

GIS AND HABITAT MANAGEMENT

Riparian Management Plan for South East Dome

Recreation Area of Cors Caron SAC.

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Fig 1:Pond area view on SouthEast Bog looking outward towards West Bog, L.Zanoni (2021)

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Plan Summary:

Cors Caron Special Area of Conservation(CCSAC) boundaries for which are shown in Fig 2 below, is a raised bog system(macrotope) formed 12000 yrs ago, from the melting of a glacial lake and consists of three surviving domes(North East,West and South East mesotopes) These mesotopes form the CCSAC, which ,as also shown below, is bisected by part of the Afon(River) Teifi SAC and associated tributaries,(Lagg streams). The bog mesotopes and associated river terraces are regularly flooded and the distinctive vegetation found in both habitats, constitute a rich resilient wetland system, providing a distinctive environment supporting diverse flora, bird, invertebrate and mammalian fauna.



Fig 2: QGIS map showing CCSAC and North East/West/South Mesotopes.(QGIS/ 'Cors

Caron'(RSIS,2022)/'Google Maps Tiled Map Service Link'(Google,2022)

The reserve and associated agricultural tenancies (five in total) was included previously in the EU's Natura 2000 ecological network, is now part of the UK National site network (NSN) created under changes made by the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)* referred to as '*The 2019 Regulations*'. Previously managed by the Countryside Council for Wales (CCW), the site is now under the management of NRW (Natural Resources Wales (NRW*)), who are a Welsh Government (WG) sponsored body, with the remit to dictate and govern how NRW will manage natural resources, nationally owned estate, inclusive of all sites making up the national site network. It should also be noted here that SACs and Special Protection Areas (SPAs) in the UK no longer form part of the EU's Natura 2000 ecological network in accordance with the *The 2019 Regulations* and all references to Natura 2000 in the 2017 Regulations and in guidance now refers to the new national site network. (GOV.UK, 2021)

*NRW were formed in 2013 and subsequently took over the functions (CCW) Countryside Council for Wales, FCW (Forestry Commission Wales), and EA (Environment Agency Wales).

Current plans covering the management of the Cors Caron SAC (CCSAC) site are the *Core Management Plan for Cors Caron SAC* (CCW, 2008) and the *Core Management plan for Afon Teifi/River Teifi SAC* (CCW, 2011) (covering the Afon Teifi SAC element bisecting the site). The purpose of this document, however, is to author a specific, management plan for the recreation area on the South East dome, primarily to enable general habitat enhancement (in line with the core management plan recommendations) and strengthening of protection measures for key annex species recently found to be utilizing certain unique habitat features on this part of the Cors Caron SAC (CCSAC). The location of the South East dome and recreation site in the context of the whole NNR can be seen in see fig 3 below.

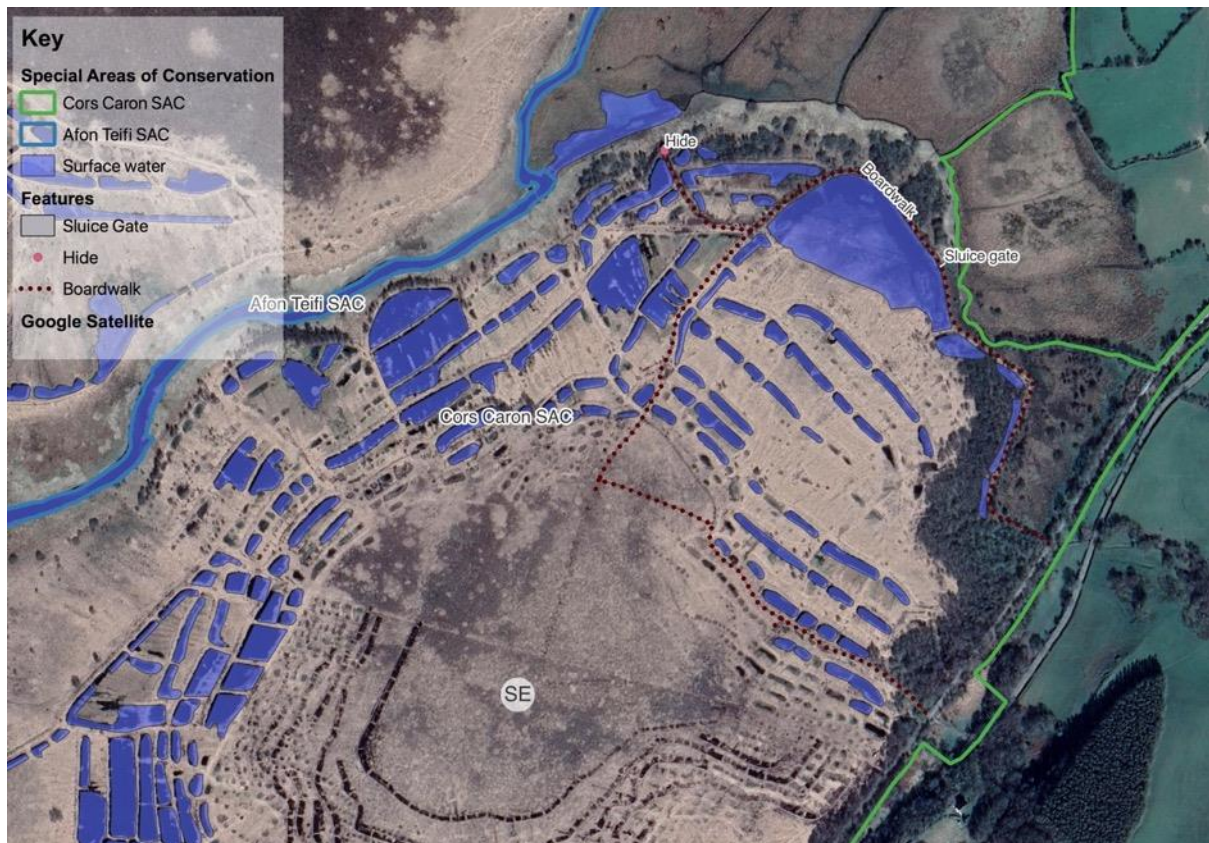


Fig 3 ‘Ariel view of South East Dome Recreation area’ QGIS / ‘SN’ (OS OpenMap-Local, 2022) / Google Maps Tiled Map Service Link’ (Google, 2022). / ‘Cors Caron’ (RSIS, 2022)

The plan will potentially cover a 10 year period but is intended to be reiterative and is envisaged that it will eventually be incorporated within updated core management documentation, (pertaining to the CCSAC plan), anticipated to be produced imminently, post completion of the current capital works being undertaken at the site as part of ‘*The LIFE Welsh Raised Bogs project*’ (NRW, 2022) (currently being undertaken by NRW at all three mesotope sites of the Cors Caron SAC)

A new set of stakeholder management recommendations will also be incorporated in the plan to facilitate further community engagement and education, recruitment of volunteers, and

enhanced visitor facilities Main documentation and data sources consulted regarding the authoring of this report are summarized in SummaryTable1, shown below.

Summary Table One: Main sources of documentation and data consulted to produce SED Recreation Area report.

Document/Data type	
SAC Core Management Plans	<i>Core Management Plan for Cors Caron SAC(CCW,2008)</i> <i>Core Management plan for Afon Teifi/River Teifi SAC(CCW,2011)</i>
Additional SAC/SSI/Ramsar Data forms onsite	Natura 2000 Standard Data Form: UK0014790:Cors Caron(JNCC,2017) Ramsar Information Sheet UK140003 (JNCC,2008)
Literature and case studies NRW, Scientific	regarding best practice measures to manage raised bog habitats and their associated flora and fauna , inclusive of LIFE Bog Project reporting from NRW(Natural Resources Wales) and supporting policies.
National/Welsh Government Legislation& policies	regarding relevant environment and conservation management measures(and those governing the mandate of NRW to manage protected sites and the welsh NSN's (created by 'The 2019 Regulations')
Site walkover observations and analysis	Field observations on site GIS analysis of data form Lle/Welsh Gov.Uk/NRW and own observations.

Aims

As previously stated in the plan summary, the main objective of this management plan are to provide a practical document for the implementation of work programs to meet key NNR objectives for the South East Dome recreation area regarding managing for the protection and maintenance of favorable habitat conditions for all designated onsite features (flora and fauna). Also, to enhance visitor/volunteer and educational facilities and capacity at this part of the reserve.

Summary Table 2 below, together with the ‘Vision for SED recreation Area’ describe the main aims intended outcomes to be achieved as a result of implementing recommended management actions for the SED recreation area.

Summary Table Two

Main Aims for the Management of the South East Dome Recreation Site at Cors Caron SAC

Management Category	Aim
Habitat Aim 1	<i>Maintain and enhance the habitat and provide conditions to restore to favourable status,(in accordance with best peer reviewed practice/legislation);also to protect in accordance with all legislation and relevant acts all SAC,SSSI , Ramsar features on site.</i>
Habitat Aim 2	<i>In accordance with relevant Welsh Government and International policies regard the site in the context of the surrounding ecosystems and landscape with respect to facilitating/enhancing connectivity and resilience to climate change</i> <i>biodiversity loss,</i>

Stakeholder Aim 3	<i>Improve stakeholder management and involvement at the SED site by</i> <i>improving local community/public engagement by workshops/talks/online reporting/annual meetings.</i> <i>reestablish a ‘core’ volunteer group from recruitment opportunities during activities above</i> <i>Establish regional/specialist group partnership working) for enabling onsite annual/specialized, monitoring, surveying and maintenance .</i> <i>Develop opportunities for training with respect to all activities above, for volunteers, project staff and reserve manager.</i>
Stakeholder Aim 4	<i>Reestablish and improve on facilities at the SED site(using existing NRW student placement/training systems/budgets)</i> <i>to enable academic research* and training, especially with regards to the following:</i> <i>Monitoring ongoing climate change and resilience of CCNNR and</i> <i>Explore possible changes/improvements to all key species and habitats post LIFE Welsh Raised Bog Project(Natural Resources Wales,2022)</i>
	<i>* formally this part of the reserve was extensively used for academic study for paleo- ecological research and Holocene climate change and was also subject to university research and teaching regarding its unique active raised bog and mire profile.RSIS.p.8(1992)</i>

Vision for SED recreation Area

The recent LIFE Bog Project hydrological management programme works will enable the ‘Active raised bog’ area to return to favourable status, contributing to restoration of fully functionality bog land habitat comprising the SED mesotope. It will consist of deep accumulated waterlogged peat layers, where the water table level should remain no less than a few centimeters from the surface all year round. The surface should also be covered in a

rich microtrophic vegetative layer, hydrated, and receiving nutrients solely by rainwater.

This vegetation should mainly consist of Sphagnum bog mosses in lawn and hummock formations, interspersed with Rhynchosporion pool vegetation. The latter should consist of a scattered canopy of bog asphodel, cotton grasses and white beaked sedge, interspersed with sundews and club mosses. Degraded raised bog areas will be returned to a condition of over three quarters of favourable status consistent with the latter.

The Natal den habitat for otters within the established buffer zone, encircled by the circular boardwalk and edged by wet 'Lagg' woodland and scrub will provide opportunities for surface dens, couches and holts, in addition to dens afforded by the 'bundled pool' features of the site, formed from past peat cutting and former hydrological management measures at CCSAC. The latter will also form valuable habitat for invertebrates, amphibians, and reptiles also residing on the bund pool banks and throughout the site. These SSSI species, together with water voles, also present on site, will maintain a varied set of food sources for the otters, currently favoring the site for breeding purposes, due to its unique combination of features as above, surrounding Lagg woodland and proximity to the Afon Teifi at the southern end of the SED. The marshy grassland in the neighbouring tenancy area will also continue to be grazed by low numbers of highland cattle dams and their calves, as agreed in the terms of the current Maes Llyn tenancy agreement; bank stock fencing will also remain along the wet ditches in this area promoting lush canary grasses and reed vegetation, supplying in turn opportune habitat conditions for invertebrates, amphibians and voles. Regarding stakeholder management measures onsite; the fully accessible boardwalk, interpretative resources and onsite bird/wildlife hide will remain in good order to facilitate recreational access for visitors, whilst providing access with minimal disturbance to key areas of the site for NRW LIFE Bog Project Staff, Reserve Managers, and volunteers groups to achieve ongoing species and habitat monitoring.

It is envisaged with the lifting of pandemic measures, that further community engagement can be reestablished, at the SED Recreation Area, to facilitate sharing and informing all interested stakeholders and the general public about raised mire ecology, and its importance to enabling flood resilience and enhanced ability to sequester CO₂, a habitat attribute which makes CCSAC a pivotal ally in helping mitigate against climate change, in addition to supporting some of the most diverse and rare wetland biodiversity in the UK..

A. GENERAL INFORMATION

This section comprises the background and description pertaining to the South East Dome(Mesotope) area of the raised bog landscape (Macrotope) known as the Cors Caron SAC , which is located on the floodplain of the Afon(River)Teifi, situated near Tregaron, Ceredigion in in MidWest Wales; geolocation data and area limits listed in summary table three below .

This area of the site is perennially popular with visitors and researchers, due to possessing a recreation area, with fully accessible circular boardwalk , onsite hide and interpretation area, and easy access to visitor carpark and toilet facilities. It also presents most of the the key habitats, flora and fauna found throughout the site. Habitat and stakeholder management recommendations will be described in Section B.

Summary Table 3: Geolocation and area limit data for bog mesotopes at Cors Caron SAC.

Site Name	Cors Caron SAC
Area(ha)	SAC 862 ha,:comprised West Bog:140 ha North East Bog:30 ha South East Bog:16 ha

	Ramsar 865 ha (CCW,2008)
Grid Ref	SN691638 (CCW,2008)
Co-ordinates:	Longitude: _3.917 Latitude: 52.257 (JNCC,2017)

1.Legislation & Policy Compliance

1.1 Relevant Authorities.

Details of relevant authorities for Cors Caron SAC given in the Summary Table 4 below:

SummaryTable 4 :Relevant Authorities regarding Cors Caron SAC

Authority/official name	Details
National Governance: Welsh Government	Cardiff Welsh Government Offices Cathays Park King Edward VII Avenue Cardiff CF10 3NQ (WG,2022)
Regional Welsh Government Office: Mid Wales	Aberystwyth Rhodfa Padarn Llanbadarn Fawr Aberystwyth SY23 3UR (WG,2022))
Welsh Government Sponsored Body: Natural ResourcesWales	Tŷ Cambria, Newport Road, Cardiff: Minister responsible: Lesley Griffiths, Minister for Environment, Energy and Rural Affairs

	NRW(2022)
Senedd Constituency	Ceredigion: AM: Elin Jones Senedd Address: Welsh Parliament Cardiff Bay Cardiff CF99 1SN Elin.Jones@senedd.wales (Senedd,2022)
Parliamentary Constituency Ceredigion	Ceredigion: MP:Ben Lake Office: Bryndulais 67 Bridge Street Lampeter Ceredigion SA48 7AB House of Commons London SW1A 0AA Email: ben.lake.mp@parliament.uk (UK Parliament,2022)
County Council Ceredigion County Council	Ceredigion County Council Canolfan Rheidol Rhodfa Padarn Llanbadarn Fawr Aberystwyth Ceredigion SY23 3UE By Telephone: 01545 570881 (CCC,2022) District Council Ceredigion Community Council was also until April 2022 part of the LNPC
County Department CeredigionCounty Council	Planning and Ecology Planning Ecologist

Ecology Department (Local Nature Partnership, regional member) https://lnp.cymru/ Requires citation)	County Hall Aberaeron SA46 0AT ecology@ceredigion.gov.uk 01545 572147 / 07966018107 (CCC,2022)
Tregaron Town Council Cyngor Tref Tregaron	Tregaron Neuadd Goffa/Memorial Hall Tregaron Square, Tregaron, Ceredigion SY25 6JL, UK Clerk to the Council, Mrs Fflur Lawlor. Contact by onsite form (TCC,2022)

1.2 Designations

The Cors Caron SAC as well as being accorded ‘National Nature Reserve’ (NNR) status since 1981, is also primarily designated as a SAC(Special Area of Conservation); confirmed by the Welsh government, in December 2004 under regulations 11 and 13-15 of the Conservation of Habitat and Species Regulations 2010 (JNCC,2008), other designations are shown below in Summary Table 5 (see below)

Summary Table 5: Additional Designations for Cors Caron SAC

Designation Status/Name/Status	Notification Dates	Data Source
SSS1	1954,1982,1984,1990	CCW 2008
Ramsar site:’Cors Caron’	1992	JNCC(2008)
Natura 2000(now NSN, post EU departure of UK) Site Code: UK0014790 NUT Code & Region: UKL1,West Wales and Valleys Biogeographical Region: Atlantic	1995,2017	JNCC(2017)

1.3 Tenancies

There are two Cors Caron NNR grassland areas within the Cors Caron SAC, with grazing rights granted to local farmers and a further two additional areas, in the north and the south of the site, under nature reserve agreements (NRA) with the owners. The latter of these is located in the SouthEast Dome area, under a pony grazing regime considered satisfactory at this time regarding management.

There are also five agricultural tenancies, as shown below in Summary Table 5, of which the 'Maes Llyn tenancy' is noted as the one closest to the SED Recreation area and is currently grazed by Scottish highland cattle, at low density, with one ditch crossing the site acting as a 'wet' barrier; the latter satisfactory 'bank fencing' in place, preventing excessive poaching and/or trampling from cattle. This is a standard measure as recommended in report Wildlife Trust of South and West Wales report to NRW (Stephens, 2014) concerning methodologies to reconnect water vole habitat and allows abundant backside vegetation to develop, providing ideal habitat not just for voles but also invertebrates and amphibians, securing plentiful food sources for apex predators such as otters and raptor species on site.

1.4 National and Devolved Policies & Acts relevant to Cors Caron SAC & SED Recreation Area Management.

All management of UK SAC/SSSI/Ramsar and NSN site habitats and their species (e.g. otters, voles) are subject to protections and measures laid out in 'The Wildlife and Countryside Act 1981' and *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* (amended from *The Conservation of habitats and Species Regulations 2017*)

In addition, NRW is expected to manage all assets and publicly owned estate currently under their management, according to an ‘ecosystem approach’ to address the main causes of biodiversity loss, and to ensure their values and priorities are represented throughout all aspects of delivering their duties with respect to sustainably managing natural resources, including protected sites.

The Welsh Government acts, legislation and NRW Area policies relevant to this approach

Synopsis of Welsh Government Environment Policy Delivery; adapted from the National Resources Policy 2019 (Gov.Wales, 2019)

For Welsh Government and Natural Resources Wales delivering a framework to Sustainably Manage Natural Resources (SMNR), NRW must collate and author the State of Natural Resources Report (SoNaRR), and Area Statements; these together with the Natural Resources Policy (NRP) forms a high level context for action for addressing biodiversity decline in Wales.

are listed in Summary Tables 6,7,8 and 9 below together with descriptions outlining their key aspects relating to NRW’s duties.

Summary Table 6

National Resources Policy 2019: Brief description and core areas of implementation for Welsh Government Environmental Objectives and context to Cors Caron SAC.

Policy/Legislation	Descriptions and Weblink
National Resources Policy	Sets out how key policies can deliver both economic and environmental objectives

	Sets out how to manage natural resources in Wales , including setting out delivery framework for SMNR(Sustainable Management of Natural Resources) Former established by the Environment Act (Wales)2016 ,also relate to delivery of Well-being goals in the Future Wellbeing of Generations 2015 Act and to to achieving welsh national contribution to UN Global Goals. Used SONARR consultation responses from Consultation re Brexit to draft this initial NRP document: Action: Welsh Government policy on decarbonisation pathway measures based on NRP which also emphasizes the roles parts1&2 of the Environment(Wales)Act play in working together, to manage natural resources and climate change. Recognizes the role that ‘nature-based solutions must play in tackling climate change and how action on climate change can support the sustainable management of our natural resources’(National Resources Policy,2019) Policy Link: https://gov.wales/sites/default/files/publications/2019-06/natural-resources-policy.pdf
Top Level NRW Area Statement relating to NRP2019	<i>‘NRW,2022.Introduction to Mid Wales Area Statement’</i> Statement Link: https://naturalresources.wales/about-us/area-statements/mid-wales-area-statement/introduction-to-mid-wales-area-statement/?lang=en
Cors Caron SAC:context to NRP2019	Cors Caron SAC provides ecological services in providing Flood water storage/desynchronization of flood peaks, which contributes to lessening of flooding in nearby market towns of Tregaron, Lampeter and Llandysul, downstream of the bog site. It is in the context of this policy considered a natural resource that contributes to mitigation of climate change in providing key flood resilience in the Mid West Wales area and therefore requires sustainable management to maintain effectiveness in this role. It is also an important environment for biodiversity and its pet land bog system is highly effective regarding carbon sequestration, providing another critical nature based solution to mitigating climate changes due to rising greenhouse gases(GHG) in the environment.

Summary Table 7

Brief description of Environment Act(Wales)2016 and Future Wellbeing for Generations Act 2015 and context to NRW.

Policy/legislation	Summary requirements for NRW	Description and Weblink
Environment(Wales) Act 2016	The Body must— (a)pursue sustainable management of natural resources in relation to Wales, and apply the principles of sustainable management of natural resources ,in the exercise of its functions, so far as consistent with their proper exercise. (Env Act Wales 2016 C3-2A,)	Environment (Wales) Act 2016 :primarily sets out the objective, principles and framework for the sustainable management of natural resources (SMNR). Regarding the latter, NRW has to abide by and manage according to principles of SMNR see summary table 7 below for principles as laid out in Env Act (Wales)2016 Act Link: https://www.legislation.gov.uk/anaw/2016/3/part/1/enacted
Future Wellbeing of Generations Act 2015: From Env Act Wales 2016 C3-2A,b	The objective is to maintain and enhance the resilience of ecosystems and the benefits they provide and, in so doing— (a)meet the needs of present generations of people without compromising the ability of future generations to meet their needs, and (b)contribute to the achievement of the well-being goals in section 4 of the Well-being of (Future Generations (Wales) Act 2015 (anaw 2).	The Well-being of Future Generations (WFG) Act 2015 :primarily sets out goals including the Resilient Wales goal for public bodies Act Link https://www.legislation.gov.uk/anaw/2015/2/contents

Summary Table 8

Brief description of Nature Recovery Action Plan and relationship to Environment Act (Wales) 2016 and Future Wellbeing for Generations Act 2015

Policy	Description
Nature Recovery Action Plan	The Nature Recovery Action Plan links to and complements The Well-being of Future Generations (Wales) Act 2015 and the Environment Act (Wales) 2016. The Nature Recovery Action Plan sets out how Wales will address the Convention on Biological Diversity's Strategic Plan for Biodiversity and the associated Aichi biodiversity targets in Wales. Identifies actions that can be delivered in the short term Set a course for delivery of commitments beyond 2020
	A number of objectives have been identified to address the issues that are driving the decline in biodiversity, and to support recovery: 1) Engage and support participation and understanding to embed biodiversity throughout decision making at all levels; 2) Safeguard species and habitats of principal importance and improve their management. (Inclusive of the requirement on Welsh Ministers to prepare and publish a list of the living organisms and types of habitat which are of principal importance for the purpose of maintaining and enhancing biodiversity in Wales;) 3) Increase the resilience of the natural environment by restoring degraded habitats and habitat creation; 4) Tackle key pressures on species and habitats; 5) Improve evidence, understanding and monitoring; and, 6) Put in place a framework of governance and support for delivery The original six objectives remain, complemented by five themes of action which flow from the objectives: The five themes are: 1) Maintaining and Enhancing Resilient Ecological Networks

	2)Increasing Knowledge and Knowledge Transfer 3)Realising new Investment and funding 4)Upskilling and capacity for delivery 5)Mainstreaming, Governance and Reporting our Progress .
Weblink for NRAP policy	https://gov.wales/sites/default/files/publications/2020-10/nature-recovery-action-plan-wales-2020-2021.pdf

Summary Table 9: SMNR principles. Adapted from Environment Act(Wales)2016.

Policy/legislation/link reference	Description of SMNR Principles
Environment(Wales) Act 2016) C5-33-57	A)manage adaptively, by planning, monitoring, reviewing and, where appropriate, changing action; B)consider the appropriate spatial scale for action C)promote and engage in collaboration and cooperation
Available at: https://www.legislation.gov.uk/aw/2016/3/part/1/enacted	D) make appropriate arrangements for public participation in decision-making E) take account of all relevant evidence and gather evidence in respect of uncertainties F) take account of the benefits and intrinsic value of natural resources and ecosystems; G) take account of the short, medium and long term consequences of actions;
	H)take action to prevent significant damage to ecosystems in particular the following aspects (i)diversity between and within ecosystems; ii)the connections between and within ecosystems; (iii)the scale of ecosystems; iv)the condition of ecosystems (including their structure and functioning); v)the adaptability of ecosystems.

1.5 NRW Partnership working within the NRAPIG and the Life for Welsh Bogs Project.

As outlined in section 1.4, NRW is managing protected sites such as CCSAC via an ecosystem' approach, especially within the context of enhancing connectivity of sites within the wider landscape and managing for resilience and climate change mitigation. It is also currently a member of the The Nature Recovery Action Plan Implementation Group NRAP(IG) ,a main stakeholder group for the NRAP , including Welsh Government, Natural Resources Wales, JNCC, environmental Non-Governmental Organization's,. They are tasked with carrying out specific priorities set by the NRAP(IG) including the 'LIFE for Welsh Bogs Project'(NRW,2022) a programme hydrological management works, currently being carried out by NRW to restore functionality to seven key welsh bog sites, including CCSAC. The project is also considered key to restoring the carbon storage functionality of the bog, another valuable ecological service which habitats such as the CCSAC delivers, as a recent NRW Evidence Report No 276 , authored by the Centre for Ecology and Hydrology suggests:

Restoration of all peatland areas to rewetted fen or bog could reduce emissions from NRW peatlands by approximately 78 kt CO₂-e yr⁻¹.
(CEH,2016)

Additionally. A recent CIEEM Position paper(July 2021), presenting recommendations for utilizing habitats and soils to address climate change, notes from recent literature reviews that regarding peatland restoration:

'potential carbon sequestration of these habitats could double if they were in good order, equivalent to 32% of annual agricultural emissions (CIEEM,2021).

1.6 Revenue and grants

Funding for the main project works currently being carried out by NRW since 2017, (across 7 Welsh bogland sites) has received total funding of £4 million, from the EU LIFE programme grant, Welsh Government and Snowdonia National Park Authority.(NRW,2017)

Annual funding for staffing, infrastructure and other regular maintenance activities occurring at the CCSAC is funded via budgets set by the NRW Operations team, informed from reporting via individual project staff and the NRW Protected Sites' team.

2.Overview Site Descriptions: Cors Caron SAC and SED Recreation Area.

2.1 General Site Description for Cors Caron SAC

Cors Caron SAC(also known previously as Cors Tregaron, Tregaron Bog and Cors Goch Glan Teifi) postulated to previously be comprised of five mesotopic forms, now consists of three mesotopes each showing complete zonal formations comprised of a central mire expanse, mire margin and final outer Lagg fen margin (the largest comprising of peat to a depth of 12 ft, smallest to a depth of 10ft)

It is regularly flooded by the Afon(River)Teifi that runs through the entire site comprised of accompanying flood river terraces consisting of 'marshy grassland' and 'swamp', which in addition to the active raised bog habitat found on the CCSAC, create a unique wetland

ecosystem housing specialist rush, fen, bog woodland and bog moss vegetation which in turn support a diverse range of wetland birds, invertebrates, amphibians and mammals.(described in 2.1 and for which this area has obtained key designations)

The whole site is nationally significant as an example of the most intact complex ‘raised mire’ macrotopic system in the UK, where clear transition from aqueous habitats (flood plain river terraces/fens) to ombrotrophic mire surfaces are clearly demonstrated, despite areas of the raised bog mires having been degraded/modified in the past from a variety of agricultural(drainage, burning to enable stock grazing) and industrial processes(i.e. peat cutting/railway construction).

2.2. Main SAC,SSSI features,Ramsar criteria and Key Species at the Cors Caron SAC

Summary Table 10 describes primary SAC and SSSI features of the Cors Caron SAC site, with their associated EU habitat codes, Ramsar criteria and lists key species:invertebrate,mammalian and vegetative, subject to biodiversity habitat measures as outlined in the current core management plan(CCW,2008).

The plan in essence, intends that each management unit of the SAC is managed to enhance/maintain and bring to favourable status the key designated features/habitats of degraded raised bog mire and active raised bog mire; the rationale being that bringing the bog habitat into fully functional condition will effectively provide optimum conditions for all other designated features/species to maintain their populations, food sources and to enable them to breed and successfully complete their lifecycles.

It should be noted here that the current core management plans and associated data sheets did not include a scenario for managing the habitat implicitly for climate change and flood

resilience, two core ecological services provided by the bog, now fully recognized in NRW policies / Area statements and catchment plans. The Life for Welsh Bog project (described in section 3) and the Rivers 4 Life projects, respectively, are mechanisms by which NRW is now enhancing and improve the ability for CCSAC(and others) to deliver these services, as part of a core ecosystem approach(to help meet their duties as per Environment Act (Wales)2016 and related policies/frameworks) to manage both for biodiversity and climate change. In some instances this plan acknowledges that this approach may be in conflict with management measures required for specific areas/habitat and associated species types. The South East Dome Recreation area, is subject to some of these conflicts, management recommendations for which, will be dealt with in Sections 5 and 6 of this plan.

Summary Table 10:To describe primary SAC Ramsar,SSSI features of the Cors Caron SAC site(including SED & SED Recreation Area)

Designated Features	Relationships, Additional Designations,Key Species	CC Mesotopes	SED Recreation Area
SAC Features			
Annex 1 habitat:primary reason for site selection			
Active Raised bog (EU Code:7110)	Ramsar Criterion 3 Referable to NVC type M18 Sphagnum papillosum-Erica tetralix community with (bog rosemary):Andromeda poliflora,(white beak sedge)Rhynchospora alba,(local bog mosses) Sphagnum magellanicum,S.pulchrum. S imbricatum not present.	X	X

	Extensive cover also present of (heather) <i>Calluna vulgaris</i> , (deergrass) <i>Trichophorum cespitosum</i> , (purple moor grass) <i>Mollina caerulea</i> on bog margins (JNCC, 2008)		
Degraded Raised bog still capable of natural regeneration (EU Code: 7120)	Ramsar Criterion 3 Predominantly composed of species poor 'strips', occurring peripheral to 7110 active raised bog, consisting of (deer grass) <i>Mollina caerulea</i> , (hare's tail cottongrass) <i>Eriophorum vaginatum</i> , (heather) <i>Calluna vulgaris</i> and poor cover of <i>Sphagnum</i> species. (JNCC, 2008)	X	X
Annex I habitats: qualifying feature but not primary reason for site selection			
Transition Mire/quaking bogs (EU 7140)	Ramsar Criterion 3 Transition Mire Only Predominantly made up of NVC types M4: <i>Carex rostrata</i> - <i>Sphagnum recurvum</i> mire with vegetation approximating to M18 <i>Sphagnum papillosum</i> - <i>Erica tetralix</i> raised mire (JNCC, 2008)	X	X
Depressions on peat substrates of the Rhynchosporion (EU Code 7150)	Integral part of active raised bog form, dealt with as part of that feature (7110) Predominantly made up NVC types M1 <i>Sphagnum auriculatum</i> bog pool community, M2 <i>Sphagnum cuspidatum/recurvum</i> bog pool community and	X	X

	surrounding bog vegetation M18 Sphagnum papillosum-Erica tetralix raised mire (JNCC,2008)		
Bog Woodland (EU Code 91D0)	Not included in designation table in CCCMP(core management plan:CCW,2008) Is shown in JNCC Data submission for Natura2K data sheet and RICS data sheet and generic documentation(JNCC,2008) Habitat type not well described in the UK but not to be confused with scrub ingress following drainage of bog environments. Trees likely to be widely spaced,growth slow and in small groups as wet conditions prevent greater establishment. NVC type predominantly birch/willow/alder type: W4c Betula pubescentis- molina caerulea woodland, Sphagnum sub community and/or other wet woodland types. (JNCC,2008)	X	X And Lagg woodland- referred to as 'other wet woodland type' Areas 8,1,2,3
Annex II habitat:primary reason for site selection			
Otter(EUCode:1355)	(Lutra,Lutra) Cors Caron important wetland area , floodplain of the Afon(River)Teifi, historically important for otters and supportive environment for breeding populations, providing	X	X Areas 4,5

	major amphibian food sources for breeding otters in the spring. Core management plan,(CCW,2008) refers management recommendations to Afon Teifi SAC Core management plan and did not include descriptions of breeding otters being present on the mesotopes, only likely to be present in and around the Afon Teifi SAC areas bisecting the site.Subsequently in 2021, breeding otters are found now to be favouring a breeding natal den area on the SED recreation area.		
Ramsar Features			
Ramsar Criteria 2: Populations: Coenonympha tullia (Large heath butterfly) Coenophila sub Rosa (Rosy Marsh moth) Otter Water Vole	In core management plan(CCW,2008) dealt with as invertebrate assemblage feature. Otter is a SAC feature Water vole is a SSSI feature Rosy marsh moth is a SSSI feature. Large Heath Butterfly is a SSSI feature.	X	X Areas-multiple
Ramsar Criteria 3: Populations: Rich vegetation assemblage.: In possession of characteristic mire type which comprises: Sphagnum pulchrum S Subsecundum	In core management plan(CCW,2008) dealt with as bryophyte assemblage feature. Scapania paludicola Treated as an SSSI feature	X	X Areas Multiple

Atrichum tenellum (Nationally scarce)			
Riccia huebeneriana			
Scapania paludicola (Nationally rare)			
Ramsar Criterion 6: Populations: Cygnus, Cygnus (Whooperswan) (JNCC, 2008)- this report cites individuals representing an average of 0.1% of UK population- this figure needs a new baseline	Not mentioned in core report (CCW, 2008) However would be dealt with under breeding bird assemblage.	X	X Afon Teifi-area 7
SSSI			
Marshy grassland		X	X Areas 8,9, Maesllyn Tenancy.
Swamp		X	X
Bryophyte assemblage		X	X
Breeding bird assemblage		X	X
Singa hamata (spider)		X	X
Arvicola amphibius (Water Vole)		X	X Areas 8,1,2,3,4

2.3 South East Dome Description: Main site and Visitor facilities at SED Recreation area.

Prior to examining onsite observations from walkover visits to the recreation area, Summary table 11 below presents a brief overview of the main site/visitor infrastructure facilities:

**Summary Table11: Describing the main site and visitor facilities at the
SED Recreation Area**

Facilities/infrastructure feature	Description	Comments
A) Fully accessible circular boardwalk trail	50% replaced with plastic, post consumer waste boarding, rest wood with anti slip grooves :at time of second visit ,section near entrance of boardwalk being replaced.(annual works, post autumn inspections, in late winter/spring period, to upgrade board walk surface as and when repairs to old wooden boarding is required.) In addition, along route 3 benches, 3 ‘species interpretation boards, 2 ‘citizen science’ mobile phone photography stands for data collection and entrance /exit signage. 1 mini pontoon point, for sampling, (area 4)	On completion of works estimate route will be 100% fully accessible for peak visitor season. All furniture, signage interpretation materials, all in good repair at time of visits. (Also subject to annual inspections)
B)Mini onsite interpretation/bird hide onsite building	Building presents as a contemporary ‘dolman type design’, in a nod to the Bronze Age history of the site. containing bird-hide facility, fully glazed wall for wildlife observations of the West Bog and part of the Afon Teifi SAC. Also houses mini interpretative materials charting geological and	At time of visits, accessible and in good repair, bar a handful of the wooden roof shingles that will requiring replacing within the next year.

	archeological history of the bog for instruction of small groups/visitors.	
C)Embankment route access(area 10)	Part of the Sustrans* 82 cycle route formed from the old railway embankment work. (This entire route *adjacent to the whole CCSAC, leads eventually to Ystrad Meurig and is known as the Railtrack route, popular with dog walkers as they can be exercised off the leash in this part of the site, also provides access to bird hides located near the North East mesotope site and the entrance to the 'Riverside walk 'which tracks along part of this mesotope to eventually join back to the circular boardwalk in area 6)	At the time of visits, clear of obstacles not prone to flooding, surface even and providing good access to visitor carpark and other recreation trails in the North East of the CCSAC.
D)Visitor Carpark Area	Site carpark can be reached by pulling in off the A482, leading from the market town of Tregaron, is also accessible via the Sustrans route onsite from Ystrad Meurig and also by Bus. The Carpark has picnic bench and camper van parking facilities and spaces for 20 vehicles. It also has a well built and maintained toilet block facility, complete with small equipment store and storm porch with interpretation , visitor notice board and leaflet holder and bike store facilities.	All facilities in carpark area in good order at time of visit. Noted though no Volunteer and/or visitor trailer/hut facilities to enable training, monitoring or surveying activities:occasionally the onsite bird hide facility is used at the SED Rec site, though it is acknowledged this is not an ideal arrangement; this will be addressed in stakeholder management section of this plan, along with recommendations to enable recruitment of an local core volunteer group to facilitate and enable expansion of the existing LIFE bog project volunteer group to train and build up skills to undertake species monitoring/surveying at the bog in addition to helping

		with annual maintenance/tasks to monitor and repair site infrastructure at the SED rec area.
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2.4:South East Dome Site walkover and observations

In order to to gather information relevant visual/observational data, for producing this revised plan, two site visits were made to the SED Recreation site as detailed below: with emphasis on regarding onsite habitat, infrastructure and general conditions..

Date	Context	Contacts
02/02/2022	Guided Walk and meeting with LIFE Bog Project officer(NRW)	Jake White:NRW Project Officer
06/03/2022	Site walkover with for data gathering purposes	E Kincaid: Survey partner: LivingDesign Consultancy

To facilitate recording observations a ‘field note’ map for the site was created image shown in Fig 4 below, in which the site was divided into 10 sections, and are summarized in Summary Table 12 below.

Summary Table 12: Record of observations and comments from South East Dome recreation area Site Walkovers 02.02.2022 and 06.03.2022

Site Walkover : Map Sections	Observations	Comments
1) Lagg woodland Dragon Fly Walk	Thick scrub, oak, sycamore , silver birch wet woodland species found here, water levels lower than usual:	Potential water vole habitat Buffer to areas 4/5 and 6..
2) Lagg woodland Embankment Walk	Thick scrub, oak, sycamore , silver birch, alder, beech, higher canopy species and hazel, brambles lower canopy Floor of woodland area: Wet scrapes interspersed with brambles, scrub, grasses and other vegetation (not tall fern and herb) Some piles of old dead wood piles, fallen branches left through out- tree species not overly crowded	Monitored currently for excessive scrub/rhododendron and damage to trees overhanging adjacent embankment walkway. Deadwood, debris left for invertebrate/reptiles, amphibians and other species for habitat, foraging, resting places. Odonata (dragonflies), frogs, commonly observed here and many song birds in addition to raptors and wetland species. Latterly used by otters and is also designated as potential water vole habitat.
3) Lagg woodland Embankment Walk	As per section 2	As per section 2
4) Raised Sphagnum Bog- Otter/reptile Territory	Areas 4/5 are key otter natal den (key SAC species) areas and reptile habitat: discovery by NRW Project officers during recent works. The unprofiled bund walls of the pools throughout this area within active and degraded raised bog habitat (blocked up peat cutting and mini bund features from past HM practices, have provided opportunities to make covered dens, near to food sources: invertebrates,	The site officers in February showed footage of a mother otter with 4 cubs who was utilising the SED Rec area , section 4. On visiting the site on 06/03/22, one section of boardwalk had ripped up sphagnum and bog vegetation piled up on the boardwalk surface, additionally the mire surface presented small localised dead patches of bog mosses

	reptiles and amphibians taking up residence in the Lagg woodland, pools, pond and raised bog vegetation throughout habitat encircled by circular boardwalk.	and mire vegetation, consistent with a dog having rolled and entered the habitat, off the lead, this has been a commonly occurring issue at this site, recommendations for which will be made in section % of this plan. Potential water vole habitat.
5)Raised Sphagnum Bog-Bull rush/pond area	As per 4 above	As per 4 above Potential water vole habitat.
6)Pond Feature	In the summer, big waterlily communities present, bullrushes, non- bog woodland tree covered island in the middle, with old logs from dead trees, sticking out of the water(age/provenance not known), characterise this water body. A ring of Rowan scrub and brambles can be found in patches at the margin adjacent to the boardwalk encountered in this section Currently water level lower than remembered.	As in 1 above- sluice repair necessitated this section of boardwalk to be cordoned off by site visit 06.03.2022. Potential water vole habitat.
7)Raised Sphagnum Bog-Bird hide area	Similar in habitat to areas 4/5, also lower quadrant of area contains bullrushes and a 'poor fen area'	Potential water voles habitat.
8)Raised Sphagnum Bog-with Bog Woodland drifts	Active raised bog woodland with characteristic goat willow bog land Carr found here, also areas of marshy grassland.	Potential water vole habitat.
9)Marshy Grassland-Maes Llyn tenancy area	Characterised by soft rushes and reeds, canary grass along wet ditches, Bank fenced running across the area: grazed by long horn cattle at low density.	Potential water vole habitat.

10)Embankment walk to visitor carpark

Edged by semi improved neutral grassland, formed from old railway embankment works, removed in the late 1960's Lagg woodland trees form. Permeable barrier on the bog side, patchy mixed hedging, scapes and hazel coppice on side facing the road: No significant areas of concern or obvious lack of arboreal management,rich in song birds, raptors and forms corridors for small mammals and amphibians , especially on Lagg side. Access route from exit and entrance points of circular board walk to visiotr carpark area and toilet block.

Parts potential water vole habitat.

(Refer to section 2.2 For description of embankment route condition and visitor carpark facilities.)

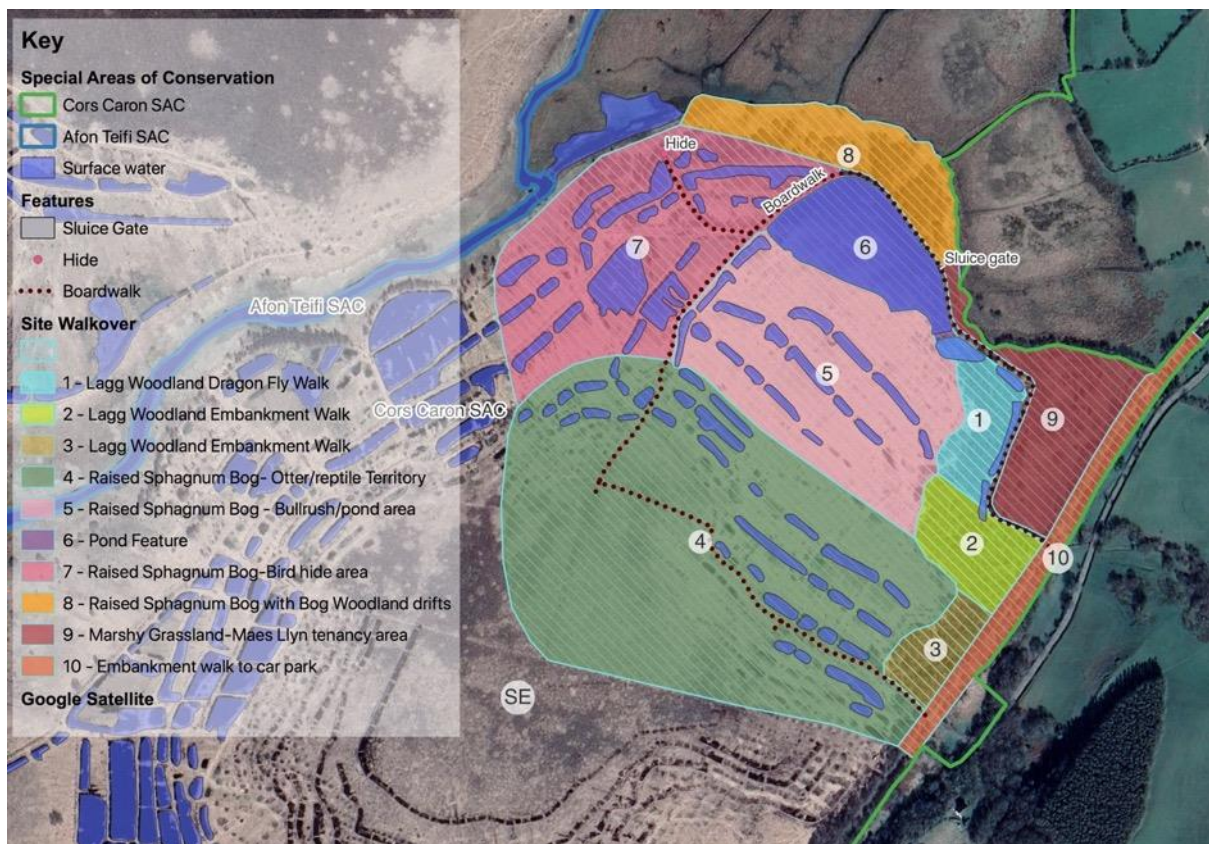


Fig 4 :QGIS Map showing category areas examined during Site Walkover at SED recreation Site/ QGIS/ 'SN'(OS OpenMap-Local,2022)/ *Google Maps Tiled Map Service Link*'(Google,2022)/ 'Cors Caron'(RSIS,2022)

Following on from both data gathering sessions, the observations above, together with data imported from a key SSSI species for the site: voles(NRW ref) were taken and mapped onto the same QGIS shape layer file in Fig 4 above, to facilitate understanding regarding potential ongoing Habitat Management measures required at the SED Recreation area, in response to finding annex 1 species breeding onsite(and to examine the potential extent of the vole habitat), during the current round of hydrological management works being undertaken by the 'LIFE for Welsh Bog' NRW project team. The combined map is shown in Fig 5 below, clearly demonstrating the vulnerability of the otters(and reptile/other SSSI) species with respect to potential disturbance from visitors and plant and machinery involved in the current restoration works.habitat management recommendations to remedy this will be discussed in Sections 5 and 6 below.



Fig 5: GIS Map:Key Observations including Otter Natal Den/Reptile Area and Potential Vole Habitat at the SED Recreation Area. (QGIS/ 'WOM21 Potential Habitat for Water Voles'DataMapWales,2022)/ *Google Maps Tiled Map Service Link* '(Google,2022)/ 'Cors Caron'(RSIS,2022)

2.5: South East Dome Phase One Habitat Survey

Desktop analysis was also carried out by using QGIS open source software to superimpose NRW Phase one habitat data over(Google) Satellite data for the area and convert this to display FSC Phase One habitat codes(citation req) to display the Phase One habitat one profile for the SED site.

The habitat map produced is shown below as shown in Fig 6 and demonstrates that the SED mesotope is representative of all habitats to be encountered throughout the other mesotopes and flood plain terraces found on site at CCSAC.

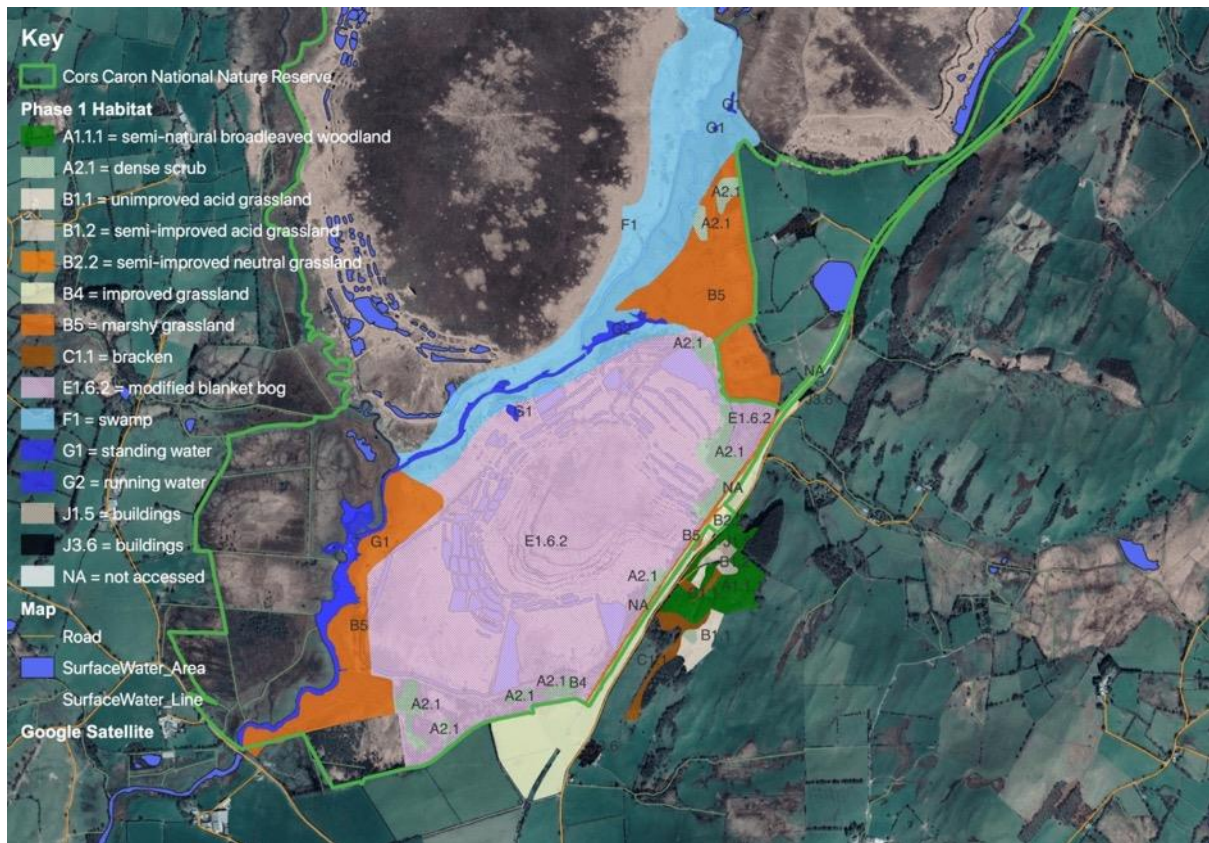


Fig 6. Phase One Habitat Data Map of South East Dome at CCSAC: QGIS/ (Lle,2022) *‘Phase 1 Habitat Survey’*(Lle,2022) / *‘QGIS mapping styles for UK habitats’*(FSC,2022)/ *‘Cors Caron’*(RSIS,2022)/*‘Google Maps Tiled Map Service Link’*(Google,2022)

The SED Recreation Area, also demonstrates the main habitats encountered, including the water features(running and standing water) between and surrounding the circular boardwalk , onsite bird hut and other visitor facilities. Summary Table 13, shown below, also makes a comparison between the habitats found throughout the SED mesotope and those found at the recreation area, where with the exception of absence of ‘Running water’, ‘Broadleaved woodland- semi natural’, ‘Gardens’ , and ‘Semi Improved grassland’ all other categories are represented in both areas.The relative similarity of habitats represented at this area of the SED, coupled with boardwalk and hide facilities has assured its perennial popularity with

visitors, volunteers and researchers, and makes the case for this area to be further improved to support these activities , whilst ensuring measures are in place to prevent disturbance to the resident flora and fauna

Summary Table 14 also shows the percentage representation of the main habitats represented at both the CCNNR and the SED Recreation site, using Natura 2000 site

codes(JNCC,2017);of note here is the anomaly of ‘Lagg Woodland’ habitat (classified in the Phase Habitat One survey as being A2.1, dense continuous scrub) at the SED Recreation site, for which there was no NK2000 code cited .This semi-wet woodland habitat provides a unique environmental niche for invertebrates/amphibians/birds and mammals at this part of the site and the management for which will be discussed in Section 5 below

Summary table 13: Comparison of habitats between SED Mesotope and the SED Recreation Area.

Codes	JNCC Phase 1 habitat survey handbook name	SED Mesotope	SED recreation Area
A1.1.1	Broadleaved woodland- semi natural	X	
A.2.1	Scrub-dense/continuous	X	X
B1.1	Acid Grassland-unimproved	X	
B1.2	Acid grassland- semi improved		
B2.2	Neutral grassland-semi- improved	X	X
B.4	Improved grassland	X	
B.5	Marshy grassland	X	X
E.1.6.2	Modified blanket bog	X	X
G.1.	Standing Water	X	X
G.2.	Running Water	X	
J. 1.5.	Gardens	X	
J.3.6.	Buildings	X	X

Summary table 14: Percentage representation of habitat classes at CCSAC and the SED Recreation Area.

SAC/SPA Habitat /Data Codes	Description	% Cover	SED Recreation area
N16-Broad Leaved Deciduous Woodland		7	Lagg mire woodland feature (distinguished from Bog woodland found elsewhere on the bog;EU Code 91DO) Located in part of the SED Lagg mire layer at the SED Recreation site Not N16- but likely arose from embankment works disturbance during construction and later removal of railway works. Provenance of some of the oak/beech species from N16 woodland located in site across from adjacent road (A482)
N07- Bogs,Marshes,Water fringed vegetation,Fens		70	X
N10-Humid grassland,Mesophile grassland		21	X
N06-Inland water bodies(Standing water,Running Water)		2	X

3.Environmental Information

3.1 Geomorphology:stratigraphy and physical features of the site

The RIGS statement of interest for the ‘*Tregaron Moraine*’(Geology Wales,2022) and the RIS sheet(JNCC,2008) categorizes the CCSAC as being ‘Pleistocene/Quaternary’.

Furthermore analysis of pollen in deposits behind the moraine site, show it was open water during the Holocene, but that peat growth commenced in the Atlantic period:subsequent pollen analysis, peat stratigraphy and radio carbon dating, from the site has been used to reconstruct land use changes from the Bronze Age to the early medieval period, and the site is considered to be the best documented Holocene pollen record site in Wales.

The bog developed from land upstream of a moraine, (or ridge) crossing the Teifi valley, comprised of glacial debris build up at the base of a glacier, that formed @ 16,000 yrs previously. The moraine is a vital component regarding geomorphological and biological forms in the area, in part because it, largely contained a large body of fresh water, produced by glacial melt and filling the entirety of the Cors Caron area.Within the last 12,000 years, the lake silted up to form the complexed raised mire macrotope that is now the Cors Caron SAC. Summary Table 15, below, summarizes the physical features of the site, adapted from RIS Data sheet for CCSAC(JNCC,2008)

Summary Table 15:Physical Features of CCSAC

Soil/Geology	Acidic clay/alluvium/peat /sedimentary
Geomorphology/Landscape	Lowland
Nutrient type	Oligotrophic
PH	Acid
Salinity	Fresh
Soil	Mostly Organic

Water permanence	Usually permanent
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3.2 Hydrological values and flood resilience.

The raised mire habitat of the Cors Caron SAC bisected by the complex wetland floodplain structure of the Afon Teifi SAC , shown in Fig 7 below, provides a useful ecological service with respect to provision of area water storage and desynchronisation of flood peaks, providing increased flood resilience for nearby market towns of Tregaron, Lampeter and Llandysul, as referred to in the '*Teifi and North Ceredigion Management Catchment Summary*'(NRW2015) and the 'Western Wales Flood Risk Management plan'(NRW,2016) respectively.



Fig 7:GIS Map showing AfonTeifi Sac and flood plain features on Cos Caron
 (QGIS/ QGIS/ (Lle,2022) *'Phase 1 Habitat Survey'*(Lle,2022) / *'QGIS mapping styles for UK habitats'*(FSC,2022)/ *'Cors Caron'*(RSIS,2022)/*'Google Maps Tiled Map Service Link'*(Google,2022)

3.3 Current Land Use

Summary Table 16 adapted from RIS data sheet(JNCC,2008) for the CCSAC and SED recreation area

Activity	CCSAC		SED Recreation Area		Comments
	Onsite	Offsite	Onsite	Offsite	
Nature Conservation	X	-	X	-	Currently Life for Welsh bogs Project and annual infrastructure maintenance tasks carried out by NRW
Tourism	X	-	X	-	
Recreation	X	-	X	-	
Scientific Research	X	-	X	-	Currently Life for Welsh Bog Projects monitoring water table and GHG emissions as part of hydrological management measures being carried out. Previous-Holocene pollen records/Species surveys/habitat surveys/Bronze Age archeological studies.
Fishing recreational sport	-	-	-	-	Status unknown
Grazing	X	-	X	-	Low density stock grazing with highland cattle on Marshy grassland at South East Recreation Dome.
Permanent agriculture	-	X	-	X	Pony stud/sheep,cattle raising.
Hunting recreational sport	-	-	-	-	Status unknown
Domestic water supply	-	X	-	-	

3.4 External management issues affecting main and South East Dome Site.



Fig 8: 'Aerial photograph of Cors Caron near Tregaron', 1946.(Peoples Collection Wales, 2022)

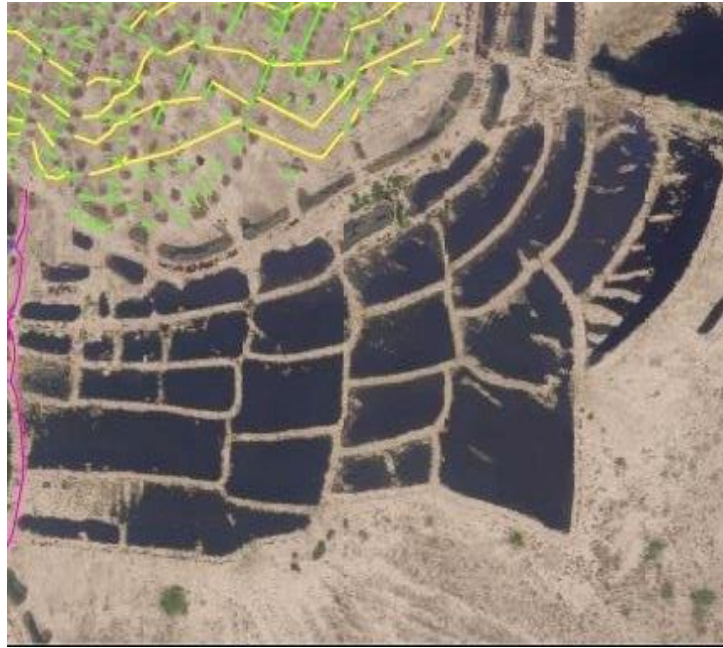


Fig 9 : Satellite image showing peripheral historic bund pools at Cors Caron SAC
(NRW,2021)

Summary table 17 , shown below, briefly describes the resulting features arising from external management and previous management measures occurring at the SED Recreation area. some of which are illustrated in Figs 8, shown above, which is an aerial view from 1946, which demonstrates the extent of peat cuttings on the raised sides of the mesotope..

Fig 9 respectively, is a satellite image showing deep bunded pool structures, formed as part of past management practices; in Summary table 18, a synopsis of external threats and past management measures affecting the CCSAC is presented.

Summary Table 17: Features arising at SED Recreation area ,resulting from past hydrological management measures

Features formed from past management at SED	Description of feature	Comments
Lagg wet woodland area	Railway ran alongside the bog from 1896 until the 1960's ,now remains as a track following the embankment track, helped to produce an anomolous Lagg wet woodland area habitat on the site anthropogenically created, as opposed to bog woodland on the rest of the site	As described in Section 2.3 above, has inadvertently provided an opportune habitat for endemic species at the site.:invertebrates, amphibians,mammals.
Surface water features/pools throughout the site	Constructed during the 1970's and 1980' at the CCSAC. Additionally in 2016, ongoing program off ditch blocking culvert installation of old peat work cutting areas) carried out. Though necessary to precede the current hydrological management techniques described in Section 3.5 below, are problematic regarding regeneration of Sphagnum bog moss vegetation. New surface gradient levels created by these processes, remain too steep next to adjacent bog mire, allowing for rainwater runoff and preventing the water logging required for peat formation; .	Has led to outcome of reduction of Sphagnum bog moss and reduced capacity to retain water, leading to areas of degraded bog and drying out along the old bunds, allowing for scrub encroachment, pH changes and species loss. As described in Section 2.3 above, has inadvertently provided an opportune habitat for endemic species at the site.:invertebrates, and annex1 SAC/SSSI species.

Summary Table 18: Synopsis of External Management and Past management practices at CCSAC

N2K:Threats and Pressures Code & Description (JNCC,2017)	N2KActivities Management Code	Inside/Outside Site (B,Both,I, Inside)	Negative Impacts Rank (H,HighM,Medioum,L-Low)
H04-Air pollution,air borne pollutants	Atmospheric levels :Sulphur/Nitrogen deposition,pH changes caused by these deposits(also by degraded bog losing hydrological resilience)	B	H
G01- Outdoor sports & Leisure activities,recreational activities	Visitors:Walking/Dog Walking- Wildlife Watching historical: angling/hunting.	B	L
A04-Grazing	As J02, over stocking of some areas- too high density of cattle and ponies in the past. poaching/eutrophication/trampling in the past of wet ditches /tributaries crossing the site.	I	H
J03-Other ecosystem modifications	Past Hydrological Management- deep pressure bunding – forming pools not suitable for Sphagnum moss regeneration but provides habitat for other annex 1/SSSI species. Practice of burning historically has caused encroachment of heather and heath species in some areas and overgrowth of molina and juncus grasses, crowding out bog moss communities.	B	H

J02-Human Induced changes in hydraulic conditions	Agricultural Drainage/Ditch creation for improving grazing land. Peat cutting- Anthropocene changes to hydrology of bog: most impactful practice: less accessible West bog relatively untouched, North East/Sout East, cutting has occurred on all sides, leaving domes uncut:evidence in past two additional domes South/North existed but eradicated by Strata Florida Monks cutting peat in 12th century.	B	H
K02-Biocenotic evolution,succesion	Past management measures speeding up succession in certain plant assemblages, i.e. Birch/ Rowan encroachment drying out habitat raised bog plant communities.	B	H
A03-Mowing/Cutting of Grassland	Cutting of poor fen'/rushes allow for stock feed/bedding and better grazing land- now a past practice.	I	L
I01-Invasive not native species	Rhododendron on tops of domes and other areas of degraded bog habitat:	B	L
			Positive Impacts Rank
D05-improved access to site	AccessibleCircular Boardwalk/Railway Track/ Riverside walk/ well maintained onsite bird hides/ good car park facilities. Site can also be reached by bus route	B	M

	on B4343 running past and/or cycle from adjacent Sustrans 82 track		
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3.5 Current Hydrological Management

Using techniques pioneered at a Cumbrian peatland site : '*Foulshaw moss*' (CWT,2022) , NRW trialed similar techniques in 2015-2016, at Cors Fochino near Aberystwyth, Ceredigion, Wales, case study details for which can be found in a recent case study paper for the '*Carbon Positive Project*' (NRW,2022)

The bunding technique adopted (developed by Natural England in Cumbria) is designed to restore surface water logging without the problems associated with larger 'pressure bund' structures (e.g. oxidation and shrinkage of mounded peat, deep water excavations and landscape issues). In essence this is a form of low elevation contour bunding method inclusive of short dividing cross bunds ,utilizing satellite data, pre construction to map bund sections, to enable the routes to be mown (using a low ground pressure machine) facilitating construction, leveling and re-turfing of the bund.

Summary Table 19 below presents additional LIFE project measures occurring in tandem with the bund construction , anticipated outcome and additional comments regarding these works with respect to the SED Recreation Area.

Summary Table 19, Additional Measures, anticipated habitat outcome and comments for the LIFE Management measures at the SED

Recreation Area.

Main Habitat Outcomes via LIFE project at CCSAC	Managing for the whole ecosystem by low elevation countour bunding is presumed to restore the active and degraded raised bogs to favourable status and in turn will provide I'll habitat conditions for all SAC and SSSI species on the bog.
Additional LIFE Project measures, in addition to bund construction.	Mowing of Molina grasses that have encroached and allow for reemergence of Sphagnum bog moss from nearby stock in the functional bog areas. Removal of birch scrub on top of the mires and old bunds Removal of Rhodedendron(INNS) Working with tenant farmers to reduce stocking densities/install bank stock fencing around wet ditch barriers to , minimize excessive of trampling, eutrophication, poaching.of bank-side environments.
Additional Comments	1970's/1980's bunds/associated hydrological works and the development of the Lagg mire layer into Lagg woodland/wet woodland environment has provided habitat for opportunities for Annex 1 species in SED Recreation Area as described in Section 2.4 above. This provides a conservation management conflict to the LIFE project measures, however the SED Recreation area is proportionally small enough with respect to the rest of the site, that other mitigation measures to protect species onsite should not compromise overall habitat restoration.

	15/02/2022- NRW Project Officer(White,2022) confirmed that Sluice repairs for pond and Lagg woodland was going to take place in March 2022. Also no rolling , cutting, reprofiling would be taking place in the area. Occupied by annex 1 species t the SED Recreation Area.
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4-Habitat Review & Conservation Objectives Cors Caron SAC and SED Recreation area.

4.1.Conservation objectives for CCSAC features(and SED recreation area)

Summary Tables 20- 24 below, describe the main visions, attributes and factors for the SAC species at the CCSAC and SED Recreation area.

Active Raised Bog:Feature Summary

Constituent Features:		Present CCNR Overall	Present SED Recreation Area
Feature 1			
EU Habitat Code	7110	X	X
Feature 3			
EU Habitat Code	7130	X	X

Summary Table 20: Active Raised Bog Vision, attributes and factors

Vision Feature One and Three		
Active raised bog at CCSAC will show typical features of fully functional raised bog, with bog moss vegetation covering all zones, and water logged within a few centimeters of surface, most months of the years. Bog surface should show lawn and hummock patterning displaying typical bogmoss species. Present: In sparse canopies: cross leaved heath, heather, hares-tail cotton grasses; bog rosemary deer grass, round leaved sundew, plentiful and occurring at intervals. Purple moor grass, scarce allowing lichens and bog mosses to occur in frequent collections on hummock forms. Wet hollows on mire surface will contain Sphagnum pulchrum, cuspidum and auriculatum, accompanied by bog asphodel, cotton grass and white beak sedge. Central domes, will be tree and scrub free with Rhododendron absent. Bog moss dominated plant communities well represented, down sloping sides of bog mires with transitions into wet heath, purple moor grass, cross leaved heath, torrential and deer grass, blending into purple moor grassland and mixed mire species. Lagg fen should contain poor and wet woodland communities with star sedge, purple moor grass, rushes, with abundant bryophyte ground cover. Rhynocosporion pool vegetation will be integral with bog moss communities of active raised mires, with plentiful wet hollows all year round, cotton grasses, bog asphodel, white beaked sedge will form scattered canopy over bog moss lawns.		
Performance Indicators for feature 1 condition(adapted from CCW,2008)		
Attribute	Specified limit	
Proportion of hummock/hollow vegetation	Wet hollow complex	Lower limit:80% Upper Limit
Ratio of hollows within hummock/hollow microtophy	Wet hollow	Lower limit; mosaic of 20% wet hollow vegetation, within 10m radius at any set survey point Upper Limit: mosaic of 30% wet hollow vegetation, within 10m radius at any set survey point Where vegetation is in favourable condition should contain Sphagnum tenellum with absence of Callun vulgaris,

		Caledonia spp, Molina Carul and Empetrum nigrum.
Presence of Rhynchosporion pool vegetation	Rhynchosporion pool vegetation should be intimately mixed with active raised mire.	R pool vegetation will cover Lower Limit:15% of primary bog surface Upper limit 70% of primary raised bog surface. In any 1 m radius: Sphagnum cuspidatum and /or pulchrum > 20% cover. Two or more Rhynchosporion Alba, Andromeda polifolia, Narthecium ossifragum present. Molina Caerulea absent
Factor	Specified limit	
Water levels	Lower limit:within 20cm of surface doe 6 months of the year, within 30cm at all times.	No Upper Limit set.
Water Quality	Lower limit :pH of 2.7	Upper Limit :pH of surface water 4.5 Polluted water e.g. from old workings,fertilise land, will not be used for raising water table.
Scrub	Lower Limit:none set	Upper Limit: no scrub present on dome surface plain; no scrub cover >5% for every 1ha area of site. Maximum scrub size 0.04 ha Maximum height of scrub 3 m, if closed canopy of 0.0025 ha. No Rhododendron Ponticum on mire plain. Tolerance of 2 Rhodedendron plants on each mesotope, with seed bearing maturity prevented.
Fire	No Fires allowed on active mire surface.	-
Atmospheric nutrient deposition	Lower limit- none set	Upper Limit-10kg/N/ha/yr
Grazing tenancies	No livestock grazing on active raised domes	-

Degraded Raised Bog: Feature Summary

Constituent Features:		Present CCNR Overall	Present SED Recreation Area
Feature 2			
EU Habitat Code	7120	X	X

Summary Table: 21 Degraded Raised Bog ,Vision, attributes and factors

VisionTwo		
The degraded raised bog at Cors Caron will reach favourable conservation status inclusive of:80% degraded bog moss communities and associated plant communities are fully representational of active raised bog.		
Performance Indicators for feature 1 condition(adapted from CCCMP)		
Attribute	Specified limit	
Habitat quality	Lower Limit:> 50% of sampling points consists of secondary active raised bog vegetation. >10% of sampling points at contain peat forming bog moss and related vegetation.	Upper limit- none set.
Factor	Specified limit	
As for Active raised Bog		

Transition Mire:Feature Summary

Constituent Features:		Present CCNR Overall	Present SED Recreation Area
Feature 4			
EU Habitat Code	7140	X	X

Summary Table:22: Transition Mire ,Vision, attributes and factors

Vision Feature Four		
Transition mire at CCSAC will be at favourable status when all the following conditions are met: Transition mire occupies small parts of the SAC, scattered over a number of management units. The feature will contain a quacking raft of vegetation, over a soft peat layer, with a wet surface year round. Bottle sedge will be the dominant plant species along with other sedge species and, devils bit scabious, marsh cinquefoil and many headed cotton grasses. Ground layer will be bog mosses No willow Carr present.		
Performance Indicators for feature 1 condition(adapted from CCCMP)		
Attribute	Specified limit	
Vegetation quality	Lower limit:in any 50 cm radius: Sphagnum cover is > 50% and at least 2 Carex rostrata, Potentilla palustris, Menyanthes trifoliata are present and Salic saplings are absent.	Upper Limit:none set.
Factor	Specified limit	
Water Levels	Lower limit:water table at surface for at least 10 months of the year, visible on walking	Upper Limit- none set
Water Quality		No limit set at present:should be absence of species such as Typha and Phragmites- indicative of nutrient enrichment.
Scrub	Critical to control ,as vegetation occurs in localised,small areas.	None tolerated
Burning	Molina abundant in this feature is flammable in dry periods, so vigilance is required re: burning when neighbouring farms do control burns for early bite grazing for cattle.	None tolerated
Grazing	Generally beneficial- control for excessive growth of rush/Molina, maintaining integrity of vegetation of	

	feature- controlled via NRA and/or NRW grazing licences/agreements.	
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Summary Table 23 :Otter,Feature Summary

Constituent Features:		Present CCNNR Overall	Present SED Recreation Area
Feature 5(CCSAC- misnumbered) in current core management plan, conservation objectives are referred to the current Afon Teifi Core Management Plan(CCW,2011)			
EU Habitat Code	1355	X	X

Summary Table 24 : Bog Woodland :Feature Summary

Constituent Features:		Present CCSAC Overall	Present SED Recreation Area
Feature (no category in the current Core Management Plan though listed JNCC RIS and Natura 2000 data sheets)			
EU Habitat Code	910D	X	X

4.2.Conservation objectives for SSSI features CCSAC(and SED recreation area)

In the current core management plan, conservation objectives for all SSSI species are as summarized in Table 25 below. Due to the paucity of information, background external data was sought in held on the NRW data base '*Finding protected areas on land and sea*', where a descriptive document '*Cors Caron Site of Special Scientific Interest:Your Special Site and its Future*'(CCW,2008) can be found from which there is mention of previous research and survey work having been undertaken, concerning the SSSI features on site.In the light of the

sparse data entries in the current plan, options to obtain new baseline data will be discussed as part of the management recommendations in Section 5 of this plan.

This is necessary to update and author new conservation objectives for these features, found throughout the CCSAC, primarily to ascertain that the current habitat management measures, including the current ‘LIFE’ project works are sufficiently restoring habitats to meet the sometimes quite specialized requirements of previously identified onsite SSSI(and SAC) species, and additionally to monitor the efficacy of the current works on restoration and betterment of conditions of all species/habitats on onsite.

Of special note here is that no separate ‘reptile’ category, data set or reference can be found in the core management plan or other data sheets and resources perused; NRW staff have noted the presence of reptiles making hibernaculae in the bund pool features at areas 4 and 5 on the SED Rec site; these species require monitoring and surveying to establish baseline and conservation objectives and the current documentation updated with these findings as a matter of urgency.

Summary Table 25: Status of Conservation objectives for SSSI Features at CCSAC

Feature	Present CCSAC	Present SED Recreation Area	Comments (Information gathered from SSSI reporting(CCW,2008))
		Note: comment opposite with respect to species present.	Part of management units 1 &7 designation in the current core management plan- inferred all SAC &SSSI species present potentially at the SED Rec reaction area.
Water Vole	X	X	A key species, with respect to all ecological systems on the SAC i.e. otter. Regarded at the time of the CCW report above as a National Key Site for this species.

Marshy Grassland	X	X	Some areas have been previously noted as species rich, other areas poor, predominantly purple moor grass, rush and sedge species.
Swamp	X	X	Scattered throughout the CC site, seasonally flooded, predominantly dominated by reed canary grass and/or sedges.
Bryophyte Assemblage	X	X	Previous survey work identified 149 bryophyte species at the site: 5 nationally rare: Moss categories: Fuzzy fork moss, Baltic bog moss, and Liverwort categories: Ribwort, Violet Crystal wort and Bog earwort. Additionally 10 nationally scarce species recorded: Moss categories Slender smooth cap River thyme moss Golden bogmoss Slender cow-horn bogmoss Liverwort categories: Blue pouchwort Spiny threadwort Wood fingerwort
Invertebrate Assemblage	X	X	Extensive survey records in the past noted, especially Moths and Spiders: Moth species of note Grey Scalloped bar Light knotgrass and Marsh oblique – barred. Beetles: Welsh peatland invertebrate Survey- noted ‘typical raised mire beetle fauna’ present.
Breeding Bird Assemblage	X	X	Non peer reviewed sites: Notes: Hen Harriers, Short Eared Owls and many wildfowl in winter https://www.cruglasfarmcottages.co.uk/wildlife-farming/ (Cruglasfarmcottages,2022) Notes 170 bird species/40 of which breed onsite Of note: Water Rails (Rallus aquaticus), Common Teal (Anas crecca), Mallard (Anas platyrhynchos),

			Snipe (<i>Gallinago gallinago</i>), Curlew (<i>Numenius arquata</i>), Redstarts (<i>Phoenicurus phoenicurus</i>) and Meadow Pipits (<i>Anthus spinoletta</i>) Also notes: Buzzards (<i>Buteo buteo</i>), Merlins (<i>Falco columbarius</i>), Sparrowhawks (<i>Accipiter nisus</i>), Hobbies (<i>Falco subbuteo</i>) and Goshawks (<i>Accipiter gentilis</i>). https://www.first-nature.com/waleswildlife/sw-nnr-corscaron.php (First-nature,2022) Main CCW SSSI report above notes wading birds, lapwings, curlews, snipe and perching birds, cuckoo, reed bunting, grasshopper warbler and sedge warbler.
Rosy Marsh Moth	X	X	Main CCW SSSI report notes substantial breeding colony noted at Cors Fochino in 1967, then discovered by happenstance in 1976 at Cors Caron—NRW officers have noted the moths at Cors Fochino- no updated data for this site at present.
Large Heath Butterfly	X	X	Cors Caron represents southern most location for this species in UK- no updated data for this site at present.
Singa Hamata	X	X	Only occurs on two sites in Wales, Cors Caron and Whixhall moss- as noted in report above- builds nests on cross leaved heath and related plant communities on the tops of the mesotope domes.
Raised mire Stratigraphy	X	X	The CCW report notes that the site has yielded valuable information re climatic environmental trends, 10,000 years ago, via direct pollen analysis, peat stratigraphy and radio carbon dating. The evidence gathered have enabled patterns for Bronze Age -12 century land use at the site to be inferred and is considered the best Holocene pollen sites in the UK.

B. CONSERVATION MANAGEMENT

Habitat and Stakeholder management recommendations for the South East Recreation Dome
ares will be described in Section 5 below.

5.Habitat management recommendations for SED

Recreation area

It is assumed that the majority of the habitat of the South East Dome mesotope will be returned to favourable status in the long term as a result of the hydrological management works currently being undertaken ‘The LIFE Welsh Raised Bogs project’(NRW,2022) and the project team will be continuing to monitor and survey the hydrological and greenhouse gas emissions, when the project ends in May 2023.

However, as established in Section 2 on examining onsite observations/ facts gathered directly at the SED Recreation area, it is clear that some of these measures are in conflict with conservation management requirements required by key mammal species occupying the site, i.e. presence of a natal breeding habitat for the Annex 1 species:otters, and that most of the site is opportune habitat for the SSSI species:voles.

Furthermore, the current management plan for the CCSAC(CCW,2008) does not provide conservation objectives for all SSSI species, previously noted to be present across the

‘The Baseline Evaluation results confirm that more information is needed on nearly 50% of the species and habitats of interest on our protected sites. The results also tell us that, where we do have the information on he features of interest, around 60% are in unfavourable condition’(NRW,2021)

reserve: This is consistent with a current NRW report , undertaken recently to review all Protected Sites Baseline data which states:

In response to this issue NRW are seeking partnership with relevant environmental stakeholder groups and organizations who can enable sharing and implementation of best practice methodologies to establish timely monitoring and surveying across protected sites, to enable closing the current evidence gap for SSSI species, pan Wales.: The Stakeholder management section below, will highlight recommendations for filling in specific SSSI evidence gaps, alongside obtaining new baseline data for all other species, to assess recovery following on from delivery of the LIFE bog project measures at the CCSAC.

5.1.Habitat Management Recommendations:

Summary Table 26, below compares previous recommended measures in the current management plan with those perceived to be required for South East Dome recreation area, Summary Table 27, presents Habitat Management Recommendation measures for South East Dome Recreation Area, as outlined in following points 1-3 below:

1)The primary habitat management recommendations for the SED Recreation area are to put in place protection measures for areas 4 and 5,a key natal breeding habitat for otters and identified potential vole habitat, for prevention from disturbance from dogs, humans, and heavy machinery currently being utilized to effect hydrological management measures by the LIFE NRW team. In an English Nature report, recommended by CIEEM(2019), concerning ‘*Otter Breeding Sites :Conservation and management*’ (from the ‘*Conserving Natura 2000 River Series*’), classic case studies in Pembrokeshire, showed that natal den sites, if favourable, can be used by otter bitches for up to 30+ years, so it is recommended that

managing disturbance measures, such as restricting dog walking and establishing buffer-zones will need to be in place beyond the duration of this plan.

The long term use of these sites by otter bitches is also emphasized by the report '*Otters and Development*' (NIEnA, 2011). A buffer zone of < 150 m is also recommended to be established between otter bitches and cubs and plant/machinery/other disturbances in the report '*Guidelines for the treatment of Otters prior to the construction of National Road Schemes*' (NRA, 2008): this would entail restricting all current and future planned hydrological works in these areas, including, mow grass mowing, bund reprofiling and further culvert and ditch blocking operations in these areas.

2) Maintenance and monitoring of the natal den / otter breeding habitat will also need to take place for the foreseeable future; part of these measures also encompass ensuring the Lagg woodland feature, (which acts as habitat and protection buffer on the east side of the recreation area) is also maintained, by ensuring the sluice gate in area 6 is monitored and remains in good repair and scrub/INNS species removal are carefully removed (or managed), allowing for root systems being utilized for dens to be retained.

This is as per recommendations made in an NRW report discussing: '*Woodland Management in the presence of the dormouse: Guidance for compliance with the Habitats Regulations*' (NRW, 2010) which makes the case, that environments such as the Lagg woodland (areas 1, 2, 3) are optimal for otters as potentially it is relatively undisturbed by humans, ungrazed by stock, near to surface water and running water features (< 50 m), not flood terrace area and contains dense cover in the form of, log piles, scrub thickets, small trees with established root systems which make ideal den environments.

3)The terms of the current Maesllyn tenancy and present grazing license agreement terms should also continue(to enhance and maintain the present habitat conditions for the potential vole habitat and all the other SSSI species groups present on the Cors Caron Sac, and also occupy the SED recreation area. These are in line with recommendations made in a report from the Wildlife Trust of South and West Wales ‘*Reconnecting our South Wales Water Voles*’(Stephens, 2014), authored for Natural Resources Wales.

5.2.Stakeholder Management

1)Following on from the habitat management recommendations previously, it is recommended that NRW reestablish partnership with ‘The Wildlife trust of South and West Wales’ (SWW,2022) primarily to facilitate establishing monitoring and survey programs, via sharing best practice/training and knowledge sharing with existing volunteers to enable establishment of baseline data for all SAC and SSI species,(to close evidence gaps and to enable new conservation objectives to be authored and incorporated in all relevant current management planning for the SED recreation area and the CCSAC)

2)It is also proposed that links with other specialist groups will also be established, with respect to monitoring and surveying, underrepresented species in the current plan, i.e. reptiles and bog woodland habitat.

3) Following on from points 1 and 2 it is anticipated that involvement with these groups will also enable delivery of increased community engagement talks, workshops and ‘citizen science’ projects to be facilitated/based at the SED Recreation area summarized in Summary Table 28 below:

Summary Table 26: Required Aims and Outcomes resulting from Increased Community Engagement Activities at the SED Recreation Area.

Aims	Outcomes
Further recruitment of volunteers from the local community, enhancing ongoing online recruitment campaigns via online the NRW LIFE website, blog and social media postings.	To enable core local group to be established to help undertake survey and monitoring activities in addition to assisting with annual reserve tasks, i.e. infrastructure repairs.
Foster interest and links to the research community at HE level, to enable/attract interest from students wishing to carry out placements concerning species specific and combined species and peatland restoration outcomes research.	To:to enable reestablishment of species/habitat research at the bog, and to facilitate evaluation of current measures from the LIFE project regarding its long term contribution to improving habitat conditions for all species at the bog, general resilience of the site to climate change and subsequent biliary to deliver key ecosystem services, re capture of greenhouse gases and flood mitigation
Deliver knowledge sharing and education about managing for the diverse habitats and species at the Cors Caron SAC and to highlight the methods, outcomes, and value of Peatland restoration measures for climate change and flood resilience management measures, currently taking place at the reserve	To further knowledge sharing and whilst developing opportunities for training with respect to all activities above, for volunteers, project staff and stakeholders..

4)

As a further infrastructure provision, it is also recommended to base a modest facility(trailer or temporary pod structure) in part of the picnic area of the visitor car park(currently under utilised) at the South East Dome recreation area. This is to meet the aim to improve conditions for knowledge sharing and community engagement for volunteers, staff and visitors at the Cors Caron SAC; it would also enable gathering of visitor profile data and provide capacity for greater training, monitoring and surveying activities at the site.

This recommendation is in recognition that, at present there is no dedicated ‘base’ on the CCSAC site in which to carry out any of the firmly mentioned activities in wet weather conditions , except for the onsite bird hide in area 7.

This building is sometimes used to deliver aspects of guided walks/tours by staff on the bog, but it is generally acknowledged it not suitable to deliver more in depth training or information sharing activities.

In the first instance it is suggested that a proportion of the ‘Protected Site’s’ annual budget should be used to fund trailer hire, with the aim that by year 3 of this plan, that sufficient volunteer hours(for match funding), and community engagement , surveying and monitoring (for demonstrable outputs) had been achieved such that a funding bid could be proposed, in the context of a suitable scheme i.e National Lottery and/or Heritage fund, to cover the capital costs of installing a permanent visitor/volunteer hub in the Car park grounds.

Summary Table 27 :to compare previous recommended measures with those recurrently required for South East Dome recreation area.

Conservation Measure Requirement	Description of measures recommended in Current Core Management Plan	Retention of measures at SED Recreation site:	Comments
Scrub	Removal of Birch Betula on drier areas, according to mapped plan:leave some areas of existing wet broad leaved woodland/willow carr	Yes	LIFE Bog project works has achieved extensive scrub/Birch and Rowan sapling removal this throughout the CCSAAt this moment in time:monitoring for re growth and/or new saplings should be continued. Bog Woodland has been left.as designated Annex 1 habitat Lagg Wet Woodland has also been left as per previous current core management plan recommendation.
Invasive Species	Minor problem onsite, management to eradicate/control to continue	Yes (See comments)	Overall on site, approach to remain however removal in Lagg woodland area to be carefully removed in sections, to leave habitat in place that may be being utilized by otters in this area As per NRW report

			recommendations concerning otter guidance measures in dormouse habitat (NRW,2010)
Burning	Poses significant threat to raised mire ecology: Annually carried out by surrounding neighbours as management strategy to create better grazing conditions for livestock. Recommended that regular liaison with farmers maintained to raise awareness of vulnerability of site re potential damage by fire caused by 'drift' of embers during controlled burns neighbouring farms undertake in the Spring.	Yes (See comments)	No fire to be tolerated on site on SED dome As per CCCMP recommendations (or any part of the site) Continue to inform and work with surrounding farms/tenancy owners to alert requirements to remain in terms of controlled, agreed burn licenses and to have sufficient provision in place to act upon Fire breaches at speed, during burning practices to prevent uncontrolled fire outbreaks spreading to CCSAC area. As per The Heather and Grass Burning Code for Wales 2008 (Gov.Wales,2008)
Agricultural tenancies	All three mesotopes at CCSAC, including SED are subject to agricultural tenancies: planned hydrological management works at the time could cause conflicts re concerns over stock safety with respect to raising water	Yes	Negotiation of tenancy terms across the CCSAC were achieved , such that blocking, filling in and sluicing of main drains could be achieved where

	table levels. The recommendation was for renegotiation of current tenancies on expiration, with move to alter terms to enable works where necessary.		required, including installation of sluice that feeds the main pond and Lagg wet woodland site at the SED Recreation area. This sluice fell into disrepair in 2021, leading to a drop in water levels in this area,(including the big pond feature) necessitating repairs as part of LIFE Bog Project Works in Spring 2022. Regarding low stocking density and bank fencing on Marshy grassland habitat on the SED recreation area:at this time is deemed satisfactory-no action recommended, save to review annually to check conditions are still favourable to benefit all occupying species.
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Summary Table 28:Habitat Management Recommendation measures for South East Dome Recreation Area.

Area/Feature	Location(s)& description	Comments	Recommended Actions:
A)Otter/Reptile occupied areas (4&5 Fig?)	Degraded bog/Active raised bog areas, enclosed by circular board walk Ponds and bund pool features onsite	Some of the required measures are in conflict with the overall recommended practices to restore bog via the LIFE Bog Project.but it is considered that the area is proportionally small enough that suspension of measures in this area would not have a significant impact on the anticipated outcomes arising from overall programme of measures At this time until further notice, not improving this area of the bog, by mowing molina grass overgrowth and not managing the Lagg woodland as 'Scrub' will afford a sufficient buffer zone to achieve necessary protection to breeding females and cubs utilizing the area as a 'favoured natal den area' as per recommendation (NRA,2008) This measure will remain in place for all /SSSI species potentially subject to	Part of SED dome recreation area can not be managed with LIFE measures in natal den territory of otters/vole and reptile area at this time. Includes: 1)Ceasing Mowing of molina grass specifically and further ditching/blocking works as per previous measures recommended in current management plan(CCW,2008) 2)Removal of any problematic scrub and any remaining INNS should be done by licensed staff, (when cubs not present outside of winter/spring time period) Removal should be done in sections) as the roots can also by otters as 'resting up' dens. As per recommendation in otter guidance wales report(NRW,2010) 3) Maintain Lagg woodland by monitoring of water levels and species present; ensure sluice repair is holding and remains in good order. 4) Restrict access to dog walkers on circular board walk, to minimize chance of disturbance, (bar assistance dogs) when mothers/cubs are known to be in residence:Otter presence can be monitored via camera-traps and monitoring Divert to Sustrans

		disturbance from LIFE Bog Project activities to effect the protections required under current relevant national legislation and acts (Habitat regulations, 2019) (The Wildlife Act, 1981)	82-Rail track walk on the site at these times. As per recommendation (NRA, 2008): That no disturbance/works should take place within a 150 m of breeding /natal site for otters
B) Lagg Woodland (1,2&3)	Bordering west end part of site, with majority located adjacent to railway embankment track access, between the entrance and exit points of the circular board walk. The remainder borders the start of the circular board walk, ending at the start of the big 'pond' feature on the site.	Leave to develop as per existing recommendation, in 'NIEA, 2011). that these habitats provide ideal buffer zones for otter natal den areas: Maintain Sluice repair, now rebuilt to enable this and to keep the large 'Pond' water levels raised, to maintain habitat for breeding bird assemblages, invertebrates, amphibians and mammals using this area. Especially important for some Odonata found here, (non thermophilic different to those found across the bog in transition mire and active/degraded raised bog habitats	As per action 3, section A.
C) Potential Vole habitat Area, as indicated on GIS data map. (Areas 1-9) Marshy Grass land area on	As marked on Fig?	For Maesllyn tenancy- no action required at present as low density grazing plan in place, using highland cattle, and well maintained bank fencing, in place along wet ditch barriers to prevent	Continue to review tenancy terms against action on site habitat/species outcomes annually, adjust terms in conjunction with tenant if, density stocking and /or bank stock fencing is not allowing for species to thrive.

References:

Burden A, Evans C ,Williamson J.(2016) *‘Carbon based estimate for greenhouse gas emissions and carbon sequestration of NRW Peatlands’*

Available at: <https://cdn.naturalresources.wales/media/687412/eng-evidence-report-276-condition-based-estimate-of-ghg-emissions-for-nrw.pdf#page23>

(Accessed:15 January 2022)

Chartered Institute of Ecology and Environmental Management(2021) *‘Position Statement on habitat Creation and restoration for Tackling the Climate Emergency’*

Available at:

<https://cieem.net/wp-content/uploads/2021/08/Carbon-and-Habitats-Position-Statement-FINAL.pdf>

(Accessed 28th January 2022)

Ceredigion County Council(2022) Contact Us

Available at: <https://www.ceredigion.gov.uk/resident/contact/>

Accessed(30th April 2022)

Ceredigion County Council (2022)Planning and Ecology

Available at: <https://www.ceredigion.gov.uk/resident/planning-building-control-and-sustainable-drainage-body-sab/planning-building-control/planning-and-ecology/>

Accessed(30th April 2022)

Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)

Available at: <https://www.legislation.gov.uk/ukxi/2019/579/contents/made>

(Accessed 30 March 2022)

Countryside Council for Wales(2008) '*Core Management Plan for Cors Caron SAC*

(Special Area of Conservation), Ramsar, SSSI. '

Available at: <https://naturalresources.wales/media/671524/Cors%20Caron-Plan%20English.pdf>

(Accessed 28 January 2022)

Countryside Council for Wales(2008) '*Cors Caron Site of Special Scientific Interest:Your Special Site and its Future* '

Available at: https://naturalresources.wales/media/656785/SSSI_0994_SMS_EN0011ab9.pdf

(Accessed 30th March 2022)

Countryside Council for Wales(2011)' *Core Management plan for Afon Teifi/River*

Teifi(Special Area of Conservation) SAC(CCW,2011)

Available at:

<https://naturalresources.wales/media/670702/Afon%20Teifi%20%20River%20Teifi%20Management%20Plan.pdf>

(Accessed 28 January 2022)

Cruglas Farm Cottages(2022) '*Wildlife and Farming*'

Available at: <https://www.cruglasfarmcottages.co.uk/wildlife-farming/>

(Accessed 15 January 2022)

Cumbrian Wildlife Trust(2022) '*Foulshaw Moss Peatland Restoration*'

Available at:

<https://www.cumbriawildlifetrust.org.uk/foulshaw-moss-peatland-restoration>

(Accessed 20th January 2022)

DataMapWales(2022) '*WOM21 Potential Habitat for Water Voles*'

Available at:

https://datamap.gov.wales/layers/geonode:GWC21_WaterVoles_Cleaned_to_100m2

(Accessed 05.March 2022)

First- Nature(2022) '*Cors Caron National Nature Reserve/Tregaron Bog, Southwest Wales*'

Available at: <https://www.first-nature.com/waleswildlife/sw-nnr-corscaron.php>

(Accessed 15 January 2022)

FSC(2022) '*QGIS mapping styles for UK habitats*'

Available at: <https://www.fscbiodiversity.uk/qgis-mapping-styles-uk-habitats>

(Accessed 15th March 2022)

Geology Wales(2022) '*RIGS Statement of Interest: Tregaron Moraine*'

Available at: http://www.geologywales.co.uk/central-wales-rigs/PDFs/tregaron_moraine.pdf

(Accessed 29th January 2022)

Google(2022) '*Google Maps Tiled Map Service Link*'

Available at: <https://www.google.cn/maps/vt?lyrs=s@189&gl=cn&x={x}&y={y}&z={z}>

(Accessed 15th March 2022)

GOV.UK(2021) 'Changes to the Habitats Regulations 2017'

Available at: <https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017#creating-a-national-site-network>

(Accessed 15 January 2022)

Joint Nature Conservation Committee(2017)*Natura 2000 Standard Data Form:*

UK0014790:Cors Caron

Available at: <https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0014790.pdf>

(Accessed 28 January 2022)

Joint Nature Conservation Committee (2008)*Ramsar Information Sheet:UK14003*

Available at: <https://jncc.gov.uk/jncc-assets/RIS/UK14003.pdf>

(Accessed 15 January 2022)

Lle(2022) '*Terrestrial Phase 1 Habitat Survey*'

Available at: <https://lle.gov.wales/catalogue/item/TerrestrialPhase1HabitatSurvey/?lang=en>

(Accessed 15th March 2022)

Natural England(2003)' '*Otter Breeding Sites :Conservation and management*'

Available at: <https://cieem.net/wp-content/uploads/2019/07/B359157-Otter-Breeding-Sites-Conserving-Natura-2000-Rivers-Series.pdf>

(Accessed 20th March 2022)

Natural Resources Wales(2021) '*Re-wetting an area of degraded raised bog Cors Fochino using low elevation contour bunding*'

Available at: <https://cdn.cyfoethnaturiol.cymru/media/685958/case-study-3-peatland-restoration-using-bunding.pdf>

(Accessed 20th January 2022)

Natural Resources Wales(2017) '*Major drive to bring new life to precious habitats*'

Available at: <https://naturalresourceswales.gov.uk/about-us/news-and-events/news/major-drive-to-bring-new-life-to-precious-habitats/?lang=en>

(Accessed 15th January 2022)

Natural Resources Wales(2022) '*Mid Wales Area Statement*'

Available at: <https://naturalresources.wales/about-us/area-statements/mid-wales-area-statement/introduction-to-mid-wales-area-statement/?lang=en>

(Accessed 20th March 2022)

Nature Recovery Action Plan Wales – the Biodiversity Strategy for Wales(2015)

Available at: <https://www.biodiversitywales.org.uk/Nature-Recovery-Action-Plan>

(Accessed March 20th 2022).

National Road Authorities(2008)'Guidelines for the treatment of Otters prior to the construction of National Road Schemes'

Available at: <https://cieem.net/wp-content/uploads/2019/07/Guidelines-for-the-Treatment-of-Otters-prior-to-the-Construction-of-National-Road-Schemes.pdf>

(Accessed 20th March 2022)

Natural Resources Wales(2022) '*New LIFE for Welsh Raised Bogs*'

Available at: <https://naturalresources.wales/about-us/our-projects/nature-projects/new-life-for-welsh-raised-bogs/?lang=en>

(Accessed January 18th 2022)

Natural Resources Wales(2015) *Teifi and North Ceredigion Management Catchment Summary*'

Available at: <https://naturalresources.wales/media/3215/teifi-and-north-ceredigion-management-catchment.pdf>

(Accessed January 25th 2022)

Natural Resources Wales(2021) '*Review of condition of Wales*' *protected natural features fuels calls for partnership approach to a nature rich future*'

Available at: <https://naturalresources.wales/about-us/news-and-events/news/review-of-condition-of-wales-protected-natural-features-fuels-calls-for-partnership-approach-to-a-nature-rich-future/?lang=en>

(Accessed March 30th 2022)

Natural Resources Wales(2022) '*Our Offices*'

Available at: <https://naturalresourceswales.gov.uk/about-us/jobs-and-placements/jobs/our-offices/?lang=en>

Accessed(April 30th 2022)

Natural Resources Wales(2016) ‘*Western Wales Flood Risk Management plan*’

Available at: https://cdn.cyfoethnaturiol.cymru/media/675146/final_frmp_-_western-wales_pk26b82.pdf?mode=pad&rnd=131466534560000000#page87

(Accessed 28 January 2022)

National Resources Wales(2010) ‘*Woodland Management in the presence of the dormouse: The ‘Habitats Regulations’ refers to The Conservation of Habitats and Species Regulations 2010 OTTER*’

Available at:

<https://naturalresources.wales/media/683858/ottersguidancewalessept2010v2.pdf>

(Accessed March 20th 2022)

Northern Ireland Environment Agency(2011)’*Otters and Development*’

Available at: <https://cieem.net/wp-content/uploads/2019/07/natural-information-otters-and-development-2011.pdf>

(Accessed 20th March 2022)

OS OpenMap-Local (2022) ‘*SN*’

Available at: <https://osdatahub.os.uk/downloads/open>

(Accessed:30th March 2022)

Peoples Collection Wales (2022) ‘*Aerial photograph of Cors Caron near Tregaron, 1946*’.

Available at: <https://www.peoplescollection.wales/items/1610221>

(Accessed 30th January 2022)

Senedd(2022)People of the Senedd

Available at: <https://senedd.wales/people/162>

(Accessed 30th April 2022)

Stephens, N.(2014) '*Reconnecting our South Wales Water Voles*'

Available at: <https://www.welshwildlife.org/wp-content/uploads/2014/07/Reconnecting-our-South-Wales-Water-Voles-final-REDACTED-compressed.pdf>

(Accessed 28 January 2022)

The Conservation of Habitats and Species Regulations 2010 c 11,13-15

Available at: <https://www.legislation.gov.uk/uksi/2010/490/contents/made>

(Accessed:30th April 2022)

The Conservation of Habitats and Species Regulations 2017

Available at: <https://www.legislation.gov.uk/uksi/2017/1012>

(Accessed:30th April 2022)

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019

Available at: <https://www.legislation.gov.uk/uksi/2019/579/regulation/50/made>

(Accessed:30th April 2022)

The Wildlife and Countryside Act 1981

Available at: <https://www.legislation.gov.uk/ukpga/1981/69/contents>

(Accessed:30th April 2022)

Ramsar Sites Information Service(2022) '*Cors Caron*'

Available at: <https://rsis.ramsar.org/ris/570>

(Accessed 15th March 2022)

Tregaron Community Council(2022)About Us

Available at: <https://cyngor-tregaron-council.org.uk/gb/>

(Accessed 30th April 2022)

UK Parliament(2022) MP's and Lords

Available at: <https://members.parliament.uk/member/4630/contact>

(Accessed 30th April 2022)

Welsh AssemblyGovernment(2008) '*The Heather and Grass Burning Code for Wales 2008*'

Available at: <https://gov.wales/sites/default/files/publications/2018-01/heather-and-grass-burning-code.pdf>

(Accessed 30th April 2022)

Welsh Government(2022)Welsh Government Offices

Available at: <https://gov.wales/welsh-government-offices>

(Accessed 30th April 2022)

