
Consider re-surveying the existing critical load exceedance maps (in relation to acid sensitive catchments).	Provision of up to date information to support better decision making and delivery of SMNR.	NRW	Currently an unfunded and un-resourced requirement.
Explore opportunities internally and with others for bespoke monitoring / evidence analysis projects to identify water quality changes due to forestry interventions.	Improved evidence base to assess the impact / effectiveness of forestry interventions on the water environment to support delivery of SMNR and well-being outcomes.	NRW and other stakeholders	Currently an unfunded and un-resourced requirement.
Review the 22 prioritised water bodies on the WGWE identified in WFD Cycle 1 to determine whether these are still relevant in WFD Cycle 2 (which runs until 2021).	Improved targeting of our actions and interventions to help improve the status of water bodies.	NRW	Work in progress – due for completion March 2018
Through our work as a regulator, advisor and enabler, promote improved forest management practices in the private sector.	A level playing field across the sector and improved compliance with the UKFS across the Welsh Forest Resource.	NRW, in partnership with stakeholders	Active and ongoing, e.g. through the work our Future Regulation Team
Provide the necessary advice, policy and financial support to maximise uptake of Glastir Woodland	Multiple benefits associated with woodland creation, restoration and	WG, in partnership with NRW and other stakeholders	No current funding commitments from WG.

¹² Currently £500k, but it will increase annually.

schemes. Influence post-EU schemes and funding requirements to achieve Wales' woodland targets.	management that complies with the UKFS and Glastir scheme rules.		
Develop an Action Plan to capture actions relevant to forestry and water, ensuring links to the WFD programme and that outcomes are aligned with the well-being goals to demonstrate the opportunity for multiple benefits (social, economic, cultural <i>and</i> environmental) from delivery of these actions.	Improved transparency and accountability on progress and outcomes, and closer linkages to WFD program.	NRW, in discussion with stakeholders	To be completed by June 2018.
Set up an informal group within NRW to share and discuss information relevant to forestry and water, including current priorities, programmes, and initiatives.	Closer cross-directorate working to raise awareness and ensure coordinated delivery.	NRW	By the end of 2017.

8. Engagement and communication

Further discussion and refinement of the actions and priorities identified in Table 2 is required and we welcome the opportunity to work with our stakeholders and partners during development of an Action Plan, and the subsequent reporting of progress. We will continue to engage and communicate with our stakeholders through established forums such as the River Basin Liaison Panels and the Forest Sector Business Group, as well as through our work with PSBs and other SMNR practitioners.

Annex 1: Water and Forestry: Progress and actions to date (as of October 2017)

Forestry as a pressure	
Issue	Actions to date
Forestry operations on WGWE (improving compliance with the UKFS and UKFWG) WFD Measure ID: CYM41 & 54	<ul style="list-style-type: none"> We identified 22 prioritised water bodies in WFD Cycle 1¹³ where our actions can lead to a significant improvement in their status. We have made a commitment to review the forest riparian management and drainage systems in these priority water bodies to ensure they meet best practice for water management by 2021. Much of the work subsequently identified in this table has been undertaken in the prioritised water bodies.
	<ul style="list-style-type: none"> Undertaking a review and update of Forest Design Plans / Forest Resource Plans¹⁴ (FDPs / FRPs). The change to the forest structure is a slow, gradual process, and the benefits of recent interventions and improvements will only be evident in the medium to longer term. FDPs / FRPs identify and facilitate restructuring opportunities on the WGWE in accordance with the UKFS and UKFWG, including for example a greater use of Low Impact Silvicultural Systems (LISS), better riparian management and open habitat restoration. All FDPs/FRPs have been reviewed and updated since 2010 to ensure that the proposals are in line with UKFS and WFD requirements. Use of LISS is considered as a management system for all plans where conditions are suitable. In locations where LISS is currently unsuitable due to previous management history this will be considered for management of the future rotation.
	<ul style="list-style-type: none"> We are undertaking river surveys to improve forest riparian management. We have developed a standard methodology for “river walks” and all local staff in forest planning teams have received training and instruction. The surveys record a wide range of information including riparian habitat quality, the presence of INNS, fish blockages, forest and roadside drain connections. To date, we have surveyed over 270km of rivers located within the WGWE. Following a survey, a programme of works is identified for the surveyed watercourses that is further prioritised where there are protected sites downstream, or communities at risk of flooding. The programme of works is designed to ensure that drainage infrastructure, riparian areas and buffer zones adjacent to watercourses (which are often heavily shaded with non-native tree species) meet the current standards set out in the UKFWG, e.g. clearance of conifer regeneration; realigning forest drainage such that no artificial drains discharge directly into watercourses; disconnecting roadside drains such that they cannot discharge directly into watercourses. To date, remedial works have been undertaken in response to river surveys along more than 25km of watercourses. A project example is the Afon Ledr, where a walkover survey identified that silt from forest roads was one of the reasons for not achieving good status (due to poor fish populations). Work was subsequently done by forest operations to install silt traps

¹³ The WFD works in six-year cycles. We are currently in year 2 of the second six-year cycle which runs to 2021.

¹⁴ All woodlands comprising WGWE have long term (20 years+) management plans called Forest Design Plans (FDPs) / Forest Resource Plans (FRPs). These are subject to regulatory approval and specify felling, thinning proposals and future species choice with the overall objective of sustainable forest management. A mid-term review is carried out at five years with a comprehensive review at plan period every ten years

	<p>and add additional drainage to the track to reduce the sediment run off going into major spawning areas. Contractors working in the forest were also briefed to explain the risks and how best to manage them, enabling forest operations to continue while protecting the water environment. A bid for future funding (by NRW and the National Trust) has been submitted and this will look to improve land management and water quality in the catchment, and will include additional monitoring, drainage management, forest surveys and a river restoration project to create a better link between the river and the SSSI, SAC and SPA peat habitat.</p> <ul style="list-style-type: none"> • We are also undertaking culvert and drain surveys on the WGWE, sometimes in partnership with others. For example, in 2017, we started the “Culvert Assessment and Prioritisation Pilot – Gorlech, Cothi and Melinddwr, Brechfa Forest” working collaboratively across NRW (planning, fisheries and operations delivery teams) and with Afonydd Cymru Rivers Trust. The pilot will identify a priority work programme of culvert replacement and amendments within the waterbodies within Brechfa Forest with the aim of reducing barriers to migratory fish. The project will run until 2020. • We have rolled out Water Management Plans (WMPs) as a requirement for all operations on the WGWE (including harvesting, civil engineering, restocking operations and recreational activity such as rallying, mountain bike trails), to minimise the risk of sediment delivery to watercourses. To date over 250 WMPs have been completed. All WMPs involve an environmental risk assessment; a map of the area detailing all water pathways, risks and mitigation, as well as water monitoring points; and details of any mitigation put in place ahead of operations starting. The documents are kept “live” and updated with information, lessons learned and a record of any infrastructure requiring ongoing management. Staff and contractors have been given training on producing WMPs at water awareness events
<p>Acidification WFD Measure ID: CYM53</p>	<ul style="list-style-type: none"> • In 2013 we published an 'Implementation guide to managing forests in acid-sensitive areas,' with the aim of clarifying and simplifying the ways in which the Forestry Commission (FC) Practice Guide (2014) on <u>Managing forests in acid sensitive catchments</u>, is put into practice in Wales. Implementing the guidance is an important step towards ensuring “good status” in some of our failing upland water bodies. The Implementation Guide: <ul style="list-style-type: none"> - Explains the principles we will follow in our application of the Practice Guide - Includes a <u>map</u> showing the acid sensitive water bodies where we will implement the Practice Guide methodology in relation to forestry projects. - Explains the thresholds and rules that we will apply when implementing the Practice Guide - Explains how we will undertake catchment-based critical load assessments or site impact assessments. • An updated version of the Guide was published in June 2017 and this rewards good forest design in line with UKFS and UKFWG by removing the requirement for Critical Load Assessments to be undertaken in all but a few situations. • Project work undertaken by NRW and partner bodies, notably the rivers trusts, has sought to bring about more rapid improvement in water quality in order to sustain fish life. NRW's predecessor bodies implemented, and NRW continues to operate, a liming programme in the upper Tywi catchment, whilst the Wye and Usk Foundation and the West Wales Rivers Trust also carry out consented discharges of lime (often limestone sand) to upper river catchments. These liming programmes seek to elevate the pH and suppress episodic low pH flushes that would otherwise be lethal to fish and other biota. NRW considers applications to treat river catchments with lime under the normal <u>Environmental Protection Regulations discharge-permitting process</u> with applications being made using a stand-alone water discharge activity bespoke permit.

	<p>Whilst liming still takes place, it is limited and carefully controlled, as it can damage and kill lime-sensitive flora.</p> <ul style="list-style-type: none"> • We are in the process of producing a Position Statement on Liming which is due for publication in late 2017 /early 2018.
<p>Restoration of afforested deep peat</p>	<ul style="list-style-type: none"> • The total afforested deep peat area in Wales in 2012 was estimated as 18,092 ha. Of this, 11,232 ha remains under coniferous tree cover – 11,038ha of which is on the WGWE. Peatland in pristine or good condition provides a range of critical ecosystem functions, contributing to biodiversity, carbon storage and sequestration, regulation of stream base flows, water runoff and downstream flood peaks. It also contributes to nutrient regulation and retention. However, afforested deep peat may generate sub-optimal benefits, and there is a case for considering restoration to open habitat where there is a clear ecosystem service benefit, and the viability of successful restoration has been assessed. • In 2012, a joint, collaborative project between FCW, CCW, EAW and the Welsh Government was commissioned and delivered by Forest Research. The published report 'A strategic assessment of the afforested peat resource in Wales, and the biodiversity, greenhouse gas flux and hydrological implications of various management approaches for targeting peatland restoration' contained information about the following: <ul style="list-style-type: none"> – An assessment of the distribution of Welsh peatlands – An improved map of the distribution of afforested deep peats in Wales and ownership of forested land in Wales – An overview of the likely impacts of peat forming factors and afforested peatland restoration and management on biodiversity, hydrology and greenhouse gas (GHG) benefits – <i>National and field-based assessment schemes</i>; rule-based criteria, proxy factors and thresholds for the assessment of afforested peatland in Wales which is viable for restoration – A national GIS assessment identifying potential restoration areas in Wales – <i>Field-based assessment</i> by ground truthing several sites in Wales – Relative costs of afforested peat restoration. • The report was subsequently used to compile a list of “top 10”¹⁵ sites on the WGWE. We have a programme put in place to manage restoration on these sites over the next 15 years. As of December 2016, a total of 65.91ha had been restored, restoration work was in progress on 124.55ha, and a further 589.5 ha of restoration was planned. All other sites of afforested deep peat must be reviewed during the next FDP revision. • We have also developed a Field Assessment Tool (FAT) for practitioners for prioritising sites based on delivery of multiple environmental benefits. Any potential restocking on deep peat requires application of the FAT, and can be only be considered when certain criteria are met. If restocking on deep peat sites is the best option, there are guidelines that must be followed to minimise any negative impacts, e.g. careful selection of tree species, planting specifications for riparian areas, retaining any areas of semi-natural open habitat, restrictions on changes to drainage infrastructure, no mechanised ground preparation etc.

¹⁵ Priority for restoration is based on WFD, proximity to drinking water supply, designated site, connectivity, access, urgency, local reasons, cost and other economic factors

<p>Pesticide usage</p>	<ul style="list-style-type: none"> • There is a clear approach set out with the UKFS and UKFWG to restrict pesticides to those approved by international agreement, seek alternatives to pesticide use and confine necessary usage to the absolute minimum. In 2014, we undertook a review of our use of Alpha-cypermethrin and cypermethrin¹⁶ to help limit the damage caused by the <i>Hylobius</i> beetle. <i>Hylobius</i> is widely recognised as the most serious pest of newly planted trees in the UK leading to 100% losses of planted conifer, broadleaf and natural regeneration in some cases without an active suite of control measures. In 2014, our Board agreed with a recommendation from this internal review that we would stop using alpha-cypermethrin and cypermethrin in our WGWE plant protection programme by 31st October 2017. In September 2016, we provided our Board with an update on progress towards this commitment. • Working with other agencies across the UK, we have undertaken research trials and invested in the use of non-chemical alternatives such as nematodes and wax paper sleeves. We also use the Hylobius Management Support System (HMSS) across our programme to inform management decisions about the best treatment options. We recently embarked on the largest nematode programme in the UK¹⁷. The work will take place in the Tywi Forest, near Llandovery in Powys before moving northwards to the Hafren Forest, and finishing in Clocaenog Forest in Denbighshire. The total area covered will be nearly 500 acres and the programme is due to be completed in October 2017. • In the future, as a method of last resort when non-chemical and other management approaches are not considered appropriate, we will use an alternative pesticide – acetamiprid. Acetamiprid is approved for use in forestry applications but is a neonicotinoid (hazardous to bees) and although not a priority substance under the WFD, it is on the ‘watch list’. • Our use of chemicals to limit the damage caused by <i>Hylobius</i> is undertaken following completion of a Habitats Regulations Assessment (HRA). • We continue to support and participate in UK-based research and development programs to find effective alternative treatment options to reduce the damage caused by <i>Hylobius</i>. We are committed to reducing the use of chemicals on land that we manage to safeguard the environment from unacceptable risk.
<p>Climate change</p>	<ul style="list-style-type: none"> • The relationship between woodlands, water and predicted climate change is complex and uncertain. However, it is generally accepted that warmer, drier summers and an extended growing season, could increase forest water use to a greater extent than other land covers. Changes in rainfall patterns may affect the concentration of pollutants intercepted by woodland though water quality trends, positive or negative, are not clear. Research suggests that woodland has a role to play in limiting impacts of climate change in terms of downstream flood alleviation, reducing thermal stress, protecting fish stocks and invertebrates,

¹⁶ Cypermethrin is a very toxic chemical and has been known to cause serious damage to aquatic ecosystems resulting in deaths of freshwater invertebrates and fish. It is a “priority substance” under the WFD.

¹⁷ See https://nrwcms001.azurewebsites.net/about-us/news-and-events/news/major-drive-to-beat-the-pine-weevil/?lang=en&utm_source=NewsletterStudio&utm_medium=email&utm_content=Cyfoeth+-+Here%e2%80%99s+your+latest+news+and+stories+from+Natural+Resources+Wales&utm_campaign=Cyfoeth+-+September+news+from+Natural+Resources+Wales

	<p>limiting the increased risk of sediment and pollutant inputs from other land uses in the face of extreme events, and bringing wider social and environmental benefits for example greater accessibility for shaded recreation and biodiversity gain through wet woodland and wetland restoration / creation.</p> <ul style="list-style-type: none"> • The Evidence Report for the second UK Climate Change Risk Assessment¹⁸ identified a number of risks and opportunities for forestry in Wales. These include: (a) Risks and opportunities from changes in forestry productivity and land suitability – where more research is needed on the nature and scale of changing land suitability and its impacts, and on resilient trees; (b) Risks to forestry from pests, pathogens and invasive species – where we should continue to implement surveillance and bio-security measures, and continue current research efforts into the impact of climate change on long-term risks; and (c) Risks to forestry from change in frequency and/or magnitude of extreme weather and wildfire events – where we should continue to build resilience of ecosystems to drought, flood and fire, continue our current efforts to manage and respond to wildfires and continue current efforts to manage impacts of high winds on forestry. • We have published three new Forest Resilience Good Practice Guides on structural, species and genetic diversity for use by all forest and woodland managers in Wales. The guides address the issue of climate change and management actions that can be taken to improve forest resilience and ensure the flow of ecosystem services and well-being benefits from woodlands. • We published SoNaRR¹⁹ in September 2016 and this addressed the issue of the predicted climate change and the likely impact this would have on woodlands, in terms of risks and opportunities.
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Forestry as a solution

Issue	Actions to date
Stakeholder engagement and partnership working	<ul style="list-style-type: none"> • We have an established programme of engagement and liaison with stakeholders in the forest, water and land management sectors, via various forums and groups. These include the Wales Land Management Forum (WLMF), Wales Environment Link (WEL) Land Use Group, River Basin Liaison Panels and the Glastir Stakeholders Group (relevant to WG’s Glastir sustainable land management scheme). These forums are important both in terms of managing existing issues and identifying solutions. Some targeted events have included: <ul style="list-style-type: none"> – A “forestry and fisheries” workshop on the 20th March 2013 which brought together representatives from the forestry, fisheries and water sectors to discuss a range of topics, including managing forests in acid sensitive catchments and the use of cypermethrin in forestry. The workshop had good attendance and was welcomed as a productive way to discuss the topics under consideration. – A meeting between NRW and WEL land use group (forestry and freshwater task and finish group) on 21st June 2016 included discussion about our progress to tackle water quality and forestry issues. – Establishment of the Talybont Reservoir Catchment Partnership (TRCP) (see below) – Meetings of the River Basin District Liaison Panels are biannually. Membership includes representation from all sectors

¹⁸ Climate Change Risk Assessment 2017: Summary for Wales

<https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/national-summaries/wales/>

¹⁹ See Chapter 3

	<p>including the forestry sector. The Liaison Panels are a forum to take forward both planning and delivery of our WFD obligations through the River Basin Management Plans.</p> <ul style="list-style-type: none"> • A Mynediad agreement has been set up between NRW and Afonydd Cymru for 5 years and it will cover partnership working on riparian management, liming (if consent is given), culvert surveys and replacement etc. • In 7 June 2017, the Sustainable Land Management Team produced a briefing note on trees and woodlands and how they contribute to SMNR and well-being for NRW staff who are liaising with PSBs and working on Area Statements.
<p>Climate change mitigation</p>	<ul style="list-style-type: none"> • The Carbon Positive Project is evaluating NRW's net carbon status, accounting for both greenhouse gas emissions and carbon sequestration across the whole of NRW's owned or managed estate. It is identifying mitigation opportunities to reduce our carbon impact as an organisation and delivering projects to demonstrate these measures. For example, woodland and peatland habitats make up approximately 84% of NRW's estate, and make significant contributions to the estate's carbon status. We are working with Forest Research and the Centre for Ecology and Hydrology to better model their carbon stock and sequestration, which will help us to plan how best to manage them to protect existing carbon stocks and enhance sequestration, e.g. by expanding woodland. • We also support renewable energy initiatives on the land that we manage, such as Pen y Cymoedd wind farm at the top of the Rhondda and Neath Valleys and the hydropower scheme at Garwnant²⁰.
<p>Woodland creation (commercial forestry, agri-environment and green infrastructure)</p> <p>WFD Measure ID: CYM58</p>	<p>Targeted and appropriate new woodland planting has the potential to reduce diffuse pollution and sediment delivery associated with other land uses, e.g. through planting erosion-prone soils and buffer strips, and be a component of natural approaches to flood risk management, e.g. restoration of floodplain forests and riparian woodland to attenuate flood peaks. However, levels of contemporary new woodland creation²¹ are very low. There are opportunities for more widespread woodland creation to deliver multiple benefits, including in relation to water management. We work on an ongoing basis to promote relevant measures for tree planting, new woodland creation and woodland management measures that are consistent with 'Woodland for Water: Woodland measures for meeting Water Framework Directive objectives' 2011. Examples of our work include:</p> <ul style="list-style-type: none"> • We published SoNaRR in September 2016 and the report highlighted 'increasing woodland cover' as one of seven areas that offer the greatest opportunity for dealing with the challenges and risks presented by SMNR, and therefore contributing to Wales's well-being goals. However, five of the seven areas are relevant to wider land management decisions, and woodlands / trees play a part in delivery of these. • We have worked closely with WG to develop the Co-operative Forest Planning Scheme, which aims to identify, facilitate and increase new woodland creation and are providing pre-application advice to potential applicants. • We appointed a Woodland Creation Advisor in March 2017 to manage a ring-fenced fund that is currently £500k and will increase annually, to compensate for woodland loss that occurs on the WGWE due to energy developments. • We have been involved in several projects related to urban trees and the benefits they provide, including in relation to water management. For example, we have worked with Local Authorities and others who have produced local tree assessments in

²⁰ See https://www.youtube.com/watch?list=UUPLAYER_NatResWales&v=XX4OAUwINsg

²¹ [FC 2016 - Forestry Statistics 2016: A compendium of statistics about woodland, forestry and primary wood processing in the United Kingdom](#)

	<p>Wrexham, Bridgend and the Tawe Catchment. These use an approach called 'i-Tree-Eco' to gain important extra information on the quality of the urban tree resource to inform local tree management strategies. We have also provided support and advice to Cardiff City Council and Dwr Cymru on tree suitability for the innovative Greener Grangetown project which is retrofitting green infrastructure into Victorian streets to reduce rainfall entering local sewers.</p> <ul style="list-style-type: none"> • NRW verified 157 schemes during the first two Glastir Woodland Creation rounds, with 130 being offered a contract by the Welsh Government. This has seen 600ha of new planting across Wales between April 2016 and April 2017. NRW is presently verifying applications from the third expression of interest round. This has seen an additional 38 applications totalling over 400Ha of new planting. NRW expects to verify a similar number and size of new planting proposals in round four (closed April 2017) and round five (opens July 2017). This will result in approximately 1,800Ha of new woodland across Wales between April 2016 and April 2018. While this falls short of the aspirations set in the Wales Climate Change Strategy in 2010, the Glastir Woodland Creation figures show a step in the right direction. A recent example of a successful application under the GWC scheme relates to an organic farm in mid Wales where 17ha (over 40,000 trees) was planted up in February and March 2016 with a “native carbon” broadleaves mixture (sessile oak, rowan, silver birch, alder, hazel and hawthorn) at 2m spacing. • We manage the Plant! programme on behalf of WG. Current planting stands at just under 300 000 trees / 137ha. Areas planted include locations Usk, Tredegar, Bridgend, Wrexham, LLanwrst, Blaenavon and Anglesey.
<p>Catchment management approaches</p>	<p>Talybont Reservoir Catchment Partnership (TRCP)</p> <ul style="list-style-type: none"> • Welsh Water and NRW have been working in partnership since 2014 to make changes to the management of the commercial forest which makes up 30% of the Talybont Reservoir catchment. The Talybont Reservoir Catchment covers an area of approximately 24km² and is located within the Brecon Beacons National Park, Mid Wales. Approximately 50Ml/d is abstracted from the reservoir for treatment at Talybont Water Treatment Works and supplies approx. 300,000 customers in the Eastern Gwent Valleys. The land is owned by Welsh Water but is let on a long-term 999 year lease to NRW. Approximately 15% of the forest has had to be cleared over the last few years due to <i>Phytophthora ramorum</i> and this provided the opportunity for a fundamental review of forest design and management to improve water quality and the other ecosystem services the forest provides. A study considered the delivery of different ecosystem services against three different scenarios: status quo (c.80% conifer, low species diversity); mixed broadleaves (c.70%) under minimum intervention; and 50-50% diverse species broadleaf/conifer mix with changes to management practice relating to e.g. initial spacing, weeding, pruning, thinning regimes, harvesting methods and long-term silvicultural systems, as assessed coupe by coupe. Management would differ in different coupes depending on their location within the forest e.g. if adjacent to a key streams/drains into the reservoir. Ecosystem services considered included: timber, fibre and fuel; biodiversity; pest and disease regulation; regulation of erosion and sedimentation (including water quality); water regulation: recreation; ecotourism; aesthetics: cultural heritage. A score was given for each service at the relevant scale, which in turn provided the Total Ecosystem Delivery (TED) score for the forest. The third option produced the highest score and is now being adopted. Management changes are underway. As part of a Payments for Ecosystem Services (PES) trial Welsh Water will pay for the additional management costs of implementing the new management regime, over and above what the ordinary management costs of maintaining the status quo. The outputs

from this partnership will help inform the development of Welsh Water's approach to Catchment Management - *WaterSource*. NRW and Welsh Water aim to replicate this forestry management approach in other reservoir catchments in the Brecon Beacons, where the land is lease-hold with Welsh Water.

Dyfi catchment

- The Dyfi has an outstanding natural environment and is one of the most scenic areas in Wales. The geography of the area ranges from the mountains of Aran Fawddwy in south Snowdonia, to sea level and beaches at Borth and Aberdovey. The area comprises a wide range of habitat types, from blanket bogs in the mountains, through woodland and farmland, down to the coastal salt marshes, mud flats and sand dunes. Farmland and woodland deliver services such as food and timber; blanket bogs provide services such as carbon storage and flood alleviation; while sand dunes provide recreation and tourism. The Dyfi has a rich cultural and industrial heritage and was once an important for lead mining, which has challenges in relation to water quality.
- The area is dominated by the Afon Dyfi itself and its many tributaries, which provide fertile floodplain grazing areas, recreational opportunities as well as spawning grounds for fish – such as salmon and sea trout.
- Since 2015, we have been working with a range of stakeholders to produce an opportunities document for sustainable management of the Dyfi's natural resources. Key projects have included:
 - Mapping barriers to fish migration in the Dyfi
 - Dyfi habitat network – restoration of 78 hectare plantation on ancient woodland sites on the WGWE to form part of a Dyfi 'resilience' network
 - Pennal natural flood risk project to model the Pennal catchment and make recommendations on changing the drainage network in the NRW managed estate.