Nature for Climate Peatland Grant Scheme: Restoration Grant

Guide for Applicants 2023

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Version: 3.1 Draft

This guidance is subject to confirmation when Natural England issues the Invitation to Apply (ITA).

www.gov.uk/natural-england

Contents

The Nature for Climate Peatland Grant Scheme

The government committed more than £750 million to a Nature for Climate Fund (NCF), including for peat restoration and tree planting programmes. As part of this, Natural England (NE) is delivering the Nature for Climate Peatland Grant Scheme (NCPGS). The competitive scheme will run from 2021 to 2025.

The NCPGS aims to:

- set 35,000ha of degraded peatland in England on a path to restoration by March 2025
- reduce emissions from peat by 5.7 million tonnes carbon dioxide equivalent by 2050, with continued reductions after that

These targets are linked to the England Peat Action Plan.

Peatland restoration will also deliver wider environmental and social benefits. It will:

- contribute to the Nature Recovery Network (NRN)
- enhance ecosystems and biodiversity
- improve water quality
- provide natural flood management
- protect the historic environment
- give opportunities for people to connect with nature

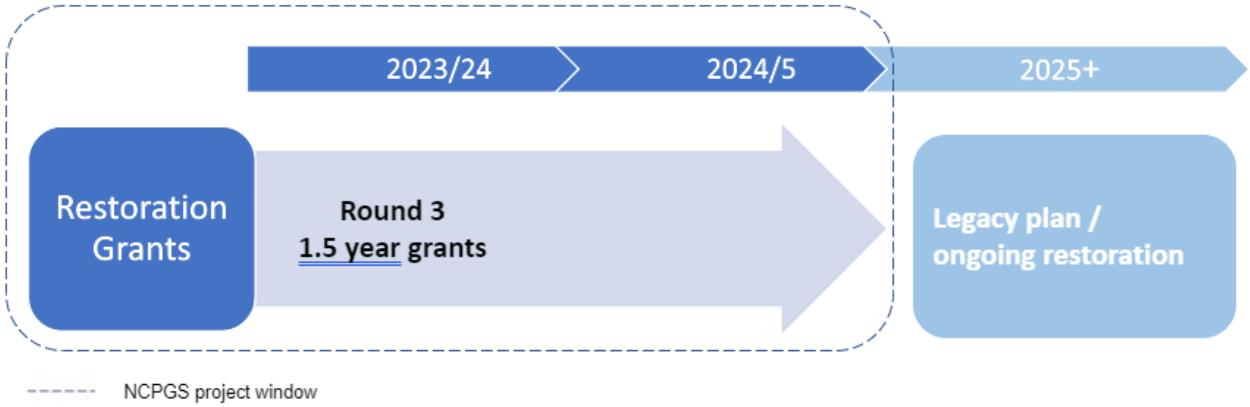

Figure 1: An overview of the scheme

The NCPGS includes the Restoration Grant and the Discovery Grant. This guidance is for round 3 of the Restoration Grant. Discovery Grants aimed to unlock barriers to peatland restoration. There are no more rounds of Discovery Grants planned.

About peatlands

Peatlands cover 3% of Earth's land surface but are the largest terrestrial carbon store (IUCN, 2018). They cover 10.9% of England but only an estimated 13% are in a near natural functioning state (Evans et al., 2017). England's degraded peatlands emit around 9.5 million tonnes of carbon dioxide equivalent annually (Department for Business, Energy & Industrial Strategy, 2021a).

Peat slowly accumulates where vegetation cannot completely decompose due to acidic, waterlogged conditions (Gregg et al., 2021). There are two main types of peatlands in England: bogs and fens. There are more details on bogs and fens in **Annex 1**.

Peatlands are drained for land uses such as:

- agriculture
- forestry
- peat extraction for horticulture or energy

Draining peat speeds up decomposition and peat-forming species are lost. The peat releases carbon and it becomes a net source of greenhouse gases (GHG). The peatlands also lose their biodiversity and other benefits.

The Committee on Climate Change recommended restoring peatlands across England to meet Net Zero commitments by 2050 (Committee on Climate Change, 2020). Recent evidence shows water levels control GHG emissions from managed peatlands (Evans et al., 2021). Re-establishing natural peatland function takes time but is vital to secure the long term benefits they offer. Working through partnerships at a landscape scale is critical to deliver this ambition.

About Restoration Grants

Restoration Grants fund capital works. They are for projects where any preparatory work and management plans are complete, or mostly complete.

Restoration Grants will provide up to 75% of total project costs. In exceptional circumstances they may offer up to 85%. See Additional funding.

2023 Restoration Grant applications can get funding until March 2025. They are for projects where restoration can begin within the 2023 - 2024 restoration season. Subject to confirmation, we expect to open for the third round of Restoration Grant applications in April 2023, for 8 weeks.

We expect applications for £1 to £2 million across the life of the project, but we will consider other amounts. Funding allocations will be fixed once awarded.

This is the third round of Restoration Grant applications. To date, the NCF has funded c. 19,000ha of peatland restoration. Find out about the first round of Restoration Grants awarded in 2021.

Eligibility

Who can apply

Applications are encouraged from partnerships or holdings with high potential for carbon capture. Successful applications are likely to offer restoration at a landscape scale, involving multiple sites and land managers, or substantial land area. Partnerships will need to decide who will lead their application.

Applications are open to:

- environmental groups
- local authorities
- businesses
- commercial enterprises
- charities
- public bodies
- landowners
- other organisations

You will need management control to meet the requirements of the grant, allow restoration works and retain them for the required term. This will include formal arrangements with site owners or managers. See 3: Legacy of investment.

You can submit more than one Restoration Grant application in 2023, but they must not include the same land.

If you applied in a previous year, you can apply again this year.

What land can you include

Restoration Grants will fund work on peatlands:

- in England's uplands and lowlands
- with peat soils at least 30cm deep and at least 50% soil organic matter content
- with potential to restore hydrological function and peat-forming vegetation

There is no minimum or maximum area of peatland for an application.

You can include peat soils that are less than 30cm deep or have a soil organic matter between 20% and 50% if essential to the restoration of a wider peat mass. For example, if they are part of a wider hydrological unit.

You must aim to establish peat-forming plant communities. This may be through peatland restoration or creation activities. These should both include raising water levels and re-instating peat-forming vegetation.

Restoration takes place where peatland has degraded semi-natural vegetation. It may be drained or bare due to management, such as grazing.

Creation takes place where peatland has previously undergone land-use change which replaced the vegetation. This includes cultivation or re-seeding.

Where there is wet grassland on peat, the NCPGS may fund restoration to bog or fen habitat. The NCPGS will not fund maintenance of wet grassland communities. The NCPGS will fund paludiculture if you can show that the management results in peat formation.

Former peat extraction sites are only eligible for Restoration Grant funding if there is no existing obligation to restore the site.

Land with Heritage Property Relief may be eligible. The NCPGS cannot fund work which is a statutory duty or fully funded by other sources. This includes management or access requirements in conditional exemption undertakings agreed under the Inheritance Tax Act 1984. You must check these undertakings before you apply for NCPGS funding.

Eligible and ineligible costs

Restoration Grants will fund work that helps restore degraded peatland at any stage in its restoration journey. You do not have to fully restore sites by the end of the project. This might include habitat and soil management, or preparation to restore sites in later years of the Restoration Grant project. Works are eligible where they secure a measurable amount of carbon. See 5: Environmental benefits – carbon.

Eligible costs include:

- physical restoration works, such as blocking drainage and revegetating bare peat
- re-establishing peatland habitat on peat soils
- monitoring and surveys relevant to the project
- project administration
- partnership development and engagement
- training, including project team and contractors
- contingency funds for unexpected or unforeseen costs – up to 10% of project costs, excluding staffing

Some other costs may be eligible if you can show they are beneficial to restoration. These include:

- access provision
- historic environment mitigation works
- protected species mitigation works
- community engagement
- equipment purchase
- small rewetting works close to restoration, including small infrastructure investments

Staff costs are eligible where they work directly on the NCPGS project. Relevant roles could include:

- Project Manager
- Project Officer
- Site Manager or Site Supervisor
- Data and Monitoring Officer
- Historic Environment Officer
- Engagement and Education Officer
- Administrator
- Communications Officer
- Ecologist or Surveyor

You can use NCPGS funding to develop expertise within your project team, for example to establish new staff to carry out restoration works. You can also support contractors to carry out training to help increase capacity within the sector.

Your project might not need some of these roles, merge them, or need other roles. For each role in your application, you need to give information on:

- salary, including NI and pension
- overheads, such as directly-related office costs, travel and subsistence
- training and equipment

You should calculate any part-time staff costs pro-rata.

Ineligible costs include:

- land purchase
- buying out tenancy agreements
- landowner compensation for inconvenience or loss of income
- activities related to discharge of contractual or legal obligations
- research that does not directly support the restoration work under the NCPGS project
- costs incurred before the grant is awarded

Please note recent changes to the regulations on the use of rebated fuels, also known as 'red' diesel. For further information see HM Revenue & Customs Excise Notice 75. You should check if this will affect your cost estimates.

Other schemes and grants

The NCPGS cannot fund any peatland restoration activities provided for within in agri-environment (AE) schemes, other agreements, or used to satisfy a compliance failure within other schemes. You should only claim for NCPGS capital works through this agreement and not through parallel agreements or schemes.

A NCPGS project can be active on the same land as Countryside Stewardship (CS) and Environmental Stewardship (ES) agreements if the work is not:

- a commitment under the ES or CS agreement
- claimed under the ES or CS agreement
- needed due to a failure to deliver the ES or CS agreement
- at odds with the aims of the ES or CS agreement

If there is an existing CS or ES agreement, the agreement holder must:

- get approval from the Rural Payments Agency (RPA) before you carry out any works under a Restoration Grant where these conflict with the ES or CS requirements and a Minor or Temporary Amendment is required
- continue to meet the requirements of the agreement and keep the RPA informed

The government will allow CS agreement holders to:

- use annual break clauses to end their agreements without penalty at agreed points, once they have secured a place in a new scheme
- remain on the same terms and conditions for the duration of their agreement if they want to

It is the responsibility of the AE agreement holder to contact the RPA. This should be done as soon as possible to reduce delays to restoration works on the ground. When there are AE conflicts regarding the protection of historic features, please contact the NCPGS team mailbox (peatlandscheme@naturalengland.org.uk) to discuss.

The new environmental land management schemes will be the main mechanism to deliver peatland restoration in future. Using the NCPGS now will not disadvantage applicants to these schemes. The NCPGS means there is no reason to wait to respond to the climate emergency.

Environmental land management schemes

Peatland restoration is a long-term process. As part of your NCPGS project, you are required to develop a legacy plan for each of your sites, setting out how you propose to continue restoration beyond March 2025 when your NCPGS grant ends – see Q3: Legacy of investment. In many cases site managers are looking to the Environment Land Management (ELM) schemes for this support. This section provides a summary of what is expected to be available.

More information is available in the Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services. This also sets out what is planned for ELM through 2023 and 2024.

Countryside Stewardship (CS)

Government has confirmed that the range of CS options currently available to fund work on upland and lowland peat will continue under ELM, and that there will be some additional options specifically focussed on peat restoration. Countryside Stewardship will be of particular interest to farmers and site managers who have management control of the water levels in the peat within their holding, with CS plus offering an opportunity to join up across larger areas.

Landscape recovery (LR)

The Landscape Recovery scheme will facilitate large-scale projects through bespoke, long-term (20+ year) agreements. It will award agreements through competitive application rounds focused on outcomes that are best delivered through these types of projects. There will be further application rounds for Landscape Recovery this year and in 2024. The next round will open in spring 2023 and will focus on net zero, protected sites and habitat creation. Up to 25 places will be available for projects of at least 500 hectares.

You can include land in a Landscape Recovery application if it is or has been involved in NCPGS or any other government scheme. Entry into Landscape Recovery is through a competitive application process. The experience you will have from your involvement in NCPGS is likely to be useful when preparing applications for Landscape Recovery.

Projects chosen for Landscape Recovery will be awarded with a project development grant to support more detailed planning where required. Projects may be able to progress through the development phase more quickly where they have developed relevant deliverables before joining Landscape Recovery, for example through the NCPGS. It is during the project development phase that the Landscape Recovery team will negotiate the terms of bespoke long-term (e.g. 20 years plus) implementation agreements with each project.

If you want to begin peatland restoration this year you should apply to the NCPGS. If successful in both NCPGS and Landscape Recovery, you can do restoration in parallel to the negotiation of a long-term Landscape Recovery implementation agreement.

You can find out more about Landscape Recovery round two by signing up to a webinar at this link. Full guidance will be provided when applications open in the spring.

Additional funding

Government funded schemes are moving towards blended funding, which means including private investment alongside government funds. This is important to achieve large scale change and meet long term restoration targets.

Restoration Grants normally cover up to 75% of total eligible costs, with the remainder coming from non-Treasury sources.

In exceptional circumstances Restoration Grants may cover up to 85%. A project is an exceptional case if it is both:

- offering unique and significant environmental benefits that commonly used restoration techniques could not achieve. For example, innovative techniques to reintroduce rare species
- from organisations or partnerships with constraints over their ability to secure other funding

These projects still need to score highly against all assessment criteria.

If you want to apply at this higher rate, you must confirm your eligibility before you apply. Contact the NCPGS team using Atamis.

You can include other sources of Treasury funds, such as funding from the Environment Agency, if the total Treasury contribution does not exceed 75%. The funded activities must be eligible under NCPGS to count as part of the NCPGS application. The other funding commitment needs to be recent enough that it is not considered a prior commitment.

Match funding

You can get the additional funding you need to secure a Restoration Grant through match funding.

Match funding can be any non-exchequer sourced funding. It needs to directly match NCPGS funding sought and be secured for the life of the NCPGS project. You can find out more about match funding, including examples, in the Commercial Questionnaire.

Match funding can include private finance.

Private finance

Private finance is any funding for your project that does not originate from public funding. For example:

- cash or in-kind contributions from private companies or individuals
- grants or contributions from charities
- volunteer time

Carbon finance is the term for funds coming from purchase of greenhouse gas reductions to offset carbon emissions. Peatland restoration secures significant amounts of carbon, so projects have an opportunity to secure carbon finance. Applications that include carbon finance in their match funding will attract higher scores. See 2: Carbon finance.

Opportunities to develop private finance and carbon finance include:

- the Peatland Code which gives assurances on the private purchases of carbon
- investment from private sources, such as water companies
- the Big Nature Impact Fund

You can claim for NCPGS funding alongside these. You can claim for other schemes on the same land as these if they are funding different activities.

Using the Peatland Code alongside the NCPGS

Version 2 of the Peatland Code is currently under development and is likely to include the addition of lowland peatlands. This section will be updated prior to the restoration application window opening with the latest information.

Carbon credits can provide funding where areas of drained or actively eroding peat are to be restored. The Peatland Code provides assurances that the climate benefits being sold are real, quantifiable, additional and permanent.

Peatland Code projects have a series of distinct steps.

1. Registration of the site with the Code.
2. Completion of site surveys and development of a management plan.
3. Validation of the surveys and management plan.
4. Implementation of the initial capital restoration works, usually over a maximum of 3 years.
5. Verification of the completion of the works.
6. Maintenance of the improvements for at least 30 years.

The first four steps align with developing an NCPGS project.

Peatland Code sites can link to the NCPGS in two ways.

- entering a site into the Peatland Code is an excellent example of a legacy plan to maintain the investments under NCPGS
- in certain circumstances the Peatland Code can provide funding during the initial capital restoration phase

To restore Peatland Code sites under the NCPGS, you will need to:

- register sites with the Peatland Code before applying to the NCPGS to make sure the Code is recognised in NCPGS scoring
- preferably get surveys and management plans validated by the Peatland Code before you start works

Beginning works before validation risks the site not being entered into the Peatland Code and losing that funding stream.

Not all costs eligible for funding under NCPGS are relevant for a Peatland Code restoration plan. Any works after March 2025 are ineligible for NCPGS funding.

How to apply for a Restoration Grant

To apply for a Restoration Grant, you need to use Defra's eSourcing portal (Atamis) . Find out how to register and apply.

You will need to complete three questionnaires:

- qualification (eligibility)
- technical
- commercial

This guidance will help you complete the technical and commercial questionnaires. You can submit any queries on the application process through Atamis.

The technical questions account for 70% of your score and include:

1. What will you achieve?
2. How will you achieve this?
3. Legacy of investment
4. Experience and ability to deliver
5. Environmental benefits – carbon
6. Environmental benefits – non-carbon

The commercial questions account for 30% of your score and assess:

1. Cost-effectiveness (value for money)
2. Carbon finance

A list of assessors is provided in the Invitation to Apply (ITA) on Atamis. Assessors will only see the response associated with the question they are scoring. You should not assume that assessors can see the response from a different question.

Technical questions

The ITA pack has a template for answering the technical questions. You can find guidance below on the technical questions in the 2023 Restoration Grant application.

1: What will you achieve?

Evaluation criteria

You must show how your proposal contributes to the objectives of the NCPGS. This outline of your project must include, but is not limited to:

- project title
- project aims – the long-term vision for the project
- restoration objectives – the short and medium-term results of project activities, which will help realise the project aim
- the partners involved
- the role of any previous NCPGS projects
- the context of the grant applied for

Your response must use the Q1 section of the technical template provided and not exceed two sides of A4, font size 12. Please do not provide attachments or links to other documents in your response as these will not be considered.

Additional guidance

Examples of a project aim and restoration objectives:

- The aim of this projects is to restore 500 ha of drained lowland raised bog using rewetting and revegetation best practice
- The restoration objectives of this project are to create peat cell bunding to raise water levels and use a moss-rich nurse crop enhanced with *Sphagnum* species to re-establish peatland vegetation

The context of the grant should consider:

- why restoration is necessary on the site, or sites

- the restoration journey and the role of the project in it
- that you have considered the conservation objectives of protected sites

You should give a non-technical description, which non-specialists could understand.

2: How will you achieve this?

Evaluation criteria

You must describe your project approach including a plan, timetable and method for the proposed restoration and associated monitoring.

You must include:

- description of all activities
- description of sites involved using the Q2 site-specific template and the technical supplementary spreadsheet
- detailed methodology, consistent with the **Restoration Annex**, with a rationale for the techniques proposed in each case
- where the application is being made on behalf of a partnership, evidence of permission from the relevant landowner(s)
- equipment/capital item purchases required.
- site maps of restoration proposed and site features
- expected restoration trajectory of sites over the next 50 years
- details of any consents and permissions required and a plan of how and when these will be obtained, or evidence they have been obtained. This must include protected sites and historic environment permissions – see **Annex 4** and **Annex 5**.
- monitoring plan to demonstrate the impact of restoration during the project lifetime, including hydrological and vegetation surveys
- description of existing monitoring and research on sites
- project work plan, including timetable of key deliverables/milestones, restoration works, monitoring and project management
- management plan for the protection of the project/site investment (e.g. wildfire management) during the NCPGS investment period
- assessment of risks and dependencies of the project and how these will be managed and mitigated

For your response you must use:

- Q2 section of the technical template
- a separate site-specific template for each site
- site overview, restoration and monitoring summary tabs in the technical supplementary spreadsheet template
- upload supplementary documents

Full details must be provided for all sites where work will start in year 1, between April 2023 and March 2024. As many details as possible should be provided for works starting in year two. Full details of activities in year 2 must be provided by the end of June 2024 (see Activities in year 2 onwards).

Additional guidance

You should show all the reasons behind site degradation and what you still need to do to fully understand what restoration work the site needs.

To restore a peatland, you will need to restore its hydrological function and establish suitable conditions for peat-forming vegetation. On bogs you may need to repair damaging features such as drains and erosion gullies.

You must choose appropriate methods for each site. You can find guidance on restoration methods in **Annex 1 – Peatland Restoration**. You must show how the method will:

- benefit the site's hydrology, habitat, and species
- restore the whole hydrological unit
- follow best practice, referencing published guidance or your previous work
- be appropriate for site conditions, and why you chose it over other methods
- minimise impacts to the habitat, species, historic environment, and any designated features

You need to give as much detail as possible, including:

- materials you will use
- dam frequency
- borrow pit frequency
- vehicle access
- information about donor material

Your response should show evaluators that the activities would be permissible if required. Assume that evaluators know nothing of any existing research projects or models you propose to use.

You must assess biosecurity to import any materials to the site. If you plan to use donor material, you must complete the Biosecurity Donor Site Information Form in **Annex 2 – Biosecurity** and include it with your application.

You must include a management plan including details of any ongoing management, grazing and sporting activities until March 2025. This must demonstrate that the ongoing management will be consistent with achieving the proposed restoration trajectory.

Spatial data

You must provide site and restoration maps to support your Q2 response. You should use a georeferenced application to plot your project areas. We prefer that you use ArcView but will accept other formats. We understand that not all projects have access to mapping systems, but there are open-source applications available.

The maps must show any:

- site boundaries
- features to restore
- access routes for machinery and equipment, including helicopter lift sites
- storage or permanent refuelling locations
- historic environment features
- monitoring locations

You may not need to individually map features to restore but you must show their location and scale. They might include:

- ditches and erosion gullies to block or re-profile
- areas of bare ground to revegetate
- areas of scrub removal
- area of surface bunding

Export maps at a scale with enough detail to accurately interpret where you plan to work. You should include:

- maps of individual sites at no more than 1:25000 scale
- an overview map showing all your sites and their locations, with references to the individual site maps

You should use one of the following combinations of file types:

- PDF and shapefile (.shp) of each site with an overview map
- PDF, JPG or other and GPX or other of each site at a suitable scale with an overview map
- PDF, JPG or other and GPX or other of each site at a suitable scale
- PDF, JPG or other of each site at a suitable scale

Permissions and regulations

Restoration works on peatlands are likely to need permissions and to follow environmental regulations. You must apply and comply with any permissions and regulations applicable to the land use change or management in your project. It is your responsibility to get any permissions required from other bodies needed for ongoing management.

You need to consider any permissions and regulations as early as possible. In the application you must give evidence of them, or when you will get them.

Permissions and regulations that may apply include:

- tree felling licences from the Forestry Commission
- Environmental Impact Assessments (EIA), such as for deforestation or rural land use change
- environmental permits and flood risk activity permits from the Environment Agency
- Ordinary Watercourse Consent
- planning permission or permitted development rights
- water storage related to the Reservoirs Act 1975
- public rights of way legislations (PROW), including the Countryside and Rights of Way Act 2000 and Highways Act 1980
- consent to construct works on common land from the Planning Inspectorate
- Scheduled Monument Consent
- minor and temporary amendments to any other agreements, such as CS and ES
- Protected species licences
- Cultural heritage impact assessments (World Heritage Sites only)

If you are unsure of the permissions and regulations which you need to consider for the work, you could consult:

- Forestry Commission
- the local planning authority
- Environment Agency
- the Lead Local Flood Authority (LLFA)
- NE: Environmental Impact Assessment (EIA) (Agriculture) Unit
- Historic England
- local authority or National Park archaeologists
- Rural Payments Agency (RPA)

Protected sites and species

Where you propose restoration that may affect a statutorily protected site, you must show that the works are necessary for conservation of the site and are appropriate to the site conditions.

If you have a protected site or landscape in the application area you must state this in the site-specific template and site overview tab in the technical supplementary spreadsheet.

In your application, you must give evaluators details of the measures necessary to avoid or minimise any impacts to designated features. Using the site-specific templates, you must give enough detail for NE to make a protected sites authorisation determination for

each of your year 1 sites. If you do not, NE will not be able to award your grant due to the possible impacts on protected sites.

You should provide as much detail as you can for year 2 sites in your application. However further information can be provided to the NCPGS team during the grant period. Assume that evaluators know nothing of any existing protected sites or species.

To reduce the clarifications required to obtain permission, you should get NE Area Team and NCPGS input to restoration proposals before you apply.

For applications affecting sites of special scientific interest (SSSI), you must not start works until you and NE complete the following steps.

1. You receive and accept a grant offer through Atamis.
2. You receive approval for your restoration plans by the NCPGS Restoration and Historic Environment Specialists.
3. You receive the Notice of Proposal template from the NCPGS team.
4. You complete your Notice of Proposal form and email it to peatlandscheme@naturalengland.org.uk.
5. NE receive the completed Notice of Proposal.
6. Natural England determine the Notice and issue SSSI Consent, Assent or Advice, if appropriate.

The Atamis application will not constitute a Notice of Proposal, and the grant offer will not act as SSSI Consent, Assent or Advice. You must submit these once your restoration plan has been signed off by the NCPGS team.

If the site and work already have a protected sites authorisation, or a Notice has already been provided to NE, please state this in your Q2 answer and attach as supporting evidence.

If statutorily protected species are known to be present in the application area and may be affected by the restoration works, you must show how you will avoid or mitigate impacts on them to comply with national legislation.

You can find more guidance in **Annex 4 – Protected sites and protected species**.

You should also consider any opportunities to improve biodiversity to maximise the score for non-carbon benefits. See 6: Environmental benefits – non carbon

Access and recreation

Peatlands are important for public access and recreation. If your area of works includes Public Rights of Way (PRoW), you must contact your local access authority. They can advise you of any temporary closures needed while works take place.

Many areas of peatland are also designated open access land. If you may need to restrict access to this land while works are underway, then you must contact the open access contact centre at openaccess@naturalengland.org.uk.

If your project includes fencing or other works which might impede access to common land, this will need a section 38 approval. You can find more information in the Carrying out works on common land guidance on GOV.UK.
Restoration planning must consider and avoid risks to PRoW or open access land. You should include this in your Q2 response in the 'Access designations and other permissions' section of the site-specific template.

If permission is already in place for the site and work, or you have had pre-application discussions with local councils about access, please state this in your Q2 answer. You can upload copies of any correspondence as part of your supporting information.

You should also consider any opportunities for improving access and recreation to maximise scoring for non-carbon benefits. See 6: Environmental benefits – non carbon.

Historic environment

Peatlands can contain valuable historic environment features. Not all important historic features are designated. You will need to:

- consult with historic environment experts
- show how your restoration plans fully consider the historic environment
- integrate these concerns into your application

If you have designated or known undesignated historic features in the application area you must state this in your site-specific template and include details in your mapping.

You will complete the Historic Environment Assessment (HEA) process to get this information. You must give details of the measures necessary to avoid, minimise or mitigate any impacts to historic features. You must do this for your year 1 sites. You should give full details in the site-specific template and include any HEA surveys as attachments.

You should provide as much detail as you can for year 2 sites in your application, however further information can be provided to the NCPGS team during the grant period. See Activities in year 2 onwards.

You should also consider any opportunities to improve historic features to maximise the score for non-carbon benefits. See 6: Environmental benefits – non carbon.

You must give evaluators enough detail to show that you will be able to apply for any historic environment permissions and consents. Assume that evaluators know nothing of any existing historic features on site.

If Scheduled Monument or Listed Building Consent is already in place for the site and work, or you have had pre-application discussions with historic environment consenting bodies, (for example, Historic England have commented on your methodology), please state this in your Q2 answer. You can include copies of any correspondence as part of your HEA, or in the supporting information section of your response.

You can find more guidance about HEAs in **Annex 5 – Guidance on Historic Environment Assessments (HEAs) for peatland restoration**.

Environmental monitoring

Monitoring will show how projects deliver against their objectives. It will also show the impact of restoration activities on peatland condition.

Monitoring should focus on hydrology and biodiversity. These factors are key to help peatlands accumulate peat, act as carbon sinks, and regulate the climate.

As peatland restoration is long-term, NCPGS monitoring will look at restoration trajectories. The approach will consider changes expected during projects, and later long-term changes.

Monitoring will show you if you need to adapt your approach during the project. For example, where responses to restoration are not as expected or take longer.
Using standardised monitoring across NCPGS projects will help build a picture of England's peatlands. For example, their location, extent, condition changes and restoration actions. The data will help NE evaluate the impact of restoration on peatland condition. This will contribute to targets such as Net Zero and give insight on what works and what needs improvement. Data submitted to NE will be made available according to the grant terms and conditions. This may include sharing scheme data externally.

You must provide a monitoring plan as part of your Q2 response. You can find more information in **Annex 3 – Environmental monitoring**.

Project work plan

Your project work plan should include a timetable showing:

- project milestones
- project management tasks: meetings, progress reports, claim submission, recruitment
- restoration tasks: planning, procurement, works on the ground, management
- monitoring tasks: installation, surveys, data submission
- access and engagement activities
- training

You must complete the project milestones table in the answer template using realistic and appropriate milestones. These milestones will be the deliverables that your project

achieves. You will need to report progress against these milestones quarterly. More detailed and frequent milestones will allow more accurate and reliable reporting.

Examples of project milestones expected include:

- project inception meeting
- monthly project meetings with the NCPGS team
- delivery of restoration works, with separate milestones for each site
- legacy plan submission
- submission of details for year 2 sites
- submission of quarterly and annual reports
- submission of monitoring data

You should only upload additional supporting documents where the information is not included in the template, for example Historic Environment Assessments. You should not upload supporting documents which repeat answers, for example separate restoration plans where the detail should be in the site-specific template.

3: Legacy of investment

Evaluation criteria

You must outline plans for management of the sites in the project, beyond the period that it will cover. This will show your understanding of the entire restoration journey. You need to demonstrate how you will:

- maintain the positive environmental outcomes obtained through the NCPGS
- negotiate a retention period for the physical infrastructure introduced to sites

The retention period must be at least the duration of the grant agreement. You must make this clear to landowners if they are not the applicant.

You need to include evidence that you will maintain the works carried out through the NCPGS and continue appropriate site management. This will help meet the long-term aims you describe in Q1.

Your response must use the Q3 section of the technical template and not exceed a maximum of two sides of A4, font size 12. Supporting attachments should be uploaded with the filename ‘XXX_Your company name_Q3_name of attachment’.

Additional guidance

You should indicate the status of actions proposed and provide appropriate supporting evidence. You should describe what is needed to maintain ongoing management and achieve long-term aims, including:

- tenure of sites, such as conservation covenants, site ownership, or long-term tenancy
- funding and mechanisms, such as registration and sale of carbon credits, private finance and environmental land management schemes
- works needed beyond the NCPGS
- co-ordination, such as a long-term management plan or organisation or partnership strategy
- monitoring to demonstrate progress and achievement of aims

You should include production of a legacy plan as a project milestone.

On SSSIs, land managers will receive consent to carry out rewetting works, but not to install drainage to undo those benefits.

4: Experience and ability to deliver

Evaluation criteria

You must show that your project has the expertise, resource and policies necessary to deliver the project as proposed. This must consider the:

- project team employed through the grant
- contractors to be used, or how they will be selected
- surveyors carrying out monitoring
- policy for demonstrating value for money

You need to give details of the project team including:

- team structure
- all associated partners and sub-contractors
- the roles and responsibilities of main personnel

You must include information on:

- contingency plans
- appropriate polices, including but not limited to sustainability, health, safety and welfare, biosecurity, procurement

Your response must use the Q4 section of the technical template and not exceed a maximum of four sides of A4, font size 12. Supporting attachments should be uploaded with the filename ‘XXX_Your company name_Q4_name of attachment’.

Additional guidance

You should look for value for money, but make sure personnel have appropriate expertise. You should give evidence of expertise and how it is relevant. For key personnel, you may give CVs, each up to two pages long.

You should give evidence of previous experience of successfully delivering similar peatland restoration projects. Include details of all aspects of project delivery, including monitoring, reporting, project management and restoration works.

You must show how you will make sure contractors follow best practice, including using the relevant specialist machinery. If you know who will do the work, you must give evidence of their qualifications or skills, experience and any relevant professional memberships. If you do not know, you must show how you will assess contractor's skills, experience, and machinery at the tender stage. Annex 1 provides further information on the relevant skills and machinery required.

You can use any standard tendering and contractor arrangements. You must show that they deliver the outcomes, meet the terms and conditions and provide value for money. Single tenders are possible where there is only one supplier with the expertise or equipment to complete the task. Successful applicants will need to give evidence to confirm this before using sole suppliers.

You should provide contingency plans for potential disruptions to the project. For example, delays due to poor weather, unexpected archaeological discoveries, or contractor or equipment availability. You should make sure you can still claim funding as agreed and deliver the agreed total area of restoration works by the end of the project. You may identify alternative works or areas to restore. Before work can begin on these areas, you must fulfil all scheme criteria and have your plans approved by the NCPGS team, see Amendments.

You should describe how you will ensure that this project is delivered alongside existing commitments, for example if you already have a live NCPGS restoration grant or live agri-environment agreements.

Job creation

You should show how the project will create and retain jobs. Include any jobs that the project funds directly, including people employed by all partner organisations. Give the total number of jobs and the full time equivalent (FTE) that the project funds directly. Include any:

- direct jobs retained **–** existing staff whose salaries are paid wholly or partly by the project budget, including through Full Cost Recovery
- direct jobs created **–** new staff employed by this grant
- new paid apprenticeships and job placements

We will not assess this information as part of your application but will use it for scheme reporting.

5: Environmental benefits – carbon

Evaluation criteria

This is a pass/fail question. You must complete the Q5 template (Excel spreadsheet) for your response. You must complete this to show the potential GHG abatement your project will deliver over 50 years.

Your Q5 template will be assessed for technical validity and scored in the commercial envelope.

Additional guidance

Improving peatland condition reduces GHG emissions. You can use changes in areas of peatland condition categories to estimate how much GHG a project saves. You can find out more about condition categories in **Annex 3 – Environmental monitoring**.

You need to complete a separate site tab for each site in the project. There are 20 tabs in the spreadsheet and you cannot add extra tabs. If your project has more than 20 sites please contact the NCPGS Team through Atamis. There is an example tab in the spreadsheet.

On each site tab you should provide the:

- site name
- timing of restoration works
- peat depth
- total site area that the project will restore, in hectares

This information should match any site details in earlier parts of the application form. The site area is the area where peat condition is expected to change due to the restoration activities undertaken.

In the second part of each site tab, you must complete a table with the condition and extent of peat. Enter the area of peat in each condition category for each 5 year interval in the table. As changes on the ground are uncertain, you will need to estimate when areas will move from one condition category to another. This may or may not be in the lifetime of the NCPGS funding.

The peat area for each time interval in the table should match the total area to be restored at the site. You can check this in the final row of the table, which will turn red if the values do not match.

The spreadsheet will calculate the total carbon savings from the project by 2050 and over the next 50 years. You can find this on the introduction tab.

These calculations of GHG abatement will be based on the latest GHG emission factors used by the Department for Business, Energy & Industrial Strategy to report on annual estimates of UK GHG emissions.

6: Environmental benefits – non carbon

Evaluation criteria

The main aim of the NCPGS is climate regulation, but projects may have other benefits. You must describe how your project will deliver wider environmental benefits, including:

- flood mitigation
- drought resilience
- water quality and supply
- biodiversity
- access and recreation
- volunteers and community
- historic environment

You should optimise how you restore peatland to deliver wider benefits at the same time. These wider benefits may differ if you are in an upland or lowland context. You should not try to deliver wider benefits separately. You may include benefits linked to your project which are not listed.

You should give project or site-specific information on how you will deliver benefits. These must go beyond the mandatory requirements of the grant scheme. Do not give generic descriptions of the wider benefits of peat restoration.

You should give evidence that you can realistically achieve the wider benefits through the restoration activities. Include any timescales you have planned.

Restoration can also increase risks, such as localised flooding. You need to minimise these risks with appropriate management.

Your response must use the Q6 section of the technical template and not exceed a maximum of three sides of A4, font size 12. Please do not provide attachments or links to other documents in your response for this question as these will not be considered.

Additional guidance

Flood mitigation

How is your restoration designed to optimise natural flood management benefits whilst minimising flood risks?

Some degraded peatlands show higher downstream peak flows. This may increase the flood risk of communities with peatland headwaters. Peatland restoration may be designed to reduce this flood risk through overland flow attenuation ('slow the flow') and surface storage.
Eroded bare peat surfaces may accelerate the surface flow of water down hillslopes. Restoration techniques which increase surface roughness can help to dissipate and slow the surface flow of water. This may include revegetation, particularly with vegetation shown to reduce flow velocity, such as Sphagnum species. Blocking ditches also has potential to slow runoff through flow channels. The design of dams, such as altering their permeability, can impact the flow of water.

Rewetting peatlands raises the water table to near the surface, which may limit additional soil water storage during rainfall events. Naturally occurring hollows and pools in semi-natural peatland systems provide small-scale surface water storage. Incorporating these features in your restoration designs may help to reduce peak discharge, though the impacts are likely to be minimal in storm events.

Raising water levels and creating saturated soil conditions may result in a localised increased flood risk to people and property. Restoration plans need to consider the potential risks where overland flow from high rainfall events may occur across a saturated surface. You need to consider these risks alongside potential flood mitigation benefits.

If your project may deliver flood mitigation, you need to describe:

- the current surface conditions, such as impoverished microtopography or depleted acrotelm
- how the design of your restoration will impact on existing, new and potentially re-instated flow pathways
- the potential risks, such as increasing runoff, synchronising flow from multiple sub-catchments or different flow pathways affecting local infrastructure
- how potential risks are mitigated
- area of peatland restoration which will occur within a catchment upstream of a community at risk of flooding – in hectares and as percentages of the total peatland area upstream and total catchment area upstream

You may find the following information helpful:

- Protect NFM project publications

- Peatland Catchments and Natural Flood Management: Report to the IUCN UK Peatland Programme
- Mires on the Moors project
- Impacts of upland open drains upon runoff generation: a numerical assessment of catchment-scale impacts (Lane and Milledge, 2012)

Drought resilience

How is your restoration project designed to deliver drought resilience?

Optimising drought resilience outcomes within programmes of peatland restoration can benefit the ecology and water supply of catchments. Increased droughts through climate change risk vegetation suited to drier conditions dominating over peat-forming vegetation due to higher evaporation.

Restoring the hydrological function of peatlands needs to go beyond raising water levels and re-establish peat-forming vegetation. This will help hold water in the surface layers of the peat (the acrotelm) during drought conditions and reduce water table fluctuations. Flushes of organic matter, which often occur during rainfall events that follow drought conditions, may also reduce.

Your response should consider:

- the current surface conditions and vegetation present
- how the design of your restoration will help to hold water
- the potential risks and how you will mitigate these

Water quality

How is your restoration project designed to deliver improvements in water quality?

Peatland restoration can improve water quality for drinking water and the ecohydrology of aquatic systems.

Degraded peatlands can significantly impact the quality of drinking water supplies through the fluvial losses of carbon from drained oxidised peat. Carbon losses can result in the brown colour of peaty water, which needs additional processing in water treatment.

Degraded peatlands can also impact the water quality and ecology in waterbodies they drain into. This may be through sedimentation, for example, or increased acid flushes and associated changes to acidity.

Your response should describe:

- local impacts on water quality from peat degradation – for example, water bodies failing due to poor water quality leaving your site
- how your restoration techniques are designed to improve the quality of water leaving sites and the catchment
- how your restoration techniques fit into a catchment or wider scale approach to improve water quality – for example, as part of a Catchment Partnership action plan
- the impact of improving water quality for partners or key stakeholders, such as water companies
- the area of restoration activities occurring on peat in a catchment which drains to a public water supply, and whether the area is in a drinking water protected area for colour –- data available from the Catchment Based Approach Data Hub

Biodiversity

How will your restoration plans deliver biodiversity benefits at the landscape scale?

Peatlands are home to species that are adapted to waterlogged, acidic, nutrient-poor conditions. Many peatland species are rare, threatened or declining. Peatland degradation threatens their survival.

Restoration brings back the conditions that peatland species need, but they may not recolonise naturally. You may need to do additional activities to reintroduce them.

You should describe how far your project will contribute to biodiversity and the aims of the 25 Year Environment Plan and Nature Recovery Network. You should include evidence on how your project will benefit biodiversity and help achieve the following three objectives.

1. Creating or restoring 500,000 ha of wildlife rich habitat outside the protected site network, focusing on priority habitats.
2. Restore 75% of protected sites on land and freshwaters to favourable condition so nature can thrive.
3. Recover threatened and iconic animal and plant species by providing more diverse and better-connected habitats.

You should show how:

- you will deliver biodiversity benefits on a landscape scale which you could not achieve on individual sites – for example within Local Nature Recovery Strategies
- restoration will tackle condition threats, remedies and benefits to designated features
- biodiversity benefits are relevant to the peatland type and site context

You can find protected sites information on NE's Designated Sites System. You can find Conservation Objectives for European Sites on NE's access to evidence website.

You must include the area of peatland you will restore or create:

- outside of a Site of Special Scientific Interest (SSSI)
- in the priority habitat inventory
- in each of the national habitat network zones

You can use NE's open data to find these, including:

- SSSI (England)
- Priority Habitat Inventory (North) (England)
- Priority Habitat Inventory (South) (England)
- Priority Habitat Inventory (Central) (England)
- Habitat Networks (Individual Habitats) (England)
- Habitat Networks (Combined Habitats) (England)

You can find these on NE's MAGIC map, following these pathways:

- Land-based designations – Statutory - Sites of special scientific interest (England)
- Habitats and species – Habitats – Wetlands for priority habitat inventory
- Habitats and species – Habitats – Other - National habitat network all habitats combined (England)

Access and recreation

Healthy peatlands can help people feel more connected with their natural environment, which benefits wellbeing. Peatland degradation can reduce this connection between people and the environment. Restoration projects should help to reconnect people with the increased value of restored peatlands.

Answer the question: **How will your project enable people to enjoy the benefits of your peatland restoration project?**

This should focus on how you are enabling people to enjoy the benefits of restoration, rather than direct engagement which is in the section below. You must also show how you will minimise any risks related to access and recreation, including footpath accessibility, public rights of way or open access land. For example, you could:

- install boardwalks to reduce impacts of disturbance on peatland vegetation, while increasing access to a site
- manage bird watching opportunities to minimise disturbance to protected species
- introduce permissive access

You may find the following useful for your response:
- Green Infrastructure Map
- Enabling a Natural Capital Approach – Services and Assets Databook

Volunteers and local community

Answer the question: **How will your project engage with people, including volunteers and the local community?**

This should focus on active ways you are directly engaging with people about restoration. You should give us an estimate of how many people you think will engage with the project and anything you plan to do to contact hard to reach groups.
Examples of engagement include:

- volunteers carrying out restoration works
- citizen science, like Eyes on the Bog monitoring
- community engagement to help mitigate fire risks or explain a site's history
- education, through school or university visits
- provision of physical or digital interpretation
- evidence and research, such as long-term monitoring or university collaborations

You may find the Heritage Fund volunteering guidance useful for your response.

Historic environment

How will your project have a positive impact on historic environment features?

Peatlands often include above and below-ground archaeological features, historic built structures and artefact scatters. These may be on, under or within the peat. Peat itself also contains records of past environments **–** in pollen, plant remains and other paleoenvironmental evidence.

Your restoration plans should avoid negative impact (damage) to historic features and minimise damage where this is not possible. Mitigation is a last resort. You must give evidence about this in your Historic Environment Assessment (HEA) and your response to Q2. This is not considered a wider benefit because it is a requirement of the grant scheme (see **Annex 5 – Guidance on Historic Environment Assessments**).

If your project **goes beyond the requirements of the HEA** and has a positive impact on historic environment features, this is considered a wider benefit. You may adapt your restoration techniques to benefit historic environment features and address their vulnerabilities. Some examples of positive impacts and adaptations follow.

- You could **stop or repair erosion to preserve known historic features**. This helps address heritage at risk with a principal vulnerability of visitor erosion, livestock erosion or natural erosion. To repair erosion on historic features, avoid ground disturbance from reprofiling. You should use geotextile barriers between the feature and any repair and move soil by hand or small machinery.

- You could **restore water tables on below-ground waterlogged historic features**. This helps address heritage at risk with a principal vulnerability of dewatering. Choose an appropriate water table on waterlogged archaeology. Sometimes this is higher than the peatland habitat needs. For previously waterlogged archaeology that is now dry seek specialist advice from an Historic England science adviser. Historic features may need more intensive monitoring during rewetting. You can find more information here.

- You could **remove woody or deep-rooted vegetation from known historic features to avoid root damage**. This helps address heritage at risk with a principal vulnerability of tree or plant growth. Fell plantation trees or remove scrub without removing stumps. You may need to use smaller machinery or hand cutting.

- You could **record exposed finds to safeguard information about the past**. Record the location of archaeological artefacts eroding from the peat and report to the local Historic Environment Record (HER). Removing archaeology is a specialist job and you should seek further advice in the event of any finds.

- You could **use peat cores to explain long-term environmental change** and the effects of changes in management practices.

- You could **use peat cores to analyse past environments,** showing the previous habitats and species at a site that might be suitable to reintroduce.

The historic environment can contribute to other wider benefits, such as engagement with volunteers and the local community.

You must seek bespoke advice from Historic England or the relevant authority if proposing work on designated features.

For spatial data on designated historic features visit Historic England's Downloading Listing Data page. You can find out more about designated historic features at the National Heritage List for England. The Historic England Heritage At Risk Register can tell you if a designated historic feature is known to be at risk and why.

Commercial questionnaire

NE will assess the commercial questionnaire separately to the technical questionnaire. You must provide your response using the commercial template spreadsheet provided.

You can find guidance below on the commercial questions in the 2023 Restoration Grant application.

1: Cost-effectiveness (value for money)

NE will assess the value for money for your project based on:

$$\frac{\text{total grant requested from the NCPGS}}{\text{total value of carbon dioxide equivalent secured by 2050, from Q5}}$$

The ITA will give further details and include a spreadsheet template. You must complete the tabs, including:

- site specific costs
- wider project costs
- additional funding

You can include supporting documents as attachments – for example, procurement policies and call-off frameworks.

You need to base costs for year 1 on detailed plans and work programmes. You can use estimated costs for later years if you do not yet have detailed information.

You need to give costs across financial quarters 1 to 4 for the first year, and at least the annual total for following years. If you know the quarterly details for later years, you should include this. If your application is successful, these figures will inform your claim profile. Your costs must enable you to achieve your project milestones set out in Q2.

Site costs tabs

You must use one site tab per site. You must enter the costs for each activity on the site. In the description field you should include:

- quantity of items, for example 10,000 plug plants
- cost per item

The spreadsheet will automatically calculate total costs entered and add a total figure against each activity on the summary tab.

Do not include any costs in these tabs that are not site specific.

Wider project costs tab

You must enter any costs that are not site specific into the wider project costs tab – for example, staff costs for overall project management.

At the bottom of the wider project costs tab you need to add the total carbon secured figure by 2050 from the carbon calculator in Q5. This will produce a figure for the grant you request per tonne of carbon secured.

You need to include the following staff costs:

- salaries, including annual salary, National Insurance and Pension contribution
- FTE amount and the number of days per year on the project
- overheads including office costs, travel and subsistence
- training
- equipment

You need to include the costs of materials and equipment for site works in site-specific costs.

Additional funding tab

You must itemise all match funding on this tab. You can add lines to show contributions from each source. You must split amounts into cash and in-kind contributions for each funder, with a line for each.

A contribution will count as match funding if it relates to an eligible project cost. If an activity is not eligible it will be excluded from project costs. If that activity was a source of match funding it will also be removed from the match funding contribution.

You are expected to have secured, or have firm plans to secure additional funding over the whole NCPGS project and to grow the capacity of private finance markets.

Examples of match funding are:

- local authority funding
- National Lottery Heritage Fund
- Landfill Communities Fund
- authority staff time funded by a non-exchequer income stream

You must show evidence of non-exchequer income streams for Authority staff in your application.

Match funding does not include:

- staff time funded by Defra
- funding from an existing obligation
- LIFE funding

You must use the following rates to calculate the value of volunteer time:

- professional volunteer, such as accountancy or teaching: £50 per hour
- skilled volunteer, such as leading a guided walk: £20 per hour
- volunteer, such as administrative work: £10 per hour

You must not include people who take part in engagement activities, such as a guided tour.

If you do not have match funding in place yet, you must include enough detail on anticipated timescales for NE to assess the credibility of plans. Some private finance schemes need to verify the baseline condition of a site before restoration works can start.

Summary tab

You do not need to populate the summary tab. It will populate automatically using the data you provide in the other tabs.

The summary tab includes:

- total project costs
- total grant requested and intervention rate
- cost per tonne of carbon dioxide equivalent

2: Carbon finance

Peatland restoration projects are an opportunity to secure carbon finance through schemes such as the Peatland Code.

The commercial score will receive a 5% uplift for applications that include land:

- eligible for the Peatland Code or equivalent scheme
- you registered with the code before you submitted the NCPGS application

If any eligible land in the application is not already registered, the uplift will be withheld.

To receive the uplift for land where you are not the landowner or tenant, you need to negotiate management agreements before you apply to NCPGS.

Application decisions

Once the application window has closed, eligibility and commercial assessments will be carried out by Defra Group Commercial and technical assessments will be carried out by NE. This is likely to take approximately two months.

If the NCPGS team need any clarifications about your application, they will contact you through Atamis. You should ensure the email address that you have used to apply for NCPGS is monitored during this period as rapid responses may be required.

Successful applications

If your application is successful, NE will notify you in writing and send you a grant offer letter.

The grant offer letter will include:

- any special conditions
- timescales to get consents or permissions
- terms and conditions

You will need to sign and return the offer letter by the date given. You must not start the project until you have signed and completed all documents in the grant offer letter and fulfilled any special conditions.

Unsuccessful applications

If your application is unsuccessful, NE will notify you in writing through Atamis. You will have the opportunity to seek further feedback.

Successful grant projects

Successful applicants will receive further information about:

- payments and the claims process
- monitoring, including monitoring templates
- reporting, including reporting templates
- project amendments, including amendment proposal templates

Payments

NE will make grant payments in arrears for eligible expenditure against agreed milestones. Claims will be subject to standard checks to confirm eligibility, that claimed activities match against project milestones, and that suitable evidence has been provided. If the entire claim meets these requirements, sign-off checks will be completed, and the claim paid in full. If initial standard checks are met for at least 75% of the value of the claim but some queries remain, an interim payment of 75% will be made, with the remaining 25% paid after the queries have been resolved.

You can submit claims monthly and must be at least quarterly. Additional guidance on grant claims will be provided if your application is successful. You will need to submit total costs and give evidence for grant claims. Some examples follow.

Evidence of restoration work or re-establishment of peat habitat might include:

- specification of works, including location and type of works
- Invitation to Tender for letting works contract, including specification
- quotes with breakdown of costs and timings
- consultant or expert advice on methods to use
- wildfire management plan
- photographic evidence of works underway or complete, with geo-tag and accompanying map
- specialist reports covering mitigation works
- NE site inspection
- receipted invoices

Evidence of scoping work might include:

- copy of consent or permission from relevant authority
- protected species survey reports and agreed mitigation
- Amended agri-environment agreement, including written RPA approval for amendments
- biosecurity form
- Historic environment survey reports HEA

Evidence of monitoring might include:

- specification or Invitation to Tender for contracting out monitoring or planning monitoring surveys
- quotes for equipment or surveyor costs
- baseline data submission, signed off by NCPGS Monitoring and Evaluation Senior Adviser
- annual data submissions, signed off by NCPGS Monitoring and Evaluation Senior Adviser
- receipted invoices

Evidence of a legacy plan might include:

- legacy plan document signed off by NCPGS team
- physical infrastructure retention – written landowner agreement
- withdrawal of incompatible consents or permissions
- management plan including how you will maintain positive environmental outcomes – agreed with partners such as water companies, NE or Environment Agency
- conservation covenant
- designations monitoring process
- new CS agreement, or environmental land management scheme tests and trials or pilots

- robust additional finance plans
- long term community engagement, such as volunteer groups

Evidence of additional finance might include:

- Peatland Code – copy of registration or documents for verification, such as plans or stakeholder meeting minutes
- bid preparation for other grant schemes or funds
- donor letters or written confirmation of other grants or funds, including dates and work specification
- specification or Invitation to Tender documents for development of private finance

Evidence of project administration might include:

- quarterly reporting using NCPGS template
- annual reporting using NCPGS template
- final reporting using NCPGS template
- land searches, such as to find out and map ownership
- certified staff and volunteer timesheets, broken down by task or milestone
- travel and subsistence claims and receipts
- job adverts or recruitment plan for new posts

Evidence of community engagement might include:

- engagement plan, including dates, types of activities, audience
- summary of activities or meeting minutes containing number or list of attendees, photos, evaluation or feedback from attendees
- receipted invoices, such as for venue hire
- access assessment, such as if you need to temporarily restrict access
- citizen science, including resources developed, evidence of data submission

Evidence of training might include:

- skills gaps identified or analysis showing training needs
- courses identified and booking confirmation
- attendance confirmation or training record
- receipted invoices
- training provided, such as a course advert or attendee feedback

Evidence of partnership development might include:

- specification or Invitation to Tender for contracted roles, such as a facilitator role
- project management, such as identification of stakeholders
- meeting minutes or list of attendees or participation rates

- terms of reference
- legal agreement between partners
- governance structure, such as a Memorandum of Understanding, or list of steering group members
- responsibility matrix to map responsibilities of partners

Reporting

Your Grant Funding Agreement will show the dates that reports are required. You will receive templates for each report you need to submit.

You will need to give quarterly updates on progress, including:

- the area under restoration
- progress made towards project milestones
- any issues, such as weather delays
- any changes to the project

At the end of each financial year, you will need to submit an annual report, including:

- summary of project progress
- the number of jobs supported by your grant
- environmental monitoring data, as described in **Annex 3**
- receipted invoices and other evidence to confirm spend to date

By the end of the project, you will need to submit all monitoring data and a final report. The final report should:

- cover all restoration work done across the project
- evaluate how far the project achieved its original aim

Regular reporting will let NE make sure projects are on track to achieve their aims. In particular, the total area of peatland restored and carbon savings. NE may also:

- use information from project reports to evaluate the role of partnership working in restoration success
- survey grant project partners through interviews or online surveys

Amendments

You will be required to deliver against the milestones set out in your signed grant agreement. If you need to make changes to the activities you have agreed to deliver or the costs of your project, you must agree changes with the NCPGS team. In some cases,

agreement will be needed from the Peat Project Board, for example if additional funding is requested.

Additional guidance and a Project Amendment Proposal template will be provided to successful grant projects.

Activities in year 2 onwards

The detail of activities being carried out in year 2 of your Restoration Grant will require approval by the NCPGS team prior to being carried out.

Restoration plans, including a HEA, for year 2 sites must be submitted by the end of Q1 in 2024/25 (i.e. June 2024). Enough detail should be included that a protected sites determination can be carried out if necessary. Plans should be submitted to peatlandscheme@naturalengland.org.uk

Acknowledging funding

You must acknowledge Natural England's support in any publicity or materials that refer to the project. This includes any written or spoken public presentations you give about the project.

You should use:

- our name **–** Natural England
- our logo, where you have asked permission or where we request it
- our grant scheme name**–** Nature for Climate Peatland Grant Scheme

When using the Natural England name and logo you need to follow any branding guidelines we send you. We will provide updated templates from time to time.

Further information

You can find further information in the guidance annexes:

Annex 1 – Peatland restoration
Annex 2 – Biosecurity
Annex 3 – Environmental monitoring
Annex 4 – Protected sites & protected species
Annex 5 – Guidance on Historic Environment Assessments (HEAs) for peatland restoration

You can also find more information about the NCPGS on www.gov.uk/guidance/nature-for-climate-peatland-grant-scheme

Prior to the application window opening, any communications should be sent to the NCPGS mailbox: peatlandscheme@naturalengland.org.uk

Once the application window is open, all communications from applicants (including their consortium members, consultants and advisers) must be undertaken using Atamis. We will not respond to communications made by other means. You should not rely on communications from the Authority other than through Atamis.

Feedback

Please contact the team via the NCPGS mailbox with any feedback on this guidance: peatlandscheme@naturalengland.org.uk

References

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Annex 1. Peatland Restoration

Nature for Climate Peatland Grant Scheme

Guide for Applicants

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www.gov.uk/natural-england

Contents

Introduction

Peatland restoration is usually concerned with the restoration of hydrology and vegetation communities. Peatlands can be split into two groups according to the water source, creating different conditions and presenting different approaches to restoration.

Aim of this document

The purpose of this document is to provide an overview of current known best practice for the restoration of peatlands. It is not an exhaustive list of all techniques and other methodologies may be appropriate. You should:

- research the current best practice
- demonstrate you have a clear understanding of the work required
- justify the use of your proposed methodology

Use of methodologies not covered in this document must be supported by sufficient evidence of efficacy to achieve the desired outcome.

The restoration methodologies presented in this document are largely examples of those used on upland and lowland bogs. However, many synergies exist between bog and fen systems and methods described here may be adapted to suit fen conditions.

Ombrogenous mires (bogs)

Bogs are typically water shedding systems that receive their water from rainfall. Most activities that damage bogs cause direct or indirect changes to the hydrology. The restoration of the hydrological function within the peatland is the priority for the conservation of both the peatland and its associated habitat and species. Techniques have been developed over the years to include a range of different approaches according to the conditions and limitations of the site in question. The principal considerations for bog restoration are:

- restore hydrological continuity
- repair and prevent further erosion features
- stabilise and revegetate bare peat
- re-instate active peat formation

When designing a restoration plan, you must select the most appropriate method for the conditions on the site. The type and extent of negative features include:

- active drainage features (ditches/grips)
- erosion gullies
- peat haggs
- bare peat

- degraded peat surface impacting hydrological conductivity and surface water flow
- degraded vegetation communities

The specific conditions of the site will determine which restoration options are the most appropriate.

Minerogenous mires (fens)

Fens and transition mires are typically water receiving systems. They support a variety of habitats, including tall herb fen and discrete vegetated seepages. They receive water from several locations including rainfall, ground water, surface water and overland flow. They are also linked to the surrounding geology and can be heavily influenced by the surrounding land type and its use.

Degraded fens may include the following negative influences that will compromise their condition:

- eutrophication
- over/under grazing
- diffuse pollution
- point source pollution

Devising a restoration plan for a fen will be site-specific. You must understand the nature and extent of negative influences as well as the functional hydrological mechanisms of the site. You will not be able to restore your fen effectively without a clear understanding of all these factors.

To gain greater understanding of fens you may use the Wetlands Framework (Wheeler et al. 2009) approach. This ecohydrological framework defines habitats according to pH, fertility, and water supply mechanisms (WETMECs). The analysis of these relationships reveals how habitats and vegetation types are intrinsically linked to their surroundings and therefore can guide restoration opportunities.

Given the wide range of types of habitats and issues that can affect fens, it is beyond the scope of this guidance to discuss specific methodologies. However, restoration proposals should consider:

- connecting the fens to their wider landscape
- limiting damaging inputs
- retaining water within the system

Applicants undertaking fen restoration should demonstrate a detailed knowledge of proposed restoration sites as well as their hydrological regime.

Project preparation

You must establish baseline data from which to build an appropriate restoration proposal. You need to understand the depth, extent, and nature of the peat within the proposed restoration area to select the most appropriate restoration methodology. You must seek to address all the impacts that are causing the peatland to be degraded.

Peatland restoration can be a complex undertaking therefore you must demonstrate that you have the relevant skills and expertise to design and undertake a restoration project. You must also explain clearly how you will choose contractors that have the relevant proven expertise to undertake the proposed works in the project.

You must demonstrate an understanding of the hydrology of the proposed area as well as how it interconnects with neighbouring land. Wherever possible, your project should aim to restore whole peat bodies. If this is not possible, you must give full details of the constraints, and how these may impact upon the proposed methodology and projected outcome.

Your project should take account of the underlying drift geology, especially in lowland settings where bogs or fens may be adjacent to agricultural land or developments. When clay is the underlying drift, the impact may be negligible owing to its low conductivity. However, where it is sand or other permeable drift, the raising of water levels within the peat may cause water to rise through the sand, even when there are perimeter drains.

Proposals on SSSI must have consent or assent from Natural England (see **Annex 4**). Where proposals apply to SAC or SPA sites Natural England will carry out a Habitats Regulations Assessment (see Annex 4). **You must demonstrate that you have consulted with the Natural England Area Team prior to your application**. Furthermore, your proposal must include sufficient information to allow Natural England to carry out the necessary regulatory processes. You must justify why the methods proposed are necessary and how all possible damaging effects of the proposals have been minimised.

Creation of bog or fen

Bog and fen creation is a broad and varied subject and beyond the scope of this document. You must demonstrate that you have undertaken the necessary hydrological and peat depth surveys and can demonstrate that the conditions are suitable for establishing an appropriate bog or fen habitat.

Creation projects will only be eligible where:

- a land use change has occurred in the past resulting in the complete loss of bog or fen vegetation
- active drainage has been undertaken to facilitate its use for agriculture.

- the site is located within the context of a peatland landscape, preferably with an existing peatland habitat that would benefit from the creation of a new peatland

Your creation project should aim to re-create the former peat forming habitat(s) that would have occupied the land prior to land use change. Your application must present the creation methodology with sufficient evidence and baseline data to support that:

- the creation of a peat forming habitat is appropriate and possible on the land
- it is possible to secure the management of the water table to support the desired habitat

You must also demonstrate that appropriate management is in place to ensure the continued success of the habitat(s).

Restoration of hydrology

Water moves through intact peat very slowly. Artificial drainage and erosion features lower the water table which dries the peat and speeds up the transmission of water through the wetland. In bogs, this leads to changes in the vegetation away from *Sphagnum* dominance to woody or shrubby plants, which in turn, exacerbates further erosion of the peat (Figure 1).

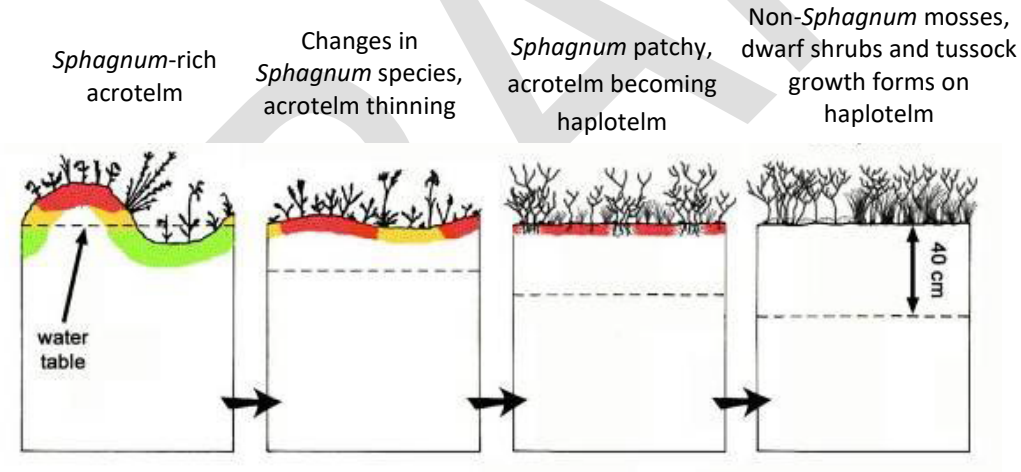

Figure 1 Changes in the surface and vegetation of an ombrotrophic bog with lowering of the water table (adapted from Lindsay (2014)

The foundation of all peatland restoration is to repair the hydrological function, through halting or slowing the loss of water from the wetland system. You can achieve this through the addition of structures both on and within the peat.

In addition to obvious visible erosion features such as grips, drains and gullies, peatlands (principally bogs) that have experienced lowered and fluctuating water levels for a prolonged period may also have damage to the upper layers of peat. The continual drying of this peat layer not only results in changes in the vegetation, but also the nature of the peat leading to increased compaction, shrinkage. The upper peat layers can also become hydrophobic.

This change in the properties of the peat can also create changes to the relative hydraulic conductivity of the damaged and hydrated layers of peat. This can lead to further erosion within the peat body and may be a contributing factor in the formation of peat pipes and gullies.

Where possible, when designing the restoration for a site you must address **all** the drainage and erosion features present. On bogs, you must investigate the possibility of sub-surface flow both vertically between peat layers and laterally across erosion and drainage features. A soil pit or inspection trench (Figure 2) can reveal the presence and extent of sub-surface damage to the peat. It may also reveal lateral water movement within the peat body or at the peat/mineral interface.

Figure 2 Soil pit showing water movement below the surface and a small peat pipe. Photo credit: Deborah Land

Failure to address sub-surface water movement will undermine the restoration and recovery of the bog. The site will continue to lose water, and this will prevent the re-establishment of the acrotelm. This can be seen on sites where ditch blocking has been carried out in the past, yet the vegetation is still dominated by heather or grasses and sedges many years later.

Bunding

You can address excess water movement through a damaged peat body using peat bunds. These structures are designed to hold water *in-situ and p*revent subsurface flow by slowing the water leaving the bog.

Most of the bund is constructed below the surface (trench bund) with only a low bund on the surface (surface bund). In some instances this may be absent. The construction of a subsurface 'wall' of intact saturated peat within the damaged layer slows the flow of the water movement to mirror that of the saturated layers below. When coupled with a small surface bund (<50cm including the turf) surface water movement is also reduced (Rook, 2016). It is important to note that surface bunds alone will not address damage within the damaged peat layer.

Figure 1 shows the change in vegetation that occurs with a lowered water table. This also impacts the structure of the peat leading to increased compaction. The combined effect of compaction, loss of surface structure and surface roughness increases overland flow. Small surface bunds can help reduce this but should always be coupled with additional remediation such as sub-surface bunding and restoration of target vegetation to increase the surface roughness.

Trench bunds typically extend to a depth of 0.5m to 1m deep (Rook, 2016) and are specially designed to re-wet degraded peatlands by sealing underground cracks or peat pipes. In some instances where the damage is extensive, deeper bunds may be necessary. Your inspection pit will reveal the degree of damage and the necessary depth required.

There are many different types and approaches to bunding depending on site conditions and the objectives of your restoration plan. Your choice of bund design may include:

- linear designs along a contour or perimeter
- discrete arc bunds
- cell bunds

There are many different terms for these designs, which can lead to confusion. Please refer to the glossary of terms on page 34. Your choice of bund design will be specific for the site conditions and depend upon the type of damage present.

Peat pipes

Natural peat pipes are subsurface cavities that are continuous in length that can transmit water, sediment, and solutes through the peat. According to Holden (2012), little is known about their hydrological role, but it is accepted that environmental changes to the peat such as drainage, compaction, and shrinkage may lead to changes in the streamflow and more prolonged drainage of the peat.

Where peat pipes are increasing the water loss of a peatland owing to peat degradation, it is necessary to remedy their impact. Regensburg *et.al*. (2021) showed that blocking peat pipes at their exit could lead to greater pipe formation upstream. Therefore it is important to carry out works to improve the water retention further into the bog expanse. This can be achieved using trench bunding techniques.

Bund construction

You must only create peat bunds where there is sufficient material available. You must construct the bunds from saturated, unoxidized peat if they are to be effective. Where practically possible, you should obtain the peat for the bund construction from within the proposed bund line. This can help to reduce the use of borrow pits. See page 11 for more guidance on borrow pits.

Bund creation must start by removing the turf and root mass and set aside for later use. The peat within the bund line must be turned and compacted to form a seal. You may need to top up the bund with saturated, unoxidized peat from a borrow pit before the original turf is replaced. The construction of bunds on peatlands will require the use of heavy machinery and excavators. See page 31 for further guidance on access and machinery.

Linear bunding

The design of a bund will depend on the individual site conditions.

Linear bunds can be useful to slow the flow through a peatland. For example, they can be sited the top and bottom of a reprofiled edge on a lowland raised bog or in discreet areas of a damaged blanket bog.

Figure 3 Linear bunds with fingers on the edge of Cors Caron NNR lowland raised bog. Photo credit: Jake White

Linear bunds should incorporate occasional short spurs or 'fingers', positioned perpendicular to the main bund. This will ensure that the water doesn't sit at the lowest point of the bund. In some cases, where the terrain is varied, a fish scale design may be appropriate. This has the added advantage of being able to slow the flow from multiple directions

Contour bunding

Contour bunding is useful on large expanses of damaged bog. It should be used on areas of gentle gradient and where the peat is largely intact, but the target vegetation is not present. The bunds can aid the re-establishment of the active acrotelm on the crown of the bog and at subsequent intervals across the slope.

Figure 4 Cors Caron low contour bunds. Photo credit: Natural Resources Wales

Arc bunding

The use of discrete arcs, or horseshoe bunds, can be effective in heavily degraded blanket bog to slow the movement of water above drainage features such as large erosion gullies.

Figure 5 Top: Newly created arc bund on degraded blanket peat constructed above a large erosion gully to slow the movement of water through the peat. Photo credit: Deborah Land.

Cell bunding

Cell bunding is used to restore the water holding capability of wet modified peatlands on a shallow gradient. This technique has been extensively used in the lowlands across degraded bog expanse and where there is extensive damage to the bog edge.

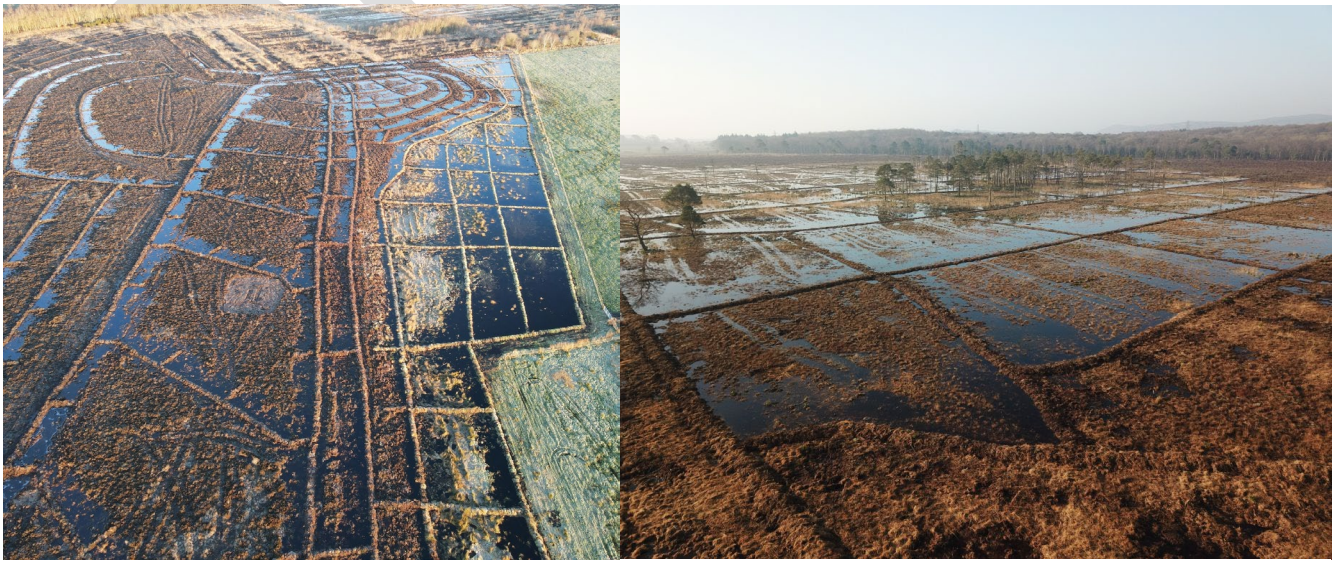

Figure 6 Left: Cell bunding at Wedholme Flow NNR. Right: Roundsea woods & Mosses NNR. Photo credit: Conservfor

When creating cell bunds, size and bund height is an important consideration. Large bodies of open deep water are not conducive to *Sphagnum* re-colonisation (Wheeler & Shaw, 1995) and can attract wild fowl and gulls, leading to localised eutrophication.

Cell size is dependent on slope. On flat or gentle gradients, cells should not exceed 30m by 30m, while on sloping ground, or areas of degraded bog edge, cells size will decrease accordingly (see Figure 6). Surface bund height must not exceed 50cm (including the turf). This is to prevent the creation of deep water bodies. The water surface within cells should be broken up by emergent vegetation or brash. This creates structure amongst which, sphagnum and other target vegetation can establish. When constructed well, there should be no need to incorporate water control mechanisms within bunds. These can be problematic by creating erosion pathways in the bunds, so should only be used where necessary.

Ditch and gully blocking

The construction of a dam in a damaged bog will not only slow the movement of water but will also raise the water levels back to the surface, thus preventing further degradation of the peat and facilitating the recovery of the vegetation.

There are several different approaches to blocking ditches and gullies using the following materials:

- peat
- timber
- plastic piling
- stone

You must consider which is the most appropriate remedy for your site.

Peat dams

Peat dams (Figure 7) are often the preferred technique used for blocking drainage features on bogs. They are most effective where there is sufficient depth of saturated un-oxidised peat within the erosion feature into which a dam can be keyed in. When constructed correctly, they share similar hydraulic properties as the surrounding bog, making them less prone to scouring and erosion.

Figure 7 Peat dams on Dove Stones. Photo credit: Deborah Land

The frequency of dams will be dependent upon the slope of the restoration site. Generally, the frequency should be less on flat terrain and increasing with slope. The spacing should follow the 'top-to-toe principle', so that the base of an upstream dam is at least level with the top of the downstream dam (Figure 8).

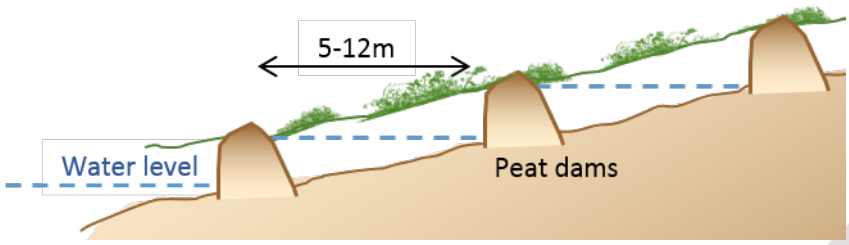

Figure 8 Dams showing top to toe spacing

Drainage features (ditches, drains, grips and gullies) depress the water table and lead to the oxidation of the peat around the drainage feature. This oxidised peat does not have the same properties as the saturated peat and becomes hydrophobic i.e. it will not absorb water. It is therefore not suitable to use this material to make dams as it will not form an effective seal with surrounded saturated peat. You must ensure that peat dams are made of saturated un-oxidised peat, **not** sloppy or oxidised peat.

You must key the dam into the surrounding peat by removing the degraded peat from the sides and base of the drainage feature so that the peat dam can connect with the saturated peat of the bog. This step is crucial to reduce the chance of dam failure. You can dispose of arisings within the drainage feature.

Figure 9 Grips before, during and summer after restoration activity at Innishewen Ford. Photo Credit: Peatland ACTION

The thickness of your dams will be site-specific, increasing in thickness with the width and expected water pressure of the drainage feature. The finished height of your dams should be slightly above the top of the drainage feature and keyed into adjacent saturated peat beyond its side to allow a diffused flow of water. This will reduce the risk of the dams being damaged or undermined by high flows.

You must revegetate any areas of bare peat on the dam and sides of the drainage feature with suitable bog vegetation to prevent erosion. You can achieve this through stretching turves from the borrow pit or other suitable method as described in this document.

Where there is sufficient depth of peat, you can take donor peat from the base or sides of the drainage feature upstream of the dam location. However, peat in these locations may be shallow, disturbed or degraded and therefore may not be suitable for making dams. If using peat from the undisturbed peat mass adjacent to the drainage feature by digging a borrow pit, you must justify this in your method statement.

Borrow pits

You must locate borrow-pits on a sufficient depth of peat to prevent exposure of the underlying mineral ground when extracting the peat for dam construction.

Figure 10 Restoration at Blackpitts, Exmoor. Photo Credit: IUCN Peatland Programme

Your design should minimise the impact by siting borrow pits away from high quality habitats so that the integrity of undisturbed parts of the peat mass is not compromised. You must keep tracking across the peat surface to a minimum. To further reduce the impact from tracking, borrow pits should be located within the reach of the excavator arm.

You must site borrow-pits using suitable spacing and **avoid forming a string of excavation hollows** that could act as a secondary parallel drain (Thom et.al, 2019). Where dams are closer together, you may need to alternate the sides of the drain that the pits are sited to reduce any possible connectivity.

You should start construction by removing the vegetation as a turf and placing to one side along with any oxidised peat. You can then excavate the exposed saturated peat and use it to form a new dam. You can then reuse turves to revegetate areas of bare peat. You should record the locations of borrow pits using GPS so that their recovery can be monitored.

Once completed, the oxidised peat that you removed when constructing the borrow pit, should be pushed back into the pit. You should reprofile the sides to a shallow angle and tease surrounding vegetation in to cover any bare peat.

Areas of open water will naturally colonise provided there is a *Sphagnum* source nearby. If not, you can introduce it using an approved method (refer to the section on revegetation below). Borrow pits will eventually form bog pools supporting species such as *Sphagnum cuspidatum* and complement the overall habitat.

Wave dams and zipping

This method of using peat to block drainage features does not rely on the use of borrow peats to form bunds. Instead, a low ground pressure excavator straddles the drain and uses the bucket to pull peat towards the machine to form an elevated vegetated ridge. The process is repeated across the drain extending either side and then compressed to create a good seal and ensure the height is just above the desired water level (Figure 11).

The peat along the drainage feature is then pulled in to block the void and therefore speed up the restoration process. The process is quick and creates less overall disturbance to the peatland beyond the drain.

Figure 11 Creation of a wave dam (Short & Robson, 2016)

When not to use peat bunds or dams

The construction of peat bunds and dams requires a skilled excavator driver with an understanding of the peat conditions. There are situations where their use is not suitable, such as:

- highly degraded/gullied peat,
- large erosion gullies
- steep slopes

You must **not** use peat bunds or dams on highly dendritic areas where there are multiple erosion gullies on thin and unstable peat (Figure 12). There is a risk that further disturbing the peat can increase instability and exacerbate erosion. In addition, holding more water within an unstable peat system could lead collapse of the peat body.

Restoration of such highly degraded peatlands may require a long-term approach. The water may need to be brought up in stages through the construction of low bunds or leaky dams within the gullies. These will catch sediment which can then vegetate and stabilise. Once stable, further bunding can be carried out to bring the water table higher. This process may need to be repeated many times.

Figure 12 Aerial footage of Bleaklow, Derbyshire

On designated historic features you may be asked to use a different methodology as part of any permissions or consents. Consult Historic England in advance for further information.

Dams made from other materials

Where peat is not suitable, other materials can be used to block drainage features. Materials such as timber, plastic piling and stone can be used within the bog to construct effective dams. Such materials possess different hydrological properties to the surrounding peat and therefore their use and siting must be carefully considered. Nonetheless, their different hydrological properties can also be used advantageously to create leaky or permeable dams. These are particularly useful in high energy erosion features.

Some drainage and erosion features can be very large or may be sited on thin and highly degraded peat. In these cases, you may decide to use permeable dams to slow the movement of the water and therefore facilitate siltation and prevent further erosion. Your choice of material will be dependent upon site-specific conditions and objectives but generally the design will use ‘top-to-toe’ principle unless the degradation is so severe that a phased approach to restoration is required.

Timber

Timber has long been used in peatland restoration and is a versatile and readily available material. Timber dams can be constructed to form both semi-permeable and permeable dams. They present a low-tech solution that can be implemented without the need for specialist machinery.

When constructing semi-permeable timber dams, you must have a sufficient depth of peat that you can drive the dams into, and you must key them into the surrounding peat to prevent scouring. You should also incorporate a notch to channel the flow to the centre of the dam. They are not suitable for use on shallow peat.

Timber dams can also form semi-permeable dams for use in drainage features such as large erosion gullies (Thom, 2019). The dams are built to be deliberately leaky so that they can trap and slowly release water from high rainfall events. They slowly accumulate sediment, raising the bed of the gully and allowing vegetation to establish. You can aid vegetation establishment by teasing out surrounding turf or by introducing vegetation (see the section on the introduction of vegetation on page 25).

Figure 13 Top: Semi-permeable timber dams in a blanket bog gully. Bottom: Permeable dam constructed from logs. Photo credit: Moors for the Future and Deborah Land

Stone

Stone dams are permeable gully blocks constructed from piles of stone. They are best suited to areas of high velocity channel flow or where the peat surrounding the grip/gully is highly fragile (Parry et al. 2014).

The design of a stone dam is porous so that they can slow the flow of the water and trap sediment. Eventually, once the pores of the dam are filled, they trap water more effectively leading to a build-up of sediment, thereby raising the base of the gully. This allows vegetation to colonise and stabilise the area (Figure 15). The installation of stone dams should be in conjunction with a suitable remedy for revegetation of the gully sides (refer to the sections on reprofiling on page 18 and introduction of vegetation on page 25).

Stone dams should be made from inert stone material, for example gritstone, so that they do not alter the water chemistry of the peatland. Owing to the volume and weight required, you will require transportation to site when constructing stone dams. Owing to the amount of material required, you must use low ground pressure vehicles to transport materials to the site. On some sites you may only need to lay a bog mat road. In remote locations you may need to airlift material to site using underslung hoppers or dumpy bags.

Figure 14 Stone dam installed in the Peak District. Photo Credit: Moors for the Future

Timber or stone baffles

These structures are useful to slow the flow in gullies that are too wide to block with a single structure. Made from stone or timber, they are installed part way across the gully in a staggered pattern at an angle of 33° from the side. This pushes into the centre of the watercourse creating a meandering flow. This enables sediment deposition and revegetation with existing or introduced flora (Yorkshire Peat Partnership Technical Specifications, see factsheet on page 35).

Dams made from natural materials

Organic dams are constructed from natural materials such as:

- heather
- coir
- willow (hurdles and whips)
- logs
- wool

These materials have been shown to form effective leaky dams on eroded gullies (Thom, 2019) and on the surface of bare peat pans. These materials are generally only suited to low-energy erosion features. You should consider alternative materials like stone for high energy systems.

Each organic material has its benefits. Your choice of material should be site-specific and dependent upon site objectives. As for all dams, you must key organic dams into the side of the gully for them to be effective and you must ensure that bare peat is revegetated.

Heather bales offer an effective solution for creating an organic leaky dam in small ditches (Figure 15) or small surface bunds on bare peat pans. They are highly effective at reducing the flow and trapping sediment. They also blend with the surrounding habitat and colonise with vegetation readily.

Heather bales can be made from material onsite or from heather cut on donor sites. If you are using material from another site this must follow strict biosecurity measures to ensure that pest species and/or diseases are not imported into the site (**Annex 2**). If you are using materials from other 'donor' sites this may also affect your historic environment assessment (HEA) requirements (see **Annex 5**).

Coir rolls offer an alternative low-tech solution for low energy erosion areas such as shallow gullies of bare peat (Figure 16). These require minimal machinery for installation and are highly effective at trapping sediment and creating conditions for vegetation to establish.

Figure 15 Established heather bale dam. Photo credit: Moors for the Future.

Figure 16 Coir rolls on Pendle Hill, Lancashire. Photo credit: Conservfor Ltd

Figure 17 Willow hurdles on Dove Stones. Photo credit: Deborah Land

Willow hurdles (Figure 17) can form leaky dams. Stakes are driven into the mineral ground within the gully creating a living leaky dam trapping sediment, on which vegetation can establish.

High erosion gullies that have degraded to the mineral base can also benefit from careful planting of willow whips to create a living scrub habitat that is robust against high water flow.

Figure 18 Log dams on Priddecombe Moor. Photo credit: Deborah Land

Placement of such planting or hurdles must be carefully considered since it is not permitted to plant trees in deep peat (>30cm) in this scheme. If you wish to use these methods, you must present good evidence of their efficacy as well as evidence to show that they will not pose a threat to the restoration of the hydrology of the peatland.

Finally, long log dams have also been used to form leaky dams. Figure 18 shows a series of log dams on Dartmoor where there was insufficient peat from which to make peat bunds and the site supported sensitive archaeology that would be damaged by excavations.

Plastic

One of the benefits of plastic is that it is lightweight and offers a low-tech solution that may not require machinery for installation. Therefore, plastic piling may be desirable to block small drainage features on remote sites with very soft ground conditions. It can also be used to provide additional core strength to a large peat dam.

Figure 19 Plastic piling in a raised bog (Thom, 2019)

There are limitations with using plastic that you must consider including:

- there must be sufficient depth of peat for you to drive the piling into.
- you must drive the piling into the peat to a depth of at least half of the height of the dam to give sufficient structural rigidity (Moors for the Future, 2020)
- there must be sufficient depth of peat at the side of the dams for you to effectively key piling into the bog

Piling will not be an effective solution on shallow peat as the piling cannot be driven into the mineral soil.

Plastic dams should incorporate a notch or lower section in the centre of the dam to help guide the flow water to the centre of the dam to prevent scouring to the surrounding peat. Also, if not sited correctly, they can create too much water pressure in the peat and fail.

General considerations

You should space dams sufficiently frequently to reduce water pressure on the dams and prevent scouring and risk of failure.

You should use any oxidised peat removed during excavations to infill the ditch line upstream of the dam and use saturated peat to shore-up the dams and key into the surrounding bog.

Where you have removed turves during construction, you must replace these or use them to cover any areas of bare peat.

Techniques which add additional material as opposed to using excavated peat are often more suitable for use on historic features. However, the technique you select must also be suitable for the hydrology and terrain present on the site.

Figure 20 Soil-filled jute bags laid stretcher bond about to be plug planted, Blackstone Edge Roman Road. Photo credit: Moors for the Future 2015

Vegetation management

Reprofiling

Degraded bogs often have multiple erosion features such as gully sides and haggs. These are likely to continue to erode if not revegetated.

Figure 21 Top: Peat hagg. Bottom: Reprofiling of a hagg. Photo credit: Cumbria Wildlife Trust

Where these features are steep sided or too steep for most revegetation methods, you will need to use reprofiling to create a more stable surface for revegetation. Reprofiling requires skilled excavation operators that can carefully pull back the turf to reprofile the slopes to 30° to 45° and then stretch the turf to cover any bare peat. This may be supplemented by using a biodegradable geotextile fabric to further stabilise the peat.

When reprofiling on or near designated historic features you may be requested to use different methods as part of your permissions and consents. One method is to revet the edges of steep peat faces using peat filled jute bags to change their angle, rather than to excavate. You can then cover with turves or plug plant into the bags.

Heather management

Heather dominance is a strong indicator of damage on a blanket bog. Extensive research suggests that some burning regimes lead to the degradation of bog habitat, reducing the presence of bog plants, loss of structural diversity and a dominance in species indicative of heath (Stewart et al. 2004; Tucker 2004; MacDonald 2008; Lindsay 2010). When combined with active drainage, blanket bogs can comprise a monoculture of heather with little or no characteristic bog vegetation and none of the natural structural diversity. The four main issues related to heather dominance are (Moors for the Future, 2020):

- lowered water tables
- peat pipes
- interception of rainwater
- shade and leaf litter – creating inhospitable conditions for other blanket bog species

When restoring heather dominated blanket bog you must aim to reduce the dominance of heather through:

- rewetting and
- reintroduction of key bog species such as *Sphagnum*

It is unlikely that re-wetting alone will reducing the dominance of heather, so you may also need to cut or flail the vegetation. The methodology of this must consider the ground conditions and potential impact of access, plus any sensitive areas as detailed below:

- flushes and mires, including areas around springs, pools, wet hollows and those rich in bog mosses with abundant and/or almost continuous cover of *Sphagnum* species, other mosses, liverworts, and lichens
- hags, erosion gullies and areas of bare peat, or where previous restoration works (brash, lime, seed and fertiliser) have been carried out
- areas where soils are less than 5cm deep or made up of scree, or where there is a high incidence of exposed rock

- areas with a noticeably uneven structure (at the spatial scale of 1m square or less). In dry heath, this is most commonly found in very old heather stands, often comprising large and spreading dwarf shrub bushes. In blanket bog, this is characterised by *Sphagnum* hummocks, lawns and hollows, or mixtures of well-developed cotton grass tussocks and spreading bushes of dwarf shrubs.
- steep slopes and gullies greater than 1 in 3 on blanket bog and 1 in 2 on dry heath
- areas of grassland and rush-dominated areas
- above-ground historic features listed on your Historic Environment Assessment (see **Annex 5** for more details about HEAs)

Once you have blocked the active drainage with dams and bunds, and reduced the heather canopy, it may be necessary to reintroduce key bog species (see section on revegetation on page 25).

Trees and scrub

In the UK, the presence of trees and scrub on degraded peat is an indication of damage, usually through drainage. Once scrub or tree regeneration from nearby plantations has become established, their presence can further contribute to the degradation of the peat through the interception of rainfall and the loss of water through evaporation and transpiration. As the peat dries, nutrients locked up in the peat are released which further stimulates the growth of tree species.

Restoration of bogs supporting trees and scrub **must** include a programme of removal with sufficient remedy of the hydrology to prevent recolonisation. This is essential so that the hydrology of the peatland can be restored, and characteristic bog vegetation re-established. The method of removal you select will be site-specific and dependent upon site conditions and access.

Traditional extraction

Where the timber has value and the site conditions are dry enough, you may use commercial removal methods such as a mini harvester. However, the scrub is often of low economic value and may only be of use as firewood if it is possible to extract it.

Where the ground conditions prevent conventional machinery, you must use low ground pressure machinery and bog mats to gain access (see section on vehicle access on page 31).

Where ground conditions are very wet and/or the vegetation is of high quality, you should remove seedlings by hand pulling. You can remove larger trees with a chainsaw and leave them to degrade naturally.

Skyline or cableway extraction

This form of timber extraction is a form of cable logging in which harvested logs are transported on a suspended steel cable (a cableway or highline) from where the trees are felled to a central processing location.

The traditional method uses spars mounted on machines that suspend the cable. There are also alternative methods where a wire cable is suspended between the tower on the machine and a "spar" tree. A carriage then runs along the taut line enabling the trees to be extracted off site, suspended mostly off the ground – thereby minimising the disturbance to the bog surface. This can be a suitable option where access is difficult, but it can be expensive.

Mulching and chipping

You may either remove scrub using chainsaws or chip it *in-situ*. You can either do this using a mobile chipper or, where access is possible, you may want to use a track mounted flail/mulcher on the end of the excavator arm.

You can push the arisings into drains between peat dams or leave them on the surface where they will be inundated once re-wetting is completed. Burning them is unnecessary and should be avoided.

Figure 22 Low ground pressure tracked mulcher. Photo credit: TreeClear Ltd

Commercial forestry

The impact of forest ploughing disrupts the water table creating deep furrows which, combined with oxidation and cracking, result in highly degraded conditions (Sloan et.al., 2018). In addition, the intense shading and needle litter may also impact the *Sphagnum* species exacerbating the degradation of the bog (Lindsay et al., 2014).

Forest-to-bog restoration is rapidly evolving, with techniques building on previous methodologies to tackle the impacts caused by forestry. As with all bog restoration, the restoration of the hydrology is key.

Your restoration project should begin with removal of the trees and scrub above ground biomass. In some cases, the peatland may be dry enough for you to use a commercial forest harvester to cut and remove the trees. In wetter conditions, you may need to employ other methods of extraction as outlined above.

Removal of commercial forestry must be undertaken in accordance with the UK Forestry Standards.

Smoothing and stump flipping

Standard methods of tree removal leave stumps and roots in the peat which can act like drains, facilitating continued water loss. New methods include forest smoothing where trees are extracted where they have a commercial value, but others are mulched *in-situ* using a low ground pressure excavator with a mulching arm. The stumps are then flipped using the excavator and pushed into the forest furrows. Smaller trees are simply pulled-up and pushed into the furrows. The ground is then tracked, consolidating the ridges and material in the furrows to leave a smooth surface.

Any removal of trees must be accompanied by a programme of ditch blocking and bunding using peat and other materials as appropriate to block drains and furrows, as well as cracks in the peat.

Figure 23 Left: Trial plot after ground smoothing. Right: One year after treatment supporting hare's tail cotton grass *Eriophorum vaginatum* and *Sphagnum cuspidatum* (Short & Robson, 2016)

Conifer regeneration

Conifer or birch regeneration is an issue where trees are adjacent to the restoration area and can be a problem on any decomposing brash mats. This should reduce once the bog hydrology is restored and the vegetation recovered, but this may take considerable time. During this recovery period, regenerating trees should be removed. In some instances, clearing trees that are acting as a seed source near the bog should help but, in some cases, these will belong to other landowners (Anderson 2010).

Molinia management

Purple moor-grass, *Molinia caerulea,* is a natural component of many bog communities. However, research has shown that since the start of the Industrial Revolution an increase in dominance has occurred. This has led, in some places, to a complete monoculture of purple moor-grass at the expense of *Sphagnum* and other bog building plants. According to Chambers (2015), there is evidence that increased burning activity led to an increased atmospheric input. When combined with a change in grazing pressure, burning may have therefore, been responsible for the increase in purple moor-grass dominance.

Research by Anderson (2015) shows the growth of purple moor-grass is much poorer where water levels are high. However, owing to its vigorous growth and location of growth nodes above the ground surface on tussocks, simply drowning out the plants to reduce dominance cannot be achieved without creating a water level that will be too high for other important bog species. Furthermore, where nitrogen and phosphorous are high, purple moor-grass can remain dominant even with a high water table (Anderson, 2015).

Several control measures have been trialled throughout the country including:

- grazing
- cutting
- flailing (including use of a mowing-bot)
- herbicide application
- compressing by tracking
- the introduction of key species to diversify the sward.

Trial results vary and it is likely that you will need to use a combination of methods alongside raising water tables to control purple moor-grass.

When proposing the restoration of *Molinia* dominated peatland, you must detail your preferred methodology. You should demonstrate a clear understanding of the issues regarding this difficult area of bog restoration. Your project should consider the causes of the dominance of purple moor-grass on the site and what specific work, or combination of work, you can undertake to reduce its dominance and increase the cover of characteristic bog vegetation.

Invasive non-native plants

Intact bogs are largely protected from invasive plants owing to their high moisture, low nutrient, and acidic nature. However, peatlands which have been degraded through drainage and other human activities, can present suitable conditions for certain invasive non-native plant species, and these species may be widespread across some sites.

The most common plants listed on the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) and Schedule 9 of the Wildlife and Countryside Act invasive non-native plants include:

- Rhododendron *Rhododendron ponticum*
- Pitcher plant *Sarracenia purpurea subsp. purpurea*
- Japanese knotweed *Fallopia japonica*
- Giant hogweed *Heracleum mantegazzianum*
- Himalayan balsam *Impatiens glandulifera*

Once established, invasive non-natives species can cause serious degradation through outcompeting and excluding native bog flora, and by altering the hydrology of habitats.

The remedial action you choose will vary between plants and sites.

Rhododendron

Rhododendron can present a serious problem once established on a degraded bog. Small plants quickly form dense bushes, shading out bog vegetation leading to the loss of *Sphagnum* cover.

You should use the same management approach for dense rhododendron as for dense scrub, with the addition of applications of herbicide to prevent regrowth. In severe cases, you may not be able to remove rhododendron by chainsaw and may find it more appropriate chip and mulch *in-situ* using a track mounted flail/mulcher on the end of the excavator arm.

Any programme of scrub or rhododendron removal must be followed up with a programme of re-wetting to prevent recolonisation of seedlings and drown out re-growth. This can negate the use of herbicides. However, rhododendron can be pernicious and will likely require follow-up treatment with herbicide to prevent it from re-establishing.

Your projects must clearly describe any programme of tree & scrub removal detailing

- the chosen methodology and
- any safeguards to protected features
- any follow-up works to ensure continued eradication.

Pitcher plant Sarracenia purpurea subsp. purpurea

Sarracenia is a carnivorous plant from North American that has been deliberately planted on lowland bogs and mires throughout Britain and Ireland since the late nineteenth century (Walker, 2014).

Management has largely been by hand-pulling the mature and juvenile plants. However, eradication through hand pulling in Cumbria has not been successful owing to the rapid recolonisation from seed. Experimental trials using glyphosate on dense beds has been highly effective but this approach can present potential risk to other plants and should be considered only where all other methods have proved unsuccessful.

You must give due consideration to the potential biosecurity risks of spreading this plant when removing it from site. You must include details on the **Biosecurity form in Annex 2**.

Figure 24 *Sarracenia purpurea* established on a lowland raised bog, Wedholme Flow, Cumbria (Walker, 2014)

Other invasive non-native species

You will need to review Defra standing guidance on invasive species before you select and take actions. This will be a particular issue if Japanese knotweed is present on site, for which separate standing guidance is available (see Factsheets and Further Information on page 35).

Introduction of vegetation

There are significant areas of bare peat throughout our uplands occurring in large areas and small patches in mosaic with degraded vegetation. In the lowlands, bare peat tends to be a feature where sites have been subject to commercial extraction of peat.

Factors that lead to bare peat forming are complex but usually include one or more of the following (Moors for the Future, 2021):

- Historic air pollution
- Wildfire
- Historic drainage
- Access
- Colonisation by non-native plants
- Commercial extraction
- Agriculture

Bare peat is extremely unstable and vulnerable to the effect of wind, rain, and livestock; all of which further exacerbate its instability creating further erosion. It is an extremely hostile environment for plants and there are few, if any, species that can colonise it without some assistance.

Figure 25 Top: Bare eroding peat. Photo credit: Yorkshire Peat Partnership. Bottom: Bolton Fell Moss extraction site. Photo credit: Natural England

The key to successful revegetation is to stabilise the substrate and create conditions that favour bog vegetation. Techniques are constantly evolving with new ways to cope with what is the most challenging part of bog restoration. There are many innovative approaches including using geo-jute, wool, and even old nets, to provide a matrix into which the applied vegetation or seed can grow. You should select the appropriate method for your site and explain fully how this will be carried out.

Most revegetation efforts focus on the re-establishment of *Sphagnum*. However, these require moisture, shelter and microtopography, as well as a high stable water table to thrive. You must address damage to the hydrology in conjunction with creating the suitable physical conditions before you attempt to introduce bog plants such as *Sphagnum*.

Brash

Early methods of restoring bare peat used heather brash since heather thrives on dry peat, so effective in covering the bare ground. However, the dominance of heather on degraded peat exacerbates the degradation through continued interception of rainfall and transpiration, and the root systems can create cracks and may lead to peat pipe formation. It can also prevent the colonisation of the appropriate bog community necessary for peat formation.

For these reasons, the establishment of heather through brash or seed is not an accepted method of restoration in this scheme. It is permitted to use low-seed burden brash as part of a moss-rich brash application. Seed of Calluna vulgaris ripens by about mid-October and remains abundant till the end of November (sometimes into December). Therefore, where possible brash should not be collected during this period. If this is unavoidable you must state in your application how the seed burden will be lessened prior to application.

Moss-rich brash

The use of heather brash is still used but only as a structural element of the brash and not for the purpose of introducing seed. Moss-rich brash is a mix of heather and mosses comprising feather moss fragments typical of drier habitats (*e.g. Hypnum* spp*., Rhytidiadelphus* spp*., Pleurozium schreberi*) together with any other cut vegetation that may be present on the donor site. The feather mosses are quick to establish and in doing so, create a thin layer of moisture and offer a suitable microclimate in which bog plants can establish.

To ensure the colonisation of *Sphagnum* to the proposed recipient area, you should either enrich the mix with *Sphagnum* prior to application or add this afterwards by plug planting or other suitable method. You must choose *Sphagnum* species suitable for the site conditions.

Figure 26 Left: Organic mat of grasses and moss donor material. Right: Donor material 1 year after application. Site: Bolton Fell Moss. Photo credit: Natural England

Where deep ombrotrophic peat is present, choose species such as:

- *Sphagnum papillosum,*
- *Sphagnum capillifolium*
- *Sphagnum medium*

On shallow fen peat choose more nutrient tolerant species such as:

- *Sphagnum palustre,*
- *Sphagnum fallax*
- *Sphagnum subnitens*

Figure 27 Sphagnum plugs produced by Cumbria Wildflowers. Photo credit: Deborah Land

The establishing sward can be further enriched by companion planting with bog plug plants including cotton grasses, *Sphagnum*, and crowberry (see section on Increasing plant diversity).

Where possible, your donor material should be sourced locally and should be located as close as possible to the receptor site. The donor site must support the target vegetation as described above. You must collect all donor material in accordance with the Biosecurity Guidance (**Annex 2**).

You must not leave donor material in dumpy bags or in piles on site for any more than 2-3 days as this can impact the viability of the material. Ideally, your project should time revegetation work to ensure that the delivery of donor material is close to when it will be applied at the recipient site.

Turfing

This method lends itself to sites where small areas of bare peat or localised gully erosion lie within a larger intact vegetated bog. Using a suitable low ground pressure excavator, a turf is removed from an intact area and then stretched over the bare peat. The turf is tamped down to ensure a good contact with the peat.

The vegetation either side of the donor area is then stretched out to cover the excavation area to ensure rapid colonisation and minimise any erosion.

This method is a quick and effective way to remedy areas of bare peat but must be carefully considered on areas of high nature conservation value. You must demonstrate in your application that you have discussed the options with the Natural England Area Team.

Grass nurse crop

A nurse crop is essentially the establishment of a crop of vegetation where the sole function is to facilitate the establishment of the desired bog vegetation, which will, over time, outcompete and replace it.

A mixture of grass seeds and bog species can be spread onto degraded peat surfaces to stabilise the surface whilst also increasing the diversity of the vegetation. You can harvest seeds using a brush harvester or by hand. You can apply these using the following methods depending on the site conditions (Thom et al., 2019):

- Traditional spinner drill
- Land based air drill
- Helicopter air drill
- Suspension hydro-seeding

Grass nurse crops

Grass nurse crops comprise fast growing agricultural and amenity grasses. However, they are unlikely to establish in on peatlands without some help owing to the low pH and acidic conditions.

The application of lime and fertiliser may be required in exceptional circumstances to aid establishment of the nurse crop. This may be on severely degraded peatlands, such those in the Peak District, which have an extremely low pH making them extremely hostile areas for plant colonisation. Soil tests should be done prior to any application so that the amount of lime and fertiliser is tailored to the needs of the site.

The application of lime to raises the pH quickly and allows nurse crop grasses to establish. Once they have germinated, you may need to apply agricultural fertiliser to encourage root growth (Thom et al., 2019). You may need repeated applications of lime and fertiliser to fully stabilise the peat and encourage a comprehensive sward, but this must always be preceded by testing the pH and nutrient levels.

As the sward develops and the pH and soil macro-nutrient levels begin to reduce to typical background levels with the cessation of fertiliser and lime applications, the sward will be stable enough to allow typical native bog flora to re-establish and the introduced nurse crop grasses will die off. If proposing this method, you need to include in your restoration plan

- Justification of why this method is required
- Details of lime and fertiliser application rates

Figure 28 Bare peat restoration in the Peak District. Photo credit: Moors for the Future

Increasing plant diversity

For degraded bogs with fragmented vegetation cover and patches of bare ground, you may need to supplement the existing vegetation with seed, plugs, donor vegetation or turves. For extensive bare ground, you may need to use further measures such as using coir logs, timber barriers or geo-textiles to stabilise the peat.

Plug planting

Revegetation can be achieved by plug planting bog plants such as:

- cloudberry *Rubus chamaemorus*
- cotton-grasses - hare's-tail *Eriophorum vaginatum* and common E*. angustifolium*
- bilberry *Vaccinium myrtillus*
- crowberry *Empetrum nigrum*
- *Sphagnum* spp.

Where available, and given the appropriate permissions, you may obtain donor plants from within the restoration site. This has the advantage of being a low cost and simple solution.

You can also harvest *Sphagnum* from suitable nearby donor sites, although this requires specialist cutting and harvesting machinery to collect the mosses without causing damage to either the moss fragments or donor site. You must complete the Biosecurity Form when importing any plant material from other sites (**Annex 2**).

You can also source bog plants and *Sphagnum* from specialist growers who can propagate these in various forms.

Figure 29 Planted *Sphagnum* clump. Photo credit: Yorkshire Peat Partnership

You must ensure that all nursery grown plants have been grown in peat free media and state this in your restoration plan.

Open water

Many lowland peatlands that have been subject to commercial extraction, support large bodies of open water. Where the peat has been lost and the water bodies are linked to the surrounding groundwater, the water bodies should be restored to a fen community appropriate to the conditions.

Rainfed water bodies on ombrotrophic peat are not conducive for the establishment of peat forming communities and require intervention to aid terrestrialisation. This may involve drawing down the water level or where this is not possible, shallowing the waterbody. This could be achieved through filling with brash or scrub arisings. The main objective will be to break the uniformity of the water surface with branches etc. This will provide some structure in which *Sphagnum* species can establish and thrive.

You should consider the wider impact of manipulating any water levels and must clearly demonstrate your understanding of this in your application.

Fluctuation of water levels is detrimental to palaeoecological deposits and below-ground archaeological sites and may require Scheduled Monument Consent where designated historic features are affected. If in doubt consult Historic England. For further information on historic features see **Annex 5**.

Grazing

The subject of grazing is complex and beyond the scope of this document. However, it is important to consider the role that grazing has on peatland habitats in the restoration context. Whilst grazing by native wild animals is a natural part of the peatland ecosystem, the impacts of high stocking rates and associated trampling can lead to changes to the peatland vegetation resulting in physical damage and the creation of areas of bare ground and erosion hot spots (Lindsay et al., 2014a).

Prior to restoration and where practicably possible, livestock numbers must be reduced to sustainable levels or removed, to allow the vegetation to recover. You must demonstrate that you have discussed the proposed restoration and explored the possibility of stock with the landowner and/or local Natural England Area Team if appropriate.

Where grazing will continue during the restoration period, you must explain how this may impact the recovery and what steps you will take to minimise this. Sites with unsustainable levels of grazing are not likely to be eligible for this grant scheme.

In areas where red deer numbers are high, grazing impacts can be problematic and you may need to implement measures to control deer numbers.

Access

Access on peatlands, where not managed correctly, can cause considerable damage to the integrity of the vegetation and the hydrology. These may be in the form of existing tracks or paths, or desire lines across the peatlands.

Some existing tracks can create a hydrological barrier within the peatland or lead to erosion and should be considered in drawing up restoration plans.

Recreational access

Recreational access on peatlands can cause damage through damage to vegetation and the peat mass which affects water movement. Further impacts occur because of braiding paths. You may need to address erosion issues caused by access so that the hydrology can be restored. This may include suitable path remediation, such as creation of 'floating' paths, or the provision of boardwalks to reduce erosion.

Access and engagement can also add value to a project. Where you think that this will be the case include more information about this in **question 6** of your application (non-carbon benefits).

Vehicle access for restoration

All machinery must be low ground pressure with wide tracks suitable for traversing soft ground. Access routes or areas of very soft/sensitive ground must be protected by using bog mats. This will protect the peatland from severe damage will prevent the machinery from becoming become stuck. Additional protection must also be implemented in sensitive areas including those supporting protected habitats and species or sensitive historic environment areas.

You should ensure all vehicles and cutting apparatus are tracked and low ground pressure (<3psi), to prevent damage to vegetation or soils. You should plan routes to ensure that vehicle movements will avoid sensitive areas. You must ensure that any disturbance is limited to that which can be expected to have recovered within 12 months.

You must re-fuel machines away from sensitive areas, using areas of hardstanding where possible. You can achieve this by placing a non-porous membrane underneath fuelling points to prevent fuel contact with the vegetation.

Fuel must be stored in a designated area and in bunded tanks. You must carry spill kits with sufficient capacity for fuel and oil with vehicles so that they can be deployed immediately if required.

Your airlifting operations should follow Civil Aviation Authority regulations. You should establish the location of drop points in advance and site them away from sensitive locations where possible. You should refuel helicopters in accordance with the measures discussed above.

Cutting and collecting brash for heather bales/dams

You must not cut in Sensitive Areas (as defined on page 19). You must set cutting machinery at a height that will avoid contact with the moss layer and/or hollows and hummocks. Cutting should ideally be focused upon drier areas where there is a dominant canopy of mature heather with occasional or infrequent mosses.

You must not cut within 5m of any watercourse to minimise erosion and damage to watercourse edges. Cutting must avoid the bird nesting season.

Delivery of materials to site

For sites where access is close to a paved road you may need to use bog mats and drive the materials to the restoration site. However, for more remote locations, you may find it more suitable to use helicopter transportation.

Where possible, you should locate any storage areas on existing hard standing or aggregate areas. Any materials that you store on vegetation should not remain on that location for too long to avoid shading out and damaging vegetation through compaction. You must remove all waste materials promptly from site.

Paludiculture

Approximately two thirds of the 325,000 ha of lowland peatlands in England are now classed as ‘wasted’. In the Somerset Levels, there has been subsidence and shrinkage estimated to be 1 to 1.5 cm per year (DEFRA, 2018) and only an estimated 16% of the peat stock recorded in 1850 in the East Anglian Fens now remains (Morris et al, 2010). The continued use of peat in traditional drainage-based agriculture will eventually result in the complete loss of the peat

Paludiculture is not nature conservation but is productive use of peatlands that aims to reduce greenhouse gas emissions during their use. Paludiculture on peat soils will maintain the peat store and result in lower carbon emissions than traditional agriculture. Some paludiculture crops can result in the active accumulation of peat.

Paludiculture crops that result in the **accumulation of peat** will be eligible for this scheme. You must:

- Clearly define the proposed paludiculture option and
- Explain how it will be managed to result in the net formation of peat

Paludiculture methods that have little soil disturbance, longer rotations and shallower root penetration will be more suitable on historic features than other methods.

Summary

You should research your proposed techniques widely and reference supporting evidence within the methodologies in your application. You should fully describe any examples of new and innovative techniques with supplementary evidence and justification.

Glossary of restoration terms

Term	Alternative terms	Description
Arc Bunds	Horseshoe bunds	Individual bunds not interlinked
Baffles		Structures built into the sides of wide gullies to slow the flow of water. They can be timber or stone
Cell bunds		Grid of linked bunded cells.
Contour bunds	Fishscale bunds, scallop bunds	Linear bunds along a contour that take account of slope direction.
Permeable dams	Leaky dams	Can be timber, stone or natural material that slow the flow of water
Linear Bunds	Trench bunds, long dams	
Peat dams	Peat blocks	These are impermeable dams constructed from peat.

Links to factsheets and further information

DEFRA: Stop invasive non-native plants from spreading. https://www.gov.uk/guidance/prevent-the-spread-of-harmful-invasive-and-non-native-plants

DEFRA: Prevent Japanese knotweed from spreading. https://www.gov.uk/guidance/prevent-japanese-knotweed-from-spreading

EcoCo Life Resources: Peat Damming Techniques – methods by OpenSpace https://www.ecocolife.scot/node/239#peat

Harvesting and using heather seed https://cieem.net/wp-content/uploads/2019/07/Harvesting-and-using-heather-seed-FL-Technical-Note.pdf

OpenSpace. Deep Trench Bunds – Method of Installation Restoration technique 5. Viewed: 11 March 2021 <https://www.ecocolife.scot/sites/default/files/Technique%205%20-%20Method%20of%20Installation%20-%20Deep%20Trench%20Bunds.pdf>

Moors for the Future https://www.moorsforthefuture.org.uk/our-resources

Moors for the Future (2020) Peat Dam Fact Sheet. Viewed: 05 March 2021.<https://www.moorsforthefuture.org.uk/__data/assets/pdf_file/0026/87434/Peat-dams-Factsheet.pdf>

Moors for the Future (2020) Timber Dam Fact Sheet. Viewed: 05 March 2021 <https://www.moorsforthefuture.org.uk/__data/assets/pdf_file/0031/87529/Timber_Dams_Factsheet.pdf>

Moors for the Future (2020) Blanket bog land Mangers Guidance: FAQs. Moors for the Future on behalf of the Uplands Management Group. Viewed 24March. <Blanket-bog-land-manager-guidance-FAQs-Report.pdf (moorsforthefuture.org.uk)>

Moors for the Future (2021) Reasons for and problems with bare peat. Viewed: 18 March 21 < Reasons for and problems with bare peat | Moors https://www.moorsforthefuture.org.uk/our-purpose/habitats-for-wildlife/reasons-for-and-problems-with-bare-peat for the Future>

Peatland Action Resources https://www.nature.scot/climate-change/nature-based-solutions/peatland-action/peatland-action-project-resources

The Bog Conservation Handbook https://www.iucn-uk-peatlandprogramme.org/sites/default/files/header-images/Conserving Bogs the management handbook.pdf (iucn-uk-peatlandprogramme.org)

Yorkshire Peat partnership https://www.yppartnership.org.uk/resources

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Annex 2. Biosecurity

Nature for Climate Peatland Grant Scheme

Guide for Applicants

Date: February 2023

Version: 3.0 Draft

www.gov.uk/natural-england

Contents

Introduction

This guidance provides information on biosecurity for restoration grant projects funded under the Nature for Climate Peatland Grant Scheme (NCPGS). This guidance should be read together with the Invitation to Apply and NCPGS Guide for Applicants.

For some restoration methods you may need to import offsite organic materials if there is not enough suitable vegetation available onsite. Examples include heather, *Sphagnum*, nurse crop grasses and plug plants or micro-propagated plants. This may be associated with the creation of permeable dams, or the revegetation of bare peat.

For further information on these techniques, please see **Annex 1 – Peatland restoration** or see the further links suggestions at the end of the document.

If you must source material from an offsite location, or grow it specifically for the restoration project, you must carefully consider how you will avoid contamination. Contaminated donor material could bring in invasive plants/species to the restoration site.

The use of vehicles and equipment may also introduce potentially hazardous organic material onto sites. You must follow best practice to ensure that vehicles enter the site clean and free of contamination.

In your application you must include details on biosecurity in your Q2 site-specific response and using the donor site information document at the end of this annex.

Brash and heather harvesting

Your proposal may include harvesting heather or straw to spread as brash in order to stabilise bare degraded peat areas – see **Revegetation** in **Annex 1 – Peatland restoration**. You should source donor material from the local area where possible. Where not possible, you should select donor sites from as close as possible. You should carry out a site inspection to ensure that material is not being taken from unsuitable sites which may be damaged by the action.

If you must harvest material from an offsite location, this must have undergone biosecurity checks focused on heather beetle and *Phytophthora*. You will need to tell the NCPGS team about this security check within the donor site information document.

Harvesting and spreading *Sphagnum*

You can carry out *Sphagnum* inoculation by sustainably harvesting *Sphagnum* fragments or clumps from a suitable donor site and spreading these either by hand or using specialised machinery (Thom *et.al*, 2019).

Just like brash collection, if you need to harvest material from an offsite location, you must carry out suitable biosecurity checks. You will need to tell the NCPGS team about this security check within the donor site information document.

Donor sites

Donor site information documents must be included as supporting documents when completing the application. You must detail the names, addresses and grid references from which the project will source the donor material. Natural England will use all reasonable endeavours to ensure that all donor sites will be kept confidential and viewed only by Natural England. If you need to change your donor sites, you must discuss this with the NCPGS team as this may require further consent.

You should be aware of the intended use of the donor material and should demonstrate that you have made appropriate enquiries to establish there is no known history of pest or disease at the donor site which may affect the recipient land. If you identify any diseases or pests at the donor site you must declare this to the NCPGS team.

If this clause is breached, it will constitute a material breach for the purposes of the Standard Conditions (Termination). In addition to the contractor being liable for Natural England's costs associated with a breach, the contractor will also be directly liable to the landowner or user of the recipient land for any costs, damages and demands incurred (including indirect loss and loss of profits).

You must provide a letter, or other written confirmation, from the owner of the donor site confirming all permissions or planned permissions and that there is no known history of pest or disease at the donor site which may affect any agricultural, conservation or sporting interests on the recipient land.

If the donor site is within a SSSI, you must ensure consent from Natural England is in place, following the guidance in **Annex 4 – Protected sites & protected species**. You should consider this early and discuss with donor site owner/occupiers to avoid later delays. You must include an indication of when the notice will be submitted within the donor site information document.

Natural England reserves the right to reject any proposed donor sites.

Commercially grown plug, nurse or micro-propagated plants

You must grow plug plants and micro-propagated *Sphagnum* in peat-free compost or other peat-free media. You must ensure that propagation takes place in greenhouses free from pests, diseases and unwanted species. You must ensure that you only plant species appropriate to the relevant bog vegetation community.

You must use the check-box in the site-specific template for Q2 to confirm that peat-free compost will be used.

Contamination

You must ensure that all equipment, tools and personal protective equipment (PPE) required to complete the works are clean and free from material which could contaminate the restoration site. This will include but is not limited to:

- restoration and access vehicles
- hand tools used for restoration activities
- PPE garments
- storage containers
- transportation apparatus

You should inspect all new equipment being brought onto site during the restoration where it has been used on sites previously.

Links to factsheets and further information

Moors for the Future https://www.moorsforthefuture.org.uk/our-resources

Peatland Action Resources https://www.nature.scot/climate-change/nature-based-solutions/peatland-action/peatland-action-project-resources

Yorkshire Peat partnership https://www.yppartnership.org.uk/resources

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Donor site information document

Application reference:

Name of Donor Site:	
Address:	
Grid Reference:	
Quality of Material available:	
Earliest available date for collection at this site?	
Is it a designated SSSI?	
Is Natural England permission required and if so when will Notice be given?	
Has an archaeological search been undertaken?	
Is there any known history of disease at the Donor Site which may affect any agricultural, conservation or sporting interests on the Recipient Land?	
Has a letter of confirmation that the Donor Site has no known history of pest or disease been provided by the landowner?	
Name:	Company:
Signed:	Date:

Annex 3. Environmental Monitoring

Nature for Climate Peatland Grant Scheme

Guide for Applicants

Date: February 2023

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www.gov.uk/natural-england

Contents

Introduction

This guidance provides information on peatland monitoring design, implementation and reporting for restoration grant projects funded under the Nature for Climate Peatland Grant Scheme (NCPGS). You should read this guidance together with the Invitation to Apply and NCPGS Guide for Applicants.

In the NCPGS, the purpose of monitoring is to:

- demonstrate projects have delivered against their restoration objectives
- assess the impact of restoration activities on peatland condition, i.e. hydrology and vegetation
- enable adaptive management where responses to restoration are not as expected

The scheme prioritises hydrology and biodiversity for monitoring and evaluation as they reflect the key benefits of healthy functioning peatlands. A water table near the surface provides the waterlogged conditions needed for peat formation and should be resilient to fluctuations. Vegetation needs to be peat-forming and support wider ecosystem diversity. Together these factors protect existing carbon stores and enable peat to accumulate.

The grant scheme will only fund monitoring that is:

- **directly linked to assessing the success of restoration activities that are funded through the NCPGS**
- **relevant and proportionate to the scale of restoration works undertaken**

We encourage projects to use standardised monitoring techniques to help build a picture of England's peat condition and restoration activities. NCPGS data will allow Natural England and Defra to undertake wider evaluation of the impact of restoration on peatland condition – contributing to targets such as Net Zero.

In your restoration grant application, you must provide a monitoring plan in your Q2 response. The monitoring plan must include:

- survey methods and design for peat depth, hydrology and vegetation surveys
- number and location of sampling points
- timing and frequency of measurements
- description of baseline surveys already completed or planned
- details of any additional monitoring or research projects
- how monitoring will fit into the project as a whole

You can carry out monitoring for the grant scheme through partnerships with academic or research institutions, or consultancies, enabling access to additional expertise or equipment.

You are welcome to carry out studies that focus on wider research into restoration methods or responses however you cannot include funding for this element through the scheme or use it as match funding. If you are unsure whether specific monitoring works can be funded, please contact the NCPGS team at peatlandscheme@naturalengland.org.uk.

Monitoring restoration

Monitoring the impact of restoration on peat condition during the grant scheme should focus on hydrology and vegetation. You should use the monitoring techniques described in this guidance. You need to decide where to carry out monitoring by considering your restoration objectives and resources available.

Monitoring should be integrated so that measurements of peat depth, hydrology, vegetation, and other environmental factors occur in the same locations. This will help you to understand the effects of restoration works on the eco-hydrology of the site and explain unexpected changes.

To assess whether restoration is leading to changes in peatland condition, you must understand the starting condition (i.e. a baseline), as well as how conditions change during restoration and the influence of wider environmental conditions, such as weather. If you have access to meteorological data from a local weather station this will be helpful to explain environmental responses to restoration and you should consider including this in your project.

Baseline survey

A robust baseline survey enables change to be assessed in the future. Where possible, you should undertake baseline surveys before restoration activities commence, allowing a before-after comparison to be made. A minimum of a one-year baseline is preferable as it allows the seasonal variability in water levels and vegetation to be captured. However, any monitoring before works commence is valuable.

You should collect the baseline survey data using the methods described in the survey methods section, unless monitoring programmes are already established at sites to be restored. Where you already have baseline surveys underway or have completed surveys as part of an existing monitoring programme (such as a Discovery Grant) you must include a description in your application.

Comparison site

If your project includes a new or innovative restoration technique you should include monitoring at a comparison site or area not under the innovative technique. Your comparison site monitoring should also include a baseline survey to enable the impact and

success of the selected technique to be assessed. When you are selecting a comparison site, you should take care to ensure that the site has the same local conditions and management history as the area under restoration (with the exception of intact sites).

Comparison sites may include:

- sites that are not under restoration but in a similar degraded state as the restoration site
- areas or sites where established techniques have been applied
- intact or near-natural sites which demonstrate locally appropriate target conditions

In your application, your monitoring plan must include a summary of baseline surveys which have been completed, are underway or planned, including:

- survey methods, including timings and frequency of sampling
- survey locations
- number of sampling points
- at both restoration and comparison sites if relevant
- a justification of how monitoring will allow change to be detected during the grant scheme

During your project, you must provide any baseline data to the NCPGS team within year one of the project (i.e. by March 2024) for sites being restored in year one of the grant scheme. For sites being restored later in the grant scheme, you must provide baseline survey data during the annual data submissions.

Monitoring objectives and restoration trajectory

Monitoring objectives are targets that help to assess whether a restoration objective has been met. For example, where your restoration objective is to rewet an area through ditch blocking, your monitoring objective may be to ensure that the water table depth is raised to within 10cm of the peat surface within 5 years of the works being completed.

Peatland restoration is inherently long-term. This means that restoration and monitoring objectives may have a longer-term goal than is achievable during the lifetime of your grant agreement. You must include a restoration trajectory to capture the changes expected during the project lifetime and project them into the future, so that you can evaluate your success at a range of timescales.

Your expected restoration trajectory will differ depending on individual restoration objectives, peatland type and condition at the start of the project (Alderson et al., 2019).

Short term changes you may see within the lifetime of the grant scheme might include:

- raising of the water table in the immediate vicinity of bunds or dams
- stabilisation of bare peat from a nurse crop
- increase in peat-forming vegetation due to planting

- removal of non-peat forming vegetation (e.g. cropland on peat)
- planting or recolonisation by fen or bog vegetation

Medium term changes you may expect are likely to reflect the gradual return of the natural functioning of the peat, for example:

- natural shifts in vegetation and increases in positive indicator species
- water levels continuing to rise
- reduction in annual water level fluctuations due to water retaining capabilities of the peat re-establishing

Over the long term, you may anticipate wider recovery of biodiversity with rare species expanding in range and increased hydrological function.

You must provide anticipated trajectories for the following attributes:

- hydrology – mean or range of annual water table depth
- vegetation
    - positive indicator vegetation – % cover or frequency
    - negative indicator vegetation – % cover or frequency
    - bare peat – % cover
- peat condition category – see peat condition section

Where you have other specific restoration objectives you should provide expected restoration trajectories for other relevant attributes. For example:

- dissolved organic carbon (DOC)
- particulate organic carbon (POC)
- species presence or abundance

Your restoration trajectory should cover expected change over the next 50 years and reflect your long-term vision of restoring your peatlands to near-natural condition. Your restoration trajectory may cover an entire site or may be focused on where restoration activities are taking place, for example in the vicinity of ditches that are blocked.

In your application, you must provide a restoration trajectory to show the expected changes in environmental attributes. You should describe the expected changes:

- over the next 50 years
- annually during the lifetime of the grant scheme
- at key checkpoints after the end of the grant scheme – every 5 to 10 years

You may need to supply separate restoration trajectories for different sites or where different restoration activities are taking place. You may group sites or areas for a trajectory where appropriate.

You may use the table set out in the example below, or use a different format such as a graph, to present the trajectory. Any figures or values you provide are intended to be indicators and do not need to be exact.

During your project, you must report progress against the restoration trajectory in your annual report.

In your final report, you must present the progress of the site condition against the restoration trajectory based on the monitoring data collected. You should describe implications for future restoration.

Restoration trajectory example

The example project involves revegetating bare peat and blocking ditches with dams. These actions are expected to raise the water table and rewet the surrounding peat. Assuming the dams are installed properly and work effectively, the annual water table is expected to rise compared to the baseline. The restoration objectives are to:

- raise water levels and reduce sediment losses through blocking grips using coir dams
- re-establish vegetation cover on bare peat areas using a moss-rich nurse crop enhanced with *Sphagnum* species

In this example, the success of restoration is assessed by:

- water levels moving towards the surface
- reduction in cover of bare peat
- increase in *Sphagnum* cover from the nurse crop

Some fluctuation in these changes is anticipated, for example seasonal drawdown of the water table. But the measures should show some overall change if restoration is working. Later checkpoints in time could also include the presence of other *Sphagnum* species which are characteristic of natural bogs.

Year	Mean annual water table depth (cm)	Vegetation (positive/negative)		Bare peat (% cover)	Peat condition
Baseline	-100		Bare peat	70%	Drained eroding modified bog, drained semi-natural modified bog
1	-100	Nurse crop application	Bare peat covered by nurse crop	70%	Drained eroding modified bog, drained semi-natural modified bog
2	-50	Sphagnum established		60%	Drained eroding modified bog, drained semi-natural modified bog
3	-30	30-50% *Sphagnum* on previously bare peat		40%	Drained eroding modified bog, drained semi-natural modified bog

4	-15	50-70% *Sphagnum* cover		20%	Drained eroding modified bog, drained semi-natural modified bog
5	-5	70-90% *Sphagnum* cover		10%	Rewetted modified semi-natural bog
10	-3	90-100% *Sphagnum*		5%	Rewetted modified semi-natural bog
15	-3	90-100% *Sphagnum*		0%	Rewetted modified semi-natural bog
20	-3	90-100% *Sphagnum*		0%	Rewetted modified semi-natural bog
25	-3	90-100% *Sphagnum*		0%	Rewetted modified semi-natural bog
30	-3	90-100% *Sphagnum*		0%	Near-natural bog
35	-3	90-100% *Sphagnum*		0%	Near-natural bog
40	-3	90-100% *Sphagnum*		0%	Near-natural bog
45	-3	90-100% *Sphagnum*		0%	Near-natural bog
50	-3	90-100% *Sphagnum*		0%	Near-natural bog

Site description

A ‘site’ is an area where peatland restoration activities are planned. Accurate site descriptions enable us to get a better idea of the state of peatlands and whether management is sustainable and helping to improve peatland condition. Spatial data is an important component of describing sites. The use of digital resources, such as ArcGIS, enables a lot of information to be accurately recorded, updated and analysed consistently.

Project boundary

The ‘project boundary’ encompasses all restoration activities undertaken by a project funded through the grant scheme. This may be over multiple sites, as well as comparison sites where required for new or innovative restoration techniques.

Site boundary

The ‘site boundary’ should include the area where restoration activities are being carried out and where they are likely to impact. Site boundaries should make sense from both a management perspective and hydrological or ecological perspective.

Area under restoration

The ‘area under restoration’ within a site specifically refers to the area where restoration activities have taken place – for example, the area of cell bunding and that would be rewetted as a result.

Footprint of works

The ‘footprint of works’ is the area of ground that will be physically disturbed by restoration activities. This may include areas not being restored, such as land used to access a site.

Natural England will use the area where peat condition changes as a consequence of funded restoration activities to report against the Nature for Climate Fund commitments.

In your application, you must provide details of each site in your Q2 response, with appropriate maps and spatial data as described in the Guide for Applicants.

During your project, you must provide spatial data layers of the site boundaries and areas under restoration to the NCPGS team for known restoration areas within year one of the project (i.e. March 2024). For sites being restored in year two, you must submit data with annual data submissions as appropriate.

The NCPGS team will provide the format to be used to successful applicants at the project start-up meeting.

In your final report, you must submit a final version of the site boundaries as a spatial data layer if any amendments are made.

Restoration activities and mapping

Mapping of site features is important to keep a record of what restoration has taken place and features that need to be considered when working on site.

Mapping of restoration and management activities and site features in a standardised format will help Natural England to collate a national picture of the restoration activities funded through the scheme.

Natural England recommends that you add your project to the restoration projects map on the IUCN Peatland website, to help build a wider inventory of restoration within the UK.

In your application, you must describe and map your proposed restoration activities in your Q2 response as described in **Spatial data**.

During your project, you must map your completed restoration works, management implemented, and monitoring locations as a spatial data layer. The NCPGS team will provide successful applicants with further information on the details to be included.

You should keep a record of restoration methods where these deviate from your agreed site restoration proposal.

You will be required to report quarterly on the progress of restoration activities and area where activities have been started for each site.

In your final report, you must provide a spatial data layer with all restoration activities, capital works and management across the project.

Peat condition

The NCPGS will calculate greenhouse gas (GHG) emission savings of projects using the latest peat condition categories and emission factors from the UK Peatland GHG Emission Inventory. The emission factors in the table below were published as part of the UK Greenhouse Gas Inventory, 1990 to 2019 (Brown et al., 2021). They provide an update to those in Evans et al. (2017). If emission factors are updated prior to the launch of the restoration grant in 2023, this will be highlighted in the ITA.

The changes in area of peat condition will be used to identify the contribution of peatlands to the Nature for Climate Fund and Net Zero Strategy commitments.

Descriptions for each of the peat condition categories can be found in Evans et al. (2017). However, the way eroded modified bogs are considered has changed. Previously, the areas of eroded modified bog assumed 15% bare peat and 85% heather or grass dominated modified bog. These emissions have now been separated into their component categories. The eroding modified bog category represents bare peat only and should be applied to the eroding areas of the landscape. The heather or grass dominated modified bog should be applied to modified bog areas dominated by heather or grass vegetation. This amendment does not affect the total emissions estimates, but more clearly demonstrates the emission savings associated with restoring eroding peat.

Peatland condition	GHG emission factor (tCO2e/ha/year)	
Forest (drained)	5.46 to 1.15	
Cropland (drained)	37.61	
Eroding modified bog (drained)	13.28	bare peat only
Eroding modified bog (undrained)	12.17	bare peat only
Heather dominated modified bog (drained)	3.54	
Heather dominated modified bog (undrained)	2.31	
Grass dominated modified bog (drained)	3.54	
Grass dominated modified bog (undrained)	2.31	
Extensive grassland (drained)	13.03	
Intensive grassland (drained)	27.54	

Rewetted bog (rewetted)	3.91	from forest, cropland, grassland, extracted or eroding
Rewetted fen (rewetted)	8.05	
Rewetted modified (semi-natural) bog (rewetted)	-0.02	from semi-natural, heather/grass dominated
Near natural bog (undrained)	-0.02	
Near natural fen (undrained)	-0.93	
Extracted domestic (drained)	13.37	
Extracted industrial (drained)	13.28	
Settlement (drained)	1.61	
Table A 3.4.28 from UK Greenhouse Gas Inventory, 1990 to 2019: Annexes (Brown et al., 2021)		

In your application, you must state the area of peat in each condition category in your Q5 response using the spreadsheet provided. For restoration at sites which will be planned during the first year of your grant, you should provide a best estimate of condition and area.

During your project, you should map the baseline peat condition for each site and submit this in a digital spatial data format within year one of the project (i.e. March 2024). Further guidance will be provided to successful applicants.

In your final report, you should submit a map of the peat condition from the final survey season in a digital spatial data format. You should include the area within each peat condition category and evaluate the progress against the expected restoration trajectory for each site in your written report, linking to any issues with completing restoration activities.

Survey methods

Sampling

Your surveying should be integrated, so that monitoring of peat depth, hydrology, vegetation and other environmental factors occurs in the same locations. This will help to understand the effects of restoration works on the eco-hydrology of the site and explain unexpected changes.

The level of sampling that you require will be site specific and will depend on the restoration being undertaken. You should keep in mind the purpose of monitoring for the grant scheme is to evaluate the success of restoration works, focusing on changes in water level and vegetation.

You will need to decide:

- the number of sampling points
- the location of sampling points

You need to ensure that monitoring can be realistically and robustly carried out during your project. You should plan to minimise the number of visits required as this will help to reduce the potential impacts of trampling. Surveyors should avoid using the same paths repeatedly, especially in wet or sensitive areas, to minimise damage.

Where you are trialling innovative restoration techniques, you may need a higher degree of monitoring, with nearby control areas. Alternatively, where you are using well-established techniques that have a robust evidence base, your monitoring may use a lighter touch.

You should consider who will carry out the monitoring. Some of the monitoring methods in this guidance require specific expertise, such as vegetation surveys. However, some methods are more general and suitable to be carried out by non-specialists, such as volunteer groups.

The questions below will help you to think about what level of sampling is appropriate:

- what are the restoration objectives of the site?
- what are the different restoration activities occurring across the site?
- how will the restoration activities impact the water levels of the site?
- how will the restoration activities impact the vegetation at the site?
- how big is the site and are the same restoration activities happening everywhere?
- how variable are conditions across the site, considering both environmental and past management history?
- what resources are available for monitoring during the project? Will volunteers be used?
- how accessible is the site? Will it take a long time to get to certain locations to monitor them?
- what nearby environmental monitoring is there, such as a weather station?

Suggested sampling approach

The sampling approach provided in this guidance is based on using 10m quadrats, within which peat depth measurements and broad level vegetation surveys are carried out (figure 1). More detailed vegetation surveying is carried out within a 2m quadrat, which sits at the centre of the 10m quadrat. During field surveys, you may find it useful to mark out the four corners of the quadrat being surveyed using ranging poles to help define the area.

You should locate hydrological monitoring near to quadrats so that water level changes can be associated with vegetation changes.

The monitoring you do should follow the survey methods included in this guidance as far as possible. However, if you are restoring sites with previously established monitoring programmes, you should describe the methods used and how they can demonstrate changes in water level, vegetation and peat condition from restoration.

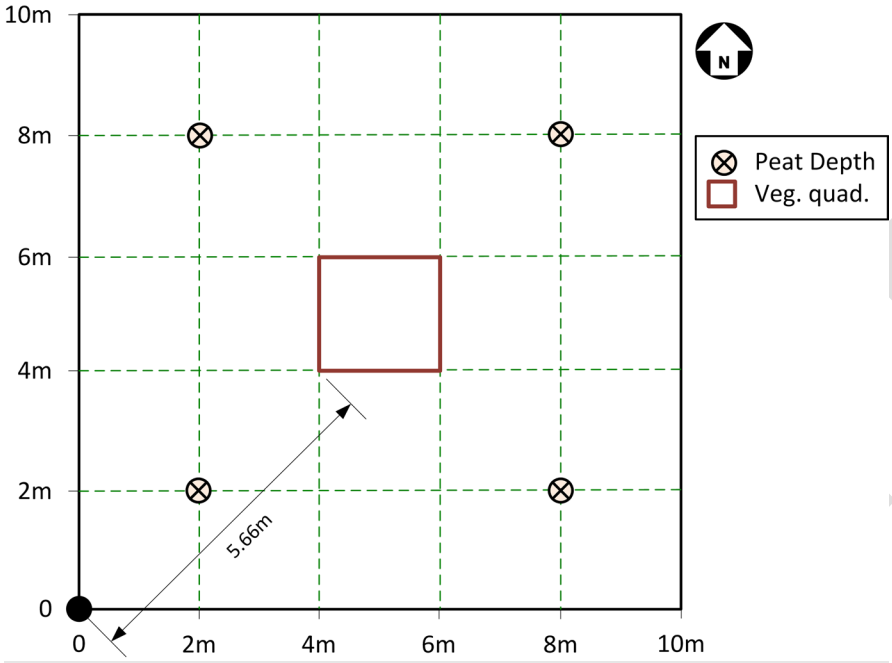

Figure 1: 10m quadrat layout with 2m quadrat in the centre for detailed vegetation surveys.

Peat depth

Measurements of peat depth help to characterise a site and determine the extent of the peat resource that may be protected through restoration. This will help to inform what restoration techniques may work on your site. Tracking the long-term change in peat depth shows whether peat is accumulating or being lost from the system. You can do this using surface-level rods.

You should carry out peat depth surveys within the first year of a restoration grant being awarded. If peat depth surveys have previously been carried out, you may not need additional surveys if comparable methods were used, and measurements are recorded to an exact depth (rather than a minimum peat depth e.g. measurements that record a depth of greater than 1m but not the exact depth). You should provide an outline of existing data in the monitoring plan of your application form.

Method: You should take peat depth measurements using peat rods to measure the depth of the organic horizon. You should take four peat depth measurements in each 10m quadrat as shown in figure 1.

1. Locate where to take peat depth measurements, according to the layout in figure 1.
2. Drive the unthreaded end of a peat depth rod into the soil, attaching further extension rods as required, until you feel the soil becoming more resistant, or the texture changing (sand grains rubbing the rod can be felt and heard). Note that completely resistant, hollow-sounding material may be woody material, which can sometimes be penetrated with further pressure.
3. Once you have reached the bottom of the organic layer, mark the peat rod at the peat surface (e.g. with tape) and gently pull out the rod until you can see the end of the join of the next rod section below.
4. Use a tape measure to measure from the end of the rod or the joint to your marked point and use the known lengths of the joints to determine the total depth of the organic layer.
5. Record the location of the measurement using a GPS, taking at least a 10 figure British National Grid (BNG) reference.
6. Make a note of the characteristics of the peat surface where the measurement was taken, like lawn, hummock, hollow or pool, open water, ditch or grip, eroded surface.

Location and number of sampling points: Peat depths vary on a local scale so you will need multiple measurements per site. You should locate peat depth measurements in areas where restoration works are proposed. Examples of peat depth measurement locations include:

- within 10m quadrats as shown in figure 1
- where there is a lack of existing data – for example creating new peat-forming habitats on arable peat
- to identify the edge of a peat mass
- to identify the extent of restoration works needed

Timings and frequency: You only need to carry out a peat depth survey once during the grant scheme. The NCPGS team recommend that you undertake peat depth measurements:

- during the baseline surveys prior to restoration work starting
- at the same time as quadrat vegetation surveys to minimise potential disturbance

Data to be reported: You should provide peat depth survey data to the NCPGS team within year one of the project (i.e. March 2024) using the monitoring data template provided by the NCPGS team. Where restoration locations are still to be determined during the project, you should provide peat depth survey data with annual data submissions.

Surface-level rods

Surface-level rods are a simple and effective way to monitor surface level change over a long time period by inserting inert rods into the peat until the mineral soil or bedrock is reached. The positioning of washers on the rod enables the surface level change to be

measured on returning to the rod. You can find the full methodology in the Eyes on the Bog Monitoring manual from the IUCN UK Peatland Programme (Lindsay et al., 2019). The low cost to construct, install and monitor the rods means they are an effective way to monitor surface level changes across large areas over a long time.

Location and number of sampling points: Peat depths vary on a local scale so a site may need multiple rods installing. You should install surface-level rods where a peat depth rod measurement has been taken (section above), though you do not need to install surface-level rods in every 10m quadrat. Surface-level rods provide an opportunity for long-term monitoring of the restoration carried out through this grant scheme and therefore you should decide locations with the long-term vision of the site in mind.

You should mark rods with at least a 10 figure grid reference so that you can find them again in future. You can use a high accuracy GPS to improve the accuracy of recording locations. A metal detector may help you to re-locate rods where they have become buried by vegetation.

Timings and frequency: You can install surface-level rods at any time of year. The NCPGS team recommends that rods are checked twice a year, once in June and once in November. Checking rods at the same time each year ensures that you can compare data across the site and reduces the impact of seasonal variation. Your measurements should aim to coincide with other monitoring visits.

The surface-level rods will last a long time once installed and therefore the NCPGS team recommend that you consider continuing measurements twice a year beyond the lifetime of your grant. This may be through volunteers or citizen science surveying. You may reduce the frequency of measurements where resources are limited, however it will be important to note the date of any measurements, to take into account seasonal changes when comparing data.

Data to be reported: You must report surface-level rod data using the monitoring data template provided by the NCPGS team. You must submit data annually and all data by the end of the project.

Hydrological monitoring

Raising water levels in peatlands is a key step to restoring a functioning system and reducing carbon losses. Dipwells are a simple and commonly used method to determine the water table depth, i.e. how far below the peat surface the water table is. Dipwell measurements throughout the year will enable you to track the seasonal changes in water levels, as well as the response to rainfall or drought events.

You need to consider water level monitoring using dipwells in the context of recent weather data, particularly rainfall, to determine whether measurements are reflecting water levels sustained by re-wetting or from recent rainfall events. You should identify whether local meteorological data is available from nearby stations, and how representative this

data is of site conditions. Where data from a local met station is not suitable, you can collect rainfall data using a rain gauge.

Method: You can purchase dipwells or construct them from a plastic pipe using the following specification:

- approximately 4 to 5cm in diameter
- length of 1.5 to 2m, so the water table will not drop below it when you insert it into the ground
- slots or holes along the entire length so water, but not peat, can easily flow into and out of the pipe – you can do this by drilling four holes approx. 5mm diameter at 7cm intervals along the length of the pipe
- you should seal the base of the pipe, for example with a bung, to prevent peat ingress when it is installed
- you should include a cap at the top of the pipe which can be removed to take measurements

To install the dipwell:

1. Use an auger with a slightly narrower diameter than the dipwell to create a hole to the required depth.
2. Insert the dipwell so approximately 15cm remains above the surface.
3. Record the location of dipwell using a GPS.
4. Place a cane or stick next to the dipwell to help locate it in future.

To take dipwell measurements:

1. Measure the depth of the water inside the dipwell from the top of the dipwell – shown by (a) on Figure 2.
   You can do this using a dipmeter which makes a noise or flashes a light when the end comes into contact with the water. Alternatively, you may insert a small straight tube into the dipwell whilst blowing until you can hear bubbles as the pipe reaches the water surface and measure the length of pipe inserted into the dipwell.
2. Measure the height of the dipwell compared to the ground surface using a tape measure – shown by (b) on Figure 2.
3. Subtract the measurement in step 1 from the measurement in step 2 to calculate the water table depth. A negative value indicates a water level below the surface.

You can also install automatic data loggers in dipwells which take measurements at a high frequency and are useful to assess the response to rainfall events. You will still need manual measurements of these dipwells for calibration. You will need to download data from automatic loggers according to the equipment instructions.

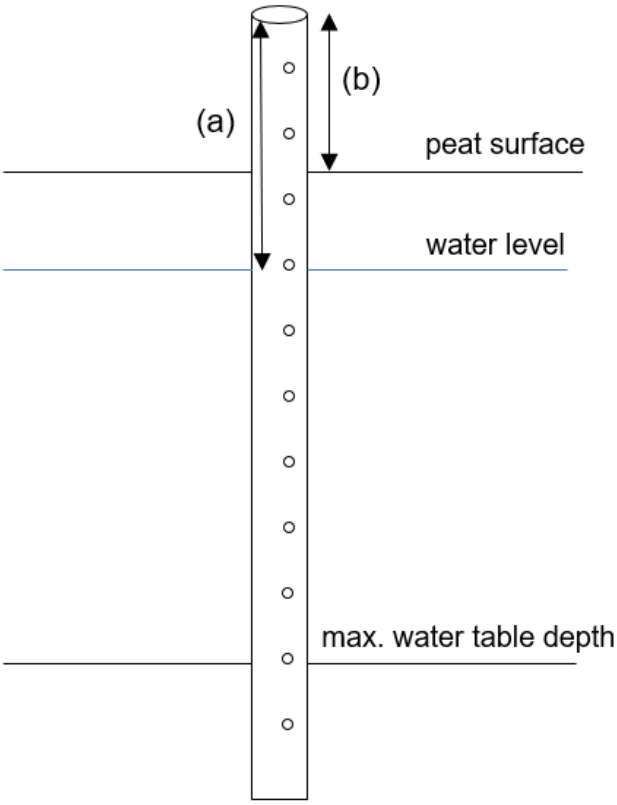

Figure 2. Dipwell installation and measurements to be taken.

Location: You should install dipwells:

- where changes to the water level from restoration activities are likely, such as where ditches are blocked or cell bunding is being installed
- at a comparison site (if required) to see if water levels respond in the same way to rainfall events
- avoiding surface features such as hummocks or hollows
- in transects or grids, depending on the sites and works undertaken
- beyond the immediate area of restoration works to help determine the extent of rewetting

For example, you might install a transect of dipwells from the centre of a raised bog to the periphery where cell bunding is being used to help re-wet central area of the bog. You might extend the transect into the surrounding lagg fen to see if water levels are impacted downslope. Alternatively, you might use a grid of dipwells across a ditch or grip network to determine the extent of rewetting from the ditch and influence of position on a slope, once grips have been blocked.

Number of sampling points: A grid of dipwells might have approximately 15 within a 30m by 30m area but you do not need to scale this up across the whole project. For example, when blocking ditches within a site you may choose to install three grids of dipwells: two grids across ditches being blocked but on different slopes and one grid where restoration

is due to start in the third year of the project. This third grid of dipwells will enable you to compare the area of works to an unrestored area for the first two years of the project as well as to a baseline, making a before-after comparison once you have completed ditch blocking.

You do not need to install automated data loggers for every dipwell but you should use them at key locations to monitor high frequency changes in water levels. You will find automated loggers most informative where water levels are still likely to fluctuate after restoration works. You should avoid installing them where inundation is likely. For example, in a transect of dipwells across a lowland raised bog, you could install three automated dipwells: one near the centre of the bog, one in the middle of the slope, and one on the margin of the bog.

Timings and frequency: You should install dipwells as early as possible during the planning of restoration to enable you to collect baseline measurements prior to restoration works starting.

You should take manual dipwell measurements monthly to capture the seasonal changes in the water table depth. You should download automated data loggers at the same time. You should carry out visits at the same time as other monitoring to minimise any possible trampling effects.

Data: During each visit, you should record the water table depth, along with the date, time and weather conditions. This will help you to match manually collected data with that from the automated data loggers and determine whether water levels have been impacted by recent rainfall or drought conditions. You must submit data using the monitoring data template provided by the NCPGS team.

Vegetation monitoring

Vegetation surveys are a crucial part of assessing peatland and habitat condition, with repeated surveys showing what change has occurred over time compared to a baseline survey. Depending on the restoration works planned, changes in vegetation during the grant scheme may only be subtle, therefore it is critical that you collect a robust baseline from which you can assess future changes. Alternatively, where the creation of peat-forming habitat is occurring, such as from improved grassland, vegetation changes may occur more rapidly.

Baseline vegetation map: Before restoration works start, you should carry out a baseline survey to map vegetation communities across sites to be restored in your project. You can use aerial photography, remote sensing or existing data to help produce these maps, but you should ground truth these. You should produce the site vegetation map as a digital spatial layer.

Location: The baseline vegetation map will help you to identify where more detailed monitoring should take place. The NCPGS team recommend that you use vegetation

quadrats to monitor vegetation change. You may carry out vegetation quadrat surveys to assess change in areas:

- under different restoration techniques
- under different types of vegetation
- where change from restoration works is likely
- which are representative of the site in general

You should choose the location of your quadrats using a stratified random sampling approach. You can use the main vegetation types present and/or restoration techniques to stratify the samples. For example, if you are carrying out ditch blocking across an area with three distinct vegetation types, you should place the quadrats randomly within each of the three vegetation types.

Quadrat locations should be permanent, meaning that you revisit the same locations for re-surveying. To ensure that you can find the same location you should use a high accuracy GPS and permanent markers.

Number of sampling points: The number of sampling locations will depend on the diversity and size of a site. You will need more sampling points on a larger and/or more variable site compared to a smaller homogenous site. The NCPGS team recommend:

- a minimum of 10 quadrats are surveyed per site
- more quadrats (25 to 50) are surveyed in larger or more diverse sites
- at least 5 quadrats are surveyed for each vegetation type and/or restoration technique
- equal numbers of quadrats are assigned to each stratification
- a pragmatic approach is followed to decide the number of quadrats to survey

You may choose to undertake a power analysis to help determine an appropriate number of quadrats to use.

You should take a pragmatic approach if you have a number of small sites, for example in a highly fragmented peatland context. In this case, you may wish to choose a catchment-scale monitoring approach. You should prioritise sites for quadrat surveys based on your restoration and peat partnership objectives.

Quadrat survey method:

1. Identify the four corners of the 10m quadrat and mark using ranging poles (figure 1).
2. Take a wide landscape photograph of the quadrat to provide a reference of general condition. Record the orientation so future photographs are taken in the same direction.
3. Record the total percent of the 10m quadrat covered by the following taxa and ground cover types. You only need to do this where the vegetation group covers more than 5% of the quadrat.
    - heather
    - other dwarf shrubs

- *Molinia caerulea*
- other grasses
- all cotton-grasses
- other sedges
- all rushes
- *Sphagnum* species
- other bryophytes
- all forbs
- *Phragmites australis*
- other reeds
- trees and shrubs (not dwarf shrubs)
- bare peat
- nurse crop/vegetation applied (bare peat re-vegetation)
- other ground cover type (e.g. bare rock, bracken, crops, open water)

4. Record the presence or absence of the following ground features within the 10m quadrat:
    - presence of microtopography (hummocks/hollow structure)
    - presence of drainage
    - presence of active erosion (e.g. eroding haggs or gullies)
    - signs of grazing or browsing
    - evidence of recent burning
    - any other form of disturbance e.g. vehicle tracks, trampling etc.
5. Mark the four corners of the 2m quadrat, in the centre of the 10m quadrat (figure 1).
6. List all the species present with a minimum of 5% cover in the 2m quadrat.
7. Record the total percent cover within the 2m quadrat for each species listed in step 6.
8. Record the frequency within the 2m quadrat for each species listed in step 6. You may do this by subdividing the quadrats into 25 equal compartments and recording the presence or absence of a species within each subdivision.
9. Take a photograph of the 2m quadrat from above (plan view). Geo-tag or label the photograph so it can easily be linked to the vegetation survey data. You may find it useful to include a scale marker in the photograph for future reference.
10. Record the altitude, aspect and slope of the quadrat. You may do this using desk-based maps, rather than in the field.

Timing and frequency: You should carry out vegetation surveys during spring or summer. However, you can make identifications throughout the year if necessary. The NCPGS team recommends that you undertake vegetation surveys twice during your project:

- you should carry out the baseline vegetation map and quadrat surveys before restoration works take place
- you should repeat the quadrat surveys in the final year the project receives grant funding. You should update the vegetation map where changes have occurred

When planning your vegetation surveying, you should consider:

- carrying out any re-surveys at the same time of year as the baseline to account for seasonal variability
- surveying later in the year if you need to assess the cumulative effect of grazing as part of your restoration proposals
- the bird nesting season and risk of disturbance to sensitive areas
- timing surveys with other monitoring visits
- continuing monitoring key indicators every 2 to 3 years after the grant scheme if possible

Data: You should submit baseline vegetation survey data within year one of the project (i.e. March 2024) for sites being restored in the first year of your project. For sites being restored later in your project, you should submit baseline data with the annual data submissions. You should submit data from the final year surveys with the final report. You should use the monitoring data template provided by the NCPGS team to submit your data. As with all monitoring, your field notes should include general observations that may help to interpret the data.

Fixed point photography

Fixed point photography is an effective way to visually record change over time. You should ensure that photographs are:

- taken before, during and after restoration works to demonstrate the efficacy of works
- include close-ups of examples of specific works
- include landscape scale views taken from vantage points or using unmanned aerial vehicles
- taken in the eight cardinal directions from vantage points
- taken from the same location to show change over time – foreground and background features will help to line up photographs
- taken at the same time of year to account for seasonal changes

Location: You should take photographs in relevant locations for identifying change. They are not required everywhere. You should choose vantage points that provide a view over representative areas of the site, for example where vegetation shifts can be observed. You may find close-ups of restoration works most useful where other monitoring is taking place, such as areas where surface-level rods are installed.

Number of sampling points: You should choose representative locations for vantage point and close-up photographs, whilst keeping in mind the potential data storage of lots of photos.

Timings and frequency: You should take vantage point photographs quarterly at a minimum. In general photographs should coincide with other site visits. You may take more frequent photographs where changes are expected to occur quickly, for example during the installation and immediately after rewetting works at a chosen location.

Data: You should name photographs in a consistent and informative way to enable comparisons over time. All photographs do not need to be submitted to the NCPGS team, but you may wish to use them as evidence to demonstrate changes happening on the ground in response to restoration, for example in written reports.

Additional monitoring

You must submit monitoring data on peat depth, water levels and vegetation as part of your Restoration Grant. You may also undertake additional monitoring, depending on individual restoration objectives or where long-term monitoring is already established.

This section provides a brief overview of some common monitoring methods which may help to evaluate the success of restoration but are typically beyond the funding provided by the grant scheme. You can find further information on monitoring techniques in the literature, for example Bonnett et al. (2009) and Thom et al. (2019).

Peat properties

Characterising the properties of peat can provide useful information to determine the extent of degradation, for example bulk density, humification or carbon content. You can carry out an indication of humification in the field using the von Post squeeze test. This method ranks peat samples relative to their degree of humification on a scale from H1 (undecomposed peat) to H10 (completely decomposed peat). Whilst more sophisticated laboratory techniques are available to determine humification, the von Post scale provides a rapid field assessment which can be used to provide indications of long-term change, especially if located with surface-level rods.

To take a sample:

1. Dig approximately wrist deep into the peat using a trowel or auger.
2. Take a sample somewhat larger than a golf ball from a depth of approximately 7 to 8 cm.
3. Squeeze the peat to determine whether any water is extruded and its colour, and the proportion of peat extruded (if any).
4. Rub a small amount of the sample between your forefinger and thumb to identify the texture.
5. Use the results to assign a H-value using the descriptions in the table below.

Various descriptive tables have been developed to describe each H-value, for example the table below from the Conserving Bogs Management Handbook (Thom et al., 2019).

	Nature of liquid expressed on squeezing	Proportion extruded between fingers	Nature of plant remains	Texture	Description
H1	Clear, colourless	None	Unaltered	Very rough and very spongy	Undecomposed
H2	Almost clear, yellow-brown	None	Plant structure distinct	Very rough and very spongy	Almost decomposed
H3	Slightly turbid brown	None	Plant structure distinct, most identifiable	Moderately rough, slightly spongy, moulded residue when squeezed	Very weakly decomposed
H4	Turbid brown	None	Component fragments distinct, leaves identifiable	Very slightly soapy feel, moulded residue	Weakly decomposed
H5	Strongly turbid, contain a little peat in suspension	Very little	Plant structure clear but becoming indistinct	Slightly soapy feel. Moulded residue	Moderately decomposed
H6	Dark brown, much peat in suspension	One-third	Plant structure indistinct	Moderately pasty, residue	Well decomposed
H7	Strongly muddy	One-half	Indistinct with few remains identifiable	Very pasty, moulded residue	Strongly decomposed
H8	Thick mud, little free water	Two-thirds	Very indistinct, only plant fibres and wood identifiable		Very strongly decomposed
H9	No free water	Nearly all	Plant structure almost unrecognisable	Feels greasy	Almost completely decomposed
H10	No free water	All (unless too dry)	Completely amorphous	Feels very greasy	Completely decomposed

Water quality

The loss of carbon from peatlands in the fluvial system is typically dominated by dissolved organic carbon (DOC). It may be important for you to measure DOC if your project aims to reduce fluvial carbon losses. Fluvial carbon losses from peatlands also include particulate organic carbon (POC), dissolved inorganic carbon and dissolved CO_2 and CH_4. Some types of DOC result in the brown colour of peaty water, which reduces water quality and must be removed during the treatment process for drinking water. As such, if your project has with restoration objectives linked to improvements in water quality, particularly in

relation to drinking water provision in the uplands, monitoring fluvial losses of carbon may be relevant.

When monitoring fluvial carbon losses, you will need to consider the flow patterns within a catchment or sub-catchment. This is so that you can locate monitoring that will identify the impacts of restoration. You may only need to monitor water quality within a sub-catchment where your restoration works are being carried out.

You should take water samples from streams which are representative of water leaving the sub-catchment. DOC concentrations naturally change seasonally, so you must take measurements which capture this variation. You may use higher intensity monitoring campaigns to capture flushes of DOC leaving peatlands during storm events.

You should first filter water samples at 2mm to remove large particles. POC represents the carbon that will be retained on a 0.45µm-membrane filter, whilst DOC is smaller than 0.45µm (including particulates smaller than 0.45µm). You can then measure the DOC concentration of the filtered water using carbon analysers in the laboratory. Whilst the methods for quantifying DOC and POC are well-established, the need for laboratory equipment and careful storage of water samples mean you may find it most effective to undertake this monitoring in partnership with a water company or academic or research institute.

Long-term monitoring is crucial to identify changes in DOC. You will need historic long-term data sets pre-restoration, and a commitment to continued monitoring post-restoration. You may be able to obtain historic datasets where organisations, such as water companies, universities or the Environment Agency, have established monitoring programmes.

The monitoring of pH (i.e. how acidic a sample is) may be useful for monitoring the impact of peatland restoration on other water quality issues, such as acid flushes, which may be impacting on the ecology downstream. You can take pH measurements simply in the field using either water samples or moist peat samples and a pH meter. You can carry out similar monitoring for electrical conductivity to give an indication of the presence of inorganic components, such as from adjacent agricultural land.

Greenhouse gas emissions

You can measure the exchange of CO_2 and CH_4 between peatlands and the atmosphere using GHG flux chambers or eddy covariance systems, also known as flux towers. Both methods are high cost and require considerable expertise for installation and maintenance. Direct measurement of GHG fluxes requires long-term datasets to overcome annual variability and for modelling annual GHG balances (Baird et al., 2019) which is beyond the funding available for this grant scheme.

The grant scheme will use proxies to calculate changes in GHG emissions from restoration activities as peatlands move between condition categories, as listed in the Peat Condition section of this guidance.

Hydrology

Whilst dipwells provide an effective method to measure water level changes within peatlands, you may find other aspects of hydrological monitoring useful to further understand the whole hydrological system and water balance of a site. You may need both additional equipment and expertise to help interpret the monitoring data collected and implications for restoration.

You can use piezometers to measure water pressure (hydraulic head) and hydraulic conductivity, which can tell you about the water flow dynamics within the peat. The construction of piezometers is similar to dipwells; however, they are sealed along their whole length, with an opening at the bottom of the pipe, and installed to different depths in groups (commonly known as nests). Installation in this way provides data on the water pressure at different levels within the peat and therefore enables you to calculate vertical and horizontal water flows within the peatland.

You may find discharge or channel flow measurements useful where water is flowing through a ditch or stream, for example using a V-notch weir and water level recorder. The weir acts as a dam, with the notch acting as a spill-way. A standard formula can be used to calculate the discharge based on the level of water above the base of the notch. You must construct weirs from materials capable of coping with waterlogged conditions and install them to prevent erosion from water flowing around the edges under high flow conditions. You may find monitoring of discharge most useful when coupled with monitoring of other aspects of the hydrological cycle, for example to identify whether changes are linked to precipitation, storage, evapotranspiration or restoration activities.

Evaluating success

Adaptive management

Regular reviews of monitoring data are important to assess the impact of restoration works and can inform whether any adjustments to site management are required, for example amending or adding capital works or trialling different restoration techniques. You may need more detailed investigations or data collection to understand why the responses on the ground to restoration are not as expected. Learning from responses observed and using this to refine the design of restoration works will help to increase your certainty of the outcomes of future restoration.

Data and quality assurance

Collecting data in comparable ways and making data openly available means that monitoring data can be collated nationally and be used to inform methods, policy and guidance on future restoration. This means that you need to manage data properly, with preparation before fieldwork, consistent handling and long-term secure storage.

The NCPGS team will provide a monitoring data template to successful applicants. This must be used for submitting data. You may also use the template to record data in the field, either on a printed-out sheet or on a tablet. The templates include reminders on what is important to record for each measurement, such as the units and scale. You may find noting down observations whilst out in the field will help you with interpreting data, such as the weather or signs of human impact. You may find this especially helpful if you carry out data analysis at a later date.

Once you have recorded data in the field, you must transfer it to the monitoring data template provided if it has been recorded elsewhere. You should check you have completed all columns in the data template using the correct units or scale, and no typos have been made. You should keep the data safe and create back up digital copies of the data in different locations to avoid any loss of the data. You must submit data at least annually to the NCPGS team using the monitoring data template provided.

It is important that you check monitoring data regularly to ensure that equipment is performing as expected and to check whether you need to adapt your site management. You might find simple plotting of data on a graph will help you to visualise the changes that are happening, for example changes in water level over the year.

Data submitted to the NCPGS team will be made available under Open Government Licence (OGL) according to the grant terms and conditions. Natural England intends to use the data submitted by projects in the development of the England Peat Map, which aims to produce an updated map of peat location, extent, depth and condition across England, which will be available under OGL. Your data may also be used in other relevant work areas by Natural England, for example to inform condition assessments of protected sites.

Reporting

The Guide for Applicants outlines reporting requirements for projects awarded a Restoration Grant. The NCPGS team will provide templates to successful applicants for quarterly, annual and final reporting.

The checklist below lists the monitoring requirements that you must submit at each stage in your project.

	Application	Baseline	Spatial data by end year 1 (March 2024)	Annual report	Final report
Restoration trajectory					
Hydrology	✓			✓	✓
Vegetation	✓			✓	✓
Peat condition	✓			✓	✓
DOC/POC	*			*	*
Other	*			*	*
Site information					
Project boundary			✓		✓
Site boundary	✓		✓		✓
Area under restoration	✓			✓	✓
Site features	✓		✓		✓
Restoration activities	✓			✓	✓
Peat condition	✓		✓		✓
Monitoring plan					
Monitoring methods	✓				✓
Monitoring locations	✓		✓		✓
Number of survey points	✓				✓
Survey timings	✓				✓
Sampling frequency	✓				✓
Completed baseline surveys	✓		✓		
Monitoring data					
Peat depth		✓		✓	✓
Surface-level rods		✓		✓	✓
Hydrology		✓		✓	✓
Vegetation map		✓		✓	✓
Vegetation quadrat surveys		✓		✓	✓
DOC/POC		*		*	*
Photography		✓		✓	✓
Other		*		*	*
✓ = essential requirement. * = optional, where relevant to the project.					

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Annex 4. Protected sites & protected species

Nature for Climate Peatland Grant Scheme

Guide for Applicants

Date: February 2023

Version: 3.0 Draft

www.gov.uk/natural-england

Contents

Introduction

This guidance provides information on protected sites and protected species for restoration grant projects funded under the Nature for Climate Peatland Grant Scheme (NCPGS). This guidance should be read in conjunction with the Invitation to Apply and NCPGS Guide for Applicants.

If you have a protected site in your application area, you must include this in the following application form sections:

- site-specific template for Q2
- site overview tab in the technical supplementary spreadsheet

In your question 2 response you must:

- demonstrate the works proposed are necessary for the conservation of the site and are appropriate to the site conditions
- include details on the measures necessary to avoid or minimise any impacts to the designated features
- provide enough detail for a protected sites authorisation to be made for year 1 sites

Details needed for protected sites authorisation must be specific to your project and the site. For example, if you want to bring materials onto site, you need to include details on the species included in a seeding proposal, or the type and size of stone proposed for stone dams.

Failing to include this level of detail will result in Natural England being unable to award your grant application due to the possible impacts on the protected site(s).

For year 2 sites, you should provide as much detail as possible in your application. Additional detail must be provided to Natural England during the grant period to obtain the relevant protected sites permission. This detail must be sufficient for an appropriate assessment to be made and should include full details of the works proposed, for example materials or species to be used, access routes and any mitigation necessary.

It is important that you engage with the relevant Natural England area team and NCPGS team to agree restoration proposals prior to the grant application to avoid delays in obtaining permission.

If you already have protected sites authorisation in place for the site and work, or you have already provided a notice of proposal to Natural England, please state this within your question 2 response and upload the relevant evidence as supporting information.

Protected sites

You must check if you have one or more of the following protected sites within your application:

- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Ramsar
- potential Special Protection Areas (pSPA)
- possible Special Areas of Conservation (pSAC)

If you are unsure how to find out about site designations you can find information on the Magic website, using the interactive mapping tool.

SSSI notice of proposals

You must follow the standard notice of proposal and consent, assent or advice procedure for all proposals on Sites of Special Scientific Interest.

Your Atamis application does not constitute a notice of proposal and your grant offer does not act as SSSI consent, assent or advice.

Consent

This will be applicable for most applications, including those where a partnership is acting as an agent on behalf of a single, or several owners or occupiers.

Assent

This will be applicable if you (the applicant):

- are a section 28G public body
- are carrying out the works yourself
- the proposed restoration work is part of the authority's functions

This also applies to proposals being undertaken outside an SSSI but likely to affect it.

Advice

For some projects it may be possible that a section 28G authority is granting a permission for a third party, such as a partnership, to carry out the works. In this instance, the section 28G body will provide Natural England written notice under section 28I. This applies also to operations you plan to undertake outside a SSSI and that are likely to affect it.

Requesting protected sites permission

If your restoration grant application is successful and you wish to accept the grant offer, you should do this via Atamis.

Before you apply for protected sites permission, your restoration plans must be agreed in writing with the Restoration and Historic Environment Specialists in the NCPGS team.

You will then be sent a notice of proposal for consent or assent template by the NCPGS team. This will include your restoration plan that has been agreed by the NCPGS team. You must complete the notice of proposal form and return it via email to the NCPGS team (peatlandscheme@naturalengland.org.uk) and not to your local area team. The NCPGS team will work with the local area team to assess the notice.

If you are not the SSSI owner or occupier (i.e. a partnership), you should include a letter of appointment stating you are acting as an agent acting on behalf of the owner or occupier (you may already have included this as part of your application). You must include all necessary information to verify this, such as signature(s) or email confirmation.

You must supply separate notice of proposals and authorisations for all SSSIs within the application boundary.

After receiving your completed notice of proposal, Natural England will determine the notice and, if appropriate, issue consent or assent or give advice that the proposal can go ahead.

You can submit site restoration plans and a notice of proposal during the first year of your grant to obtain permission for works in year 2. The NCPGS team will discuss this with you during your project inception meeting if necessary.

It is your or the owner/occupier's responsibility to make sure that all necessary permissions and consents are in place to cover activities prior to commencing works, and that contractors are fully aware of the site requirements.

It may take up to four months to secure consent. You should start discussions with Natural England and landowners as early as possible so a valid notice can be submitted with enough time for determination before you want to start works. You must not carry out activities on a protected site without the required permission.

European sites and habitat regulation assessment

European sites are defined as Special Areas of Conservation and Special Protection Areas.

If your plan or project is within a European site, or outside a European site but restoration activities could impact upon it, a habitat regulation assessment (HRA) may be required.

In most cases, Natural England will act as the 'competent authority' and undertake this assessment (the HRA) before deciding whether to permit restoration plans or projects. This assessment will take place prior to any formal grant offer. Where the plans or projects are being developed by s28G authorities or where a s28G authority is permitting the proposal, the s28G authority should act as the competent authority and carry out an HRA where necessary.

If you are a s28G authority and the proposed restoration work is part of the authority's function or where the s28G authority is permitting this action in the exercise of its functions, then it is your responsibility to complete an HRA prior to Atamis submission of the plan or project, unless you do not have the means to do so.

Your Atamis application should include confirmation of the decision-making process that you have undertaken under regulation 63 of the Habitats Regulations. This should include proof that the screening stage (and if necessary an appropriate assessment) has been undertaken. If you do not have the means to undertake this assessment, please make this clear within the application.

The HRA process consists of two main elements – screening and an appropriate assessment. An appropriate assessment is not always required if the plan or project is directly connected with – or necessary to – the nature conservation management of the site, or if the proposals are not likely to have a significant effect on the European site(s), either alone or in-combination with other plans and projects. This initial stage of the assessment must take into consideration all features on the site, not just those at which the restoration is aimed. This means that the appropriate assessment stage of the HRA process may still be required even if conservation management is the aim of your restoration proposals.

Protected sites outside project boundaries

You may require access to protected sites outside the project boundary, to carry out your restoration activities. This may include:

- access via an adjacent site
- storage on an adjacent site
- the use of donor material

You may want to import offsite organic materials such as timber, heather brash and bales, *Sphagnum*, nurse crop grasses, wool and plug plants to facilitate restoration actions. This may be associated with the creation of dams, or the revegetation of bare peat.

You should source donor material locally, where possible. Where donor material must be imported from an offsite location, you should closely follow the advice within **Annex 2 – Biosecurity** and complete the **donor site information document.**

You must inform the owner/occupiers of donor sites or adjacent sites used for access and storage where they are SSSIs, and the SSSI is not within the NCPGS application

boundary. You are responsible for securing prior consent, if required, from Natural England for the activity.

As consents for access, storage and donor sites may cover SSSIs outside a NCPGS application, and will therefore need separate SSSI authorisations, you should engage with donor site owner or occupier early to avoid delays.

Protected species

If you have statutorily protected species within your application area you must include this in the protected sites and protected species section of the question 2 site-specific template.

If you know that protected species are present within the application area (such as otters, beavers, water voles, great crested newts or freshwater pearl mussels etc.) and may be affected by the restoration works, you must demonstrate how impacts on those statutorily protected species will be avoided and/or mitigated to comply with legislation.

If you are unsure whether you have protected species on your site, information is available on the Magic website, using the interactive mapping tool. Your local records centre will also hold details of protected species previously recorded in that area. The most suitable local records centre for your site can be found using the Association of Local Environmental Records Centres 'find records centre tool'.

You may need to collect baseline data to determine the presence/absence and population abundance of protected species or to produce a full Ecological Impact Assessment (EcIA). You should consider these requirements and complete data collection prior to applying for a grant.

Where to get help

Your ecologist should be your main source of ecological advice.

Your local Natural England area team can give advice regarding local species and issues to be aware of. If you do not know your area team contacts, the NCPGS team can help put you in touch. The NCPGS team can advise on live Restoration Grant projects or during the pre-application period. During the live grant application window, you must seek advice via Atamis.

Annex 5. Guidance on Historic Environment Assessments (HEAs) for Peatland Restoration

Nature for Climate Peatland Grant Scheme

Guide for Applicants

Date: February 2023

Version: 3.0 Draft

www.gov.uk/natural-england

Contents

About Historic Environment Assessments (HEAs)

You must complete an HEA to meet the historic environment standards for NCPGS Restoration Grant applications. You must complete it for the area proposed for Year 1 works **before** you apply and submit it with the Restoration Grant application.

You can complete HEAs for later years during year 1 of your Restoration Grant. However, they must be completed and submitted with your restoration plan by the end of quarter 1. See the **Guide for Applicants – Activities in year 2 onwards** for more details. HEAs may affect the order in which you decide to undertake works. For example, you may decide to work on areas where the archaeology is well understood first.

Note that any work undertaken prior to a Restoration Grant may **not** be claimed retrospectively.

About this guidance

Use this guidance, including any links, to help you complete an HEA.

Natural England and Historic England have joint guidance on the wider principles of *Peatland restoration and the historic environment: Standards for delivering environmentally sustainable peatland restoration projects* which is compatible with this detailed guidance

Further information about peatland archaeology can be found in Historic England's documents:

Peatlands and the Historic Environment: An Introduction to their Cultural and HeritageValue.

What an HEA involves

You need to find a qualified archaeologist and get their advice to:

- complete an Historic Environment Record (HER) consultation and desk-based assessment (DBA)
- identify and undertake any scoping surveys necessary, such as remote sensing or fieldwork
- describe the impact of proposed works on the historic environment, including adjacent monuments, donor sites, access routes etc

- create integrated proposals for restoration planning
- plan how to deal with any contingencies, such as discovery of human remains

You must have **all** of these elements for your HEA to be signed off as complete for year 1 works.

If you intend to complete HEAs for year 2 works onwards during the agreement you must show what each of these elements would cost in your application. You should provide quotations or estimates as part of your application in the **Commercial questionnaire**.

You may want to complete a DBA for the whole potential restoration area, even if you must only scope year 1 of works before applying for a multi-year Restoration Grant. This may be the best value for money.

Find a qualified archaeologist

The HEA must be done by a qualified archaeologist(s), who may be a staff member or contractor. They must have knowledge of:

- historic environment legislation in England
- industry best practice as described in the Chartered Institute for Archaeologists (CIfA) Standards and Guidance

They should have experience of:

- consulting records and databases for archaeological evidence, sometimes called desk-based assessment or DBA
- field-based or remote sensing survey in upland or lowland peat environments
- giving heritage management advice
- archiving data gathered during fieldwork

You can use an archaeological professional accredited by the CIfA. They offer guidance on finding contractors.

You can use an archaeologist who is not accredited, but they must give evidence of:

- references for similar work
- archaeological qualifications – a minimum of tertiary education in Archaeology, Heritage Management, or an allied subject
- appropriate insurance

If you are uncertain about whether an archaeologist fulfils these criteria you can ask the Nature for Climate Peatland Grant Scheme Senior Historic Environment Adviser.

Where a project partner, like a National Park Authority, is offering the services of their archaeologist as an in-kind contribution you must explain this in your application and state how many sites this arrangement will cover. You must estimate the cost of the work and include it in both the total cost and in-kind contribution sections of the **Commercial questionnaire.**

If you have an archaeologist on staff, you must make clear that this work is included in your staffing costs in the **Commercial questionnaire**.

Include any information about your archaeologist(s) in your response to **Q4 - Experience and ability to deliver**.

If using contractors you should share this guidance document when you request tenders, to help your archaeologist understand the work and the standards they need to achieve on your behalf.

Desk-based assessment

Desk-based assessment (DBA) considers known historic environment features that a peatland restoration project might affect. This is through analysis of written, graphic, photographic, or electronic information.

Within a specified area, it will usually identify the:

- known heritage assets and their interest and significance
- character of the study area, including considering the settings of heritage assets
- nature, extent, and quality of potential archaeological, historic, architectural, and artistic interest

For this scheme, the DBA should focus on the nature and extent of physical features rather than their characterisation. Detailed study of archived material is not required.

An archaeologist can usually do a DBA at any time of year.

How to commission the DBA

To commission the DBA:

- create a project brief compliant with the requirements of this guidance explaining the work that you need completed
- find a suitable archaeologist
- request that they complete the DBA following the industry standards set by CIfA

The project brief should include:

- the area to search, as either a radius around a central National Grid Reference, a buffer around the site boundary, or a .shp file or .dxf file
- the context and purpose of the search request - to inform peat restoration work funded by the NCPGS Restoration Grant
- a brief description of the proposed restoration work
- what specific information you need (as described below)
- the formats you need search results returned as, such as mapping as GIS .shp files or .pdf maps
- when you need the search results back, allowing time to integrate the results into your restoration plan

If you miss out any of this information then your archaeologist may misunderstand the work and give inaccurate advice. For example, they may assume that this is a planning-related consultation in advance of development.

The brief should describe the work schedule in enough detail to quantify, implement and monitor the project. The brief would be the basis for a contract specification or project design, sometimes called a Written Scheme of Investigation (WSI), completed by your archaeologist.

What the DBA should include

You or your archaeologist should contact your local Historic Environment Record (HER) and local authority or National Park archaeologist directly for data. Some organisations, such as the National Trust, may also maintain a HER. You should not use online data as this is often incomplete. This service may incur a charge.

The DBA datasets requested should include a minimum of:

- Historic Environment Record (HER) Monument and Event data, including database records and mapping
- designated heritage assets on the National Heritage List for England
- designated heritage assets registered under the Protection of Military Remains Act 1986 – if your local HER does not keep this data refer to the Defence of Britain database which can be used with Google Earth

You should also include any other relevant datasets required to understand the site, for example, previous palaeoecological analyses.

If land is in a live agri-environment agreement, you also need to include Selected Heritage Inventory for Natural England (SHINE) data or, for longstanding agreements, any historic features identified in your Farm Environment Plan (FEP) and accompanying Historic Environment Record (HER) consultation. These are a type of non-designated historic feature protected via agri-environment schemes. The presence of SHINE or historic

features may affect the **permissions and consents** you need for a restoration project. This data alone is not of high enough resolution to inform restoration plans.

You can find SHINE or historic feature data for:

- Countryside Stewardship (CS) agreements that went live within the last 3 years at the Historic Environment Farm Environment Record (HEFER) Portal (use the relevant Single Business identifier number to retrieve it)
- CS agreements over 3 years old, or Environmental Stewardship (ES)agreements, from agreement documentation held by the agreement holder

Natural England is unable to provide information on SHINE for you. If you do not include this data in your application where there is a live agri-environment scheme the NCPGS team may request further clarification.

Restoration works are unlikely to physically impact some historic interest, such as:

- place names
- intangible cultural heritage

You do not need to include plans for how to deal with these, unless your archaeologist believes they may indicate previously unrecorded historic features.

You will not need historic landscape characterisation (HLC) data.

Outputs from the desk-based assessment (DBA)

The DBA report should include the name, qualifications and any relevant professional memberships of the author.

It should identify, within all areas that the restoration plans will affect:

- designated historic features
- known non-designated historic features (plus data about features protected via agri-environment where relevant)
- areas where the archaeological resource is poorly understood due to lack of prior systematic survey

The DBA should also identify areas:

- unlikely to have remaining archaeological potential, such as former landfill
- where archaeological layers are buried below the level of ground disturbance, such as on warped peat

You may not need to survey these areas even if they have never previously been surveyed.

The data must be presented in both map format and gazetteer format. This will allow you to identify any overlaps with proposed works more easily. You must cross-reference these elements to show which site they lie within, or if they lie within the search buffer.

You must include the full data in your submission. An email stating that you have undertaken this check is not sufficient.

The map of known historic sites must show the boundary of the restoration site(s). It may cover more than one site. If multiple sites are included the map must show sufficient detail for each site to determine if historic features are co-located with restoration work. See **Spatial data** for information how to format your data.

Where possible the DBA should be supplemented by advice from a local authority or National Park archaeologist about:

- Whether the known historic features accurately represent the full archaeological potential.
- Recommendations for further work needed

You can add this advice as an attachment if you received it via email or quote it within your HEA.

Scoping surveys

Decide if you need scoping surveys

You need scoping surveys in areas that restoration proposals will affect, where the DBA shows that the archaeological resource is poorly understood. Your archaeologist will tell you when this is the case. This may be in areas:

- not previously surveyed
- where the previous survey was a long time ago, sporadic, or at very coarse resolution

You do not need scoping surveys in areas that restoration plans will not affect, even if they were not previously surveyed.

You should not use very large exclusion zones to avoid scoping surveys as this may compromise the hydrological restoration of the site.

The HEA requires you to assess potential for unrecorded historic environment features that peatland restoration may impact. Scoping surveys meet this requirement.

When to do scoping surveys

Your archaeologist must do surveys at an appropriate time of year. Consider constraints in survey timing when you plan your project. These may include:

- species related issues, like avoiding disturbance during the bird nesting season
- physical issues, such as difficulties in conducting field survey when bracken is high
- safety issues, such as grouse shooting
- timing issues, such as needing to incorporate the results into your restoration plan by the end of quarter 1

You should include the estimated timing of any scoping surveys in your project gantt chart.

What scoping surveys involve

You will need a qualified archaeologist to do scoping surveys. You should discuss the type of scoping required with your archaeologist, referring to any advice which you received from the Local Authority or National Park archaeologist. If you have not received advice from a local authority or National Park archaeologist, discuss with the Nature for Climate Peatland Grant Scheme Senior Historic Environment Adviser prior to the opening of the application window.

Scoping surveys may include analysis of existing remote sensing data, such as:

- LIDAR, of at least 1m resolution
- rectified aerial photography, using approaches like those used in the National Monuments Mapping Programme pilots
- any other relevant datasets

Scoping surveys may include field-based surveys, like:

- archaeological walkover surveys (Historic England Level 2)
- gouge or auger surveys
- drone surveys
- any other relevant field survey technique

Surveys should be proportionate to the size of the site and the benefits of restoring it. They should show the nature and extent of archaeology to a high enough resolution to inform peatland restoration. You do not need to collect information for archaeological research alone. Unless useful for the restoration project, they do not need to include:

- archaeological walkover surveys across the entire site, only those areas affected by work and poorly understood (see A_worked_example)
- the topography of individual historic features

- palaeoecological cores, unless you plan to use these to inform the restoration or associated engagement activities, or to mitigate the destruction of palaeoecological deposits

All archaeological work should follow industry best practice in the relevant Chartered Institute for Archaeologists standards and guidance.

You should include information collected via survey in the final HEA report and submit it to the HER. Many HERs have their own requirements for data deposition. It will be useful to consult them before finalising reporting requirements with your archaeologist.

A worked example

The figures below show how you might use a DBA and scoping surveys to inform restoration works, and their timing to apply for a Restoration Grant.

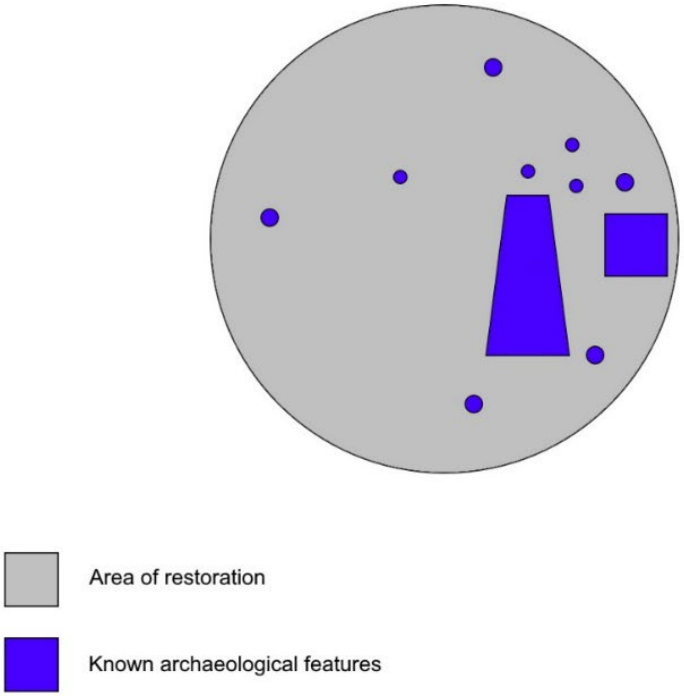

Figure 1 – Known historic features (HER monument data)

This image appears to show that the south-west of the site lacks known historic features.

Maps like this are often generated as part of agri-environment agreements, such as FEP plans or HEFERS. The first stage of a DBA showing known historic features may be similar to this.

This work alone would not meet the requirements of an HEA, because it does not:

- assess the potential for significant unrecorded historic features
- demonstrate the impact of proposed works

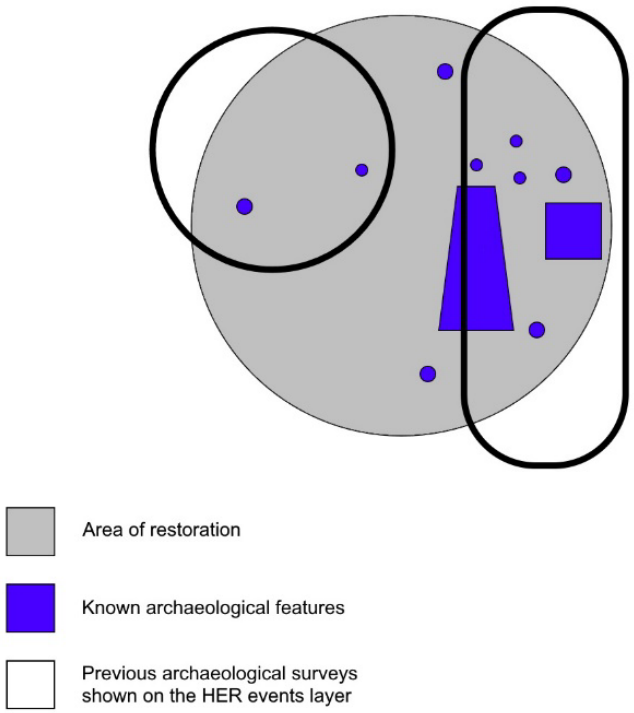

Figure 2 – Known historic features plus past surveys (HER event data)

This image shows that there have been no previous surveys in the south-west of the site, although there have been surveys to the north-west and east. As such the apparent lack of historic features may be due to lack of systematic survey.

You will need to undertake further scoping surveys in the unsurveyed area. However, as yet, you do not know where to locate these surveys.

Within the previously surveyed areas you assess the impact of proposed works, using the knowledge about known historic features from your DBA. You check the impact of any works, consulting with your archaeologist, and use the mitigation hierarchy (as described in **Creating Integrated Proposals**) to ensure that this impact is considered. These are your Year 1 works.

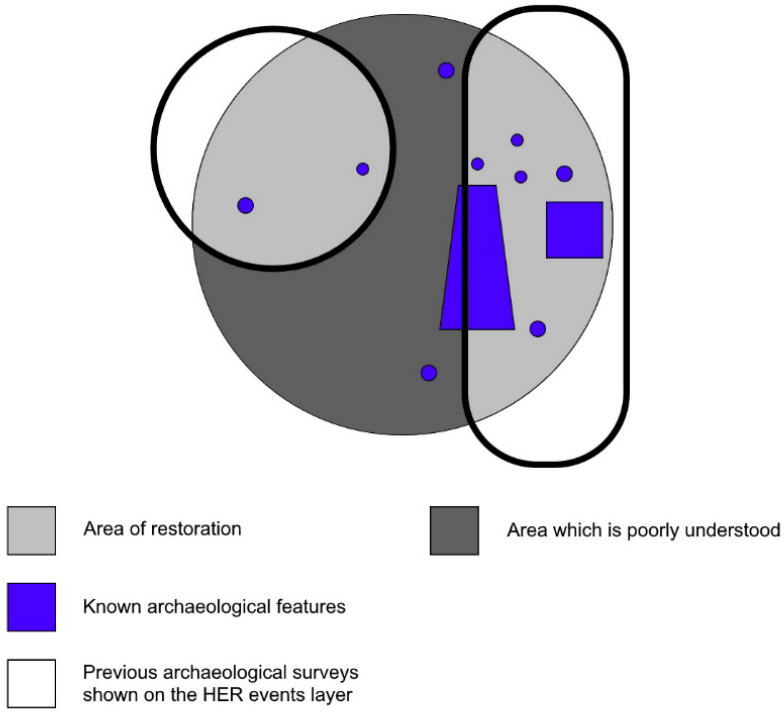

Figure 3 – Area that is poorly understood

Areas which have had no previous systematic survey may have occasional known sites but remain poorly understood. They will need further survey unless you receive advice from our archaeologist or a local authority or National Park archaeologist stating otherwise.

You will need to defer any proposed works here until Year 2 of your Restoration Grant and amend your draft application accordingly.

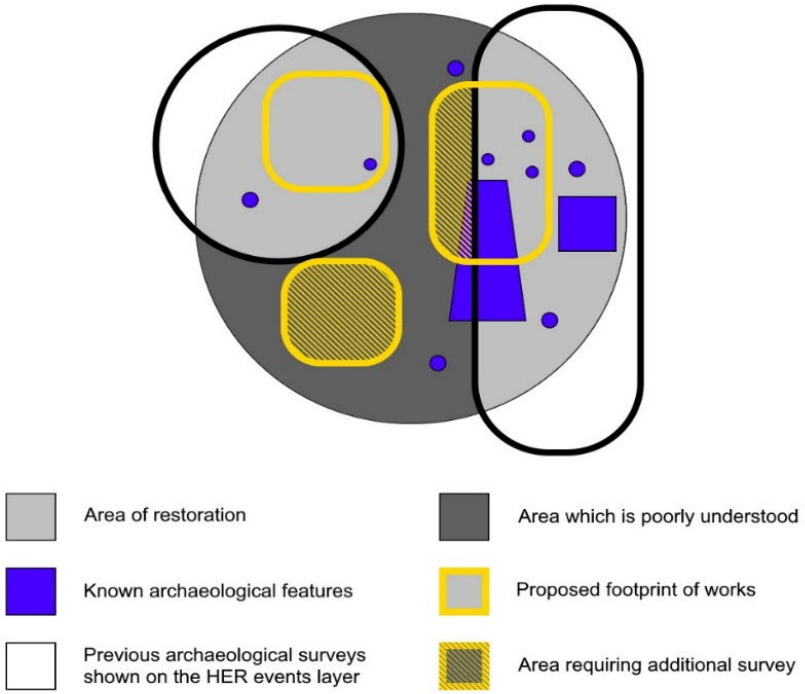

Figure 4 – Area affected by works and requiring further scoping survey

You will need to work out what costs to include in your Restoration Grant application for further scoping survey. To determine how large the survey area should be, compare the actual footprint of proposed works against the poorly understood area.

The image shows areas that are **both** poorly understood and affected by proposals as hatched areas. These areas should have further scoping and should be deferred to Year 2 of your Restoration Grant. Once you know the size of these areas you can get quotations or estimate costs.

You do not need further survey on the rest of the poorly understood areas as these will not be affected by works.

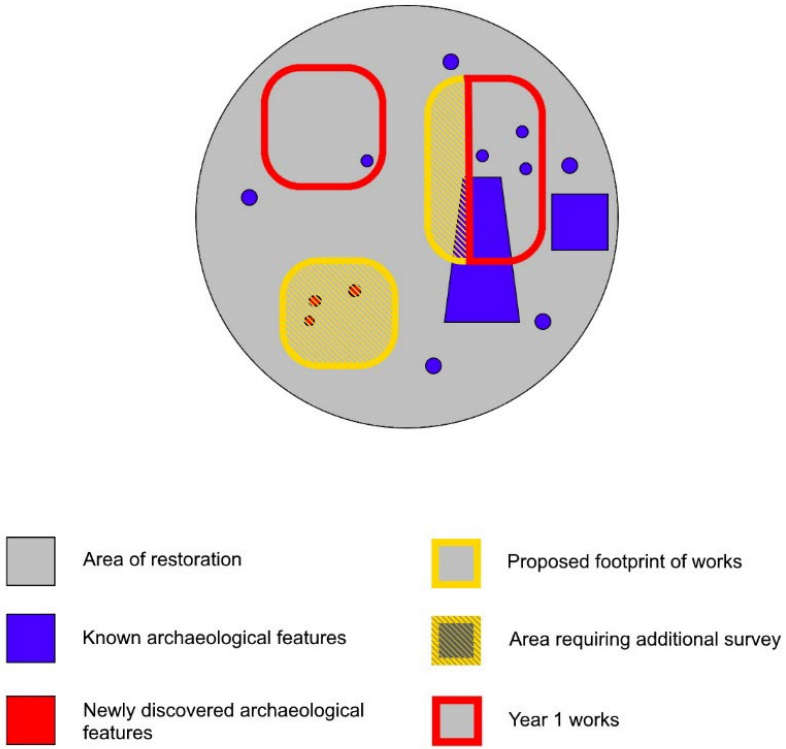

Figure 5 - After a successful Restoration Grant application

You proceed with works as discussed in Year 1 on areas that were identified as well understood. Meanwhile your archaeologists survey the hatched areas indicating possible impact on poorly understood historic features.

The results of the scoping surveys in Year 1 will form the HEA for Year 2 of the Restoration Grant application. You can see that the previously 'blank' area in the south-west of the site does contain some newly discovered historic features that coincide with work. You do not discover any new sites in the north-eastern survey area.

Again, you check the impact of any works, consulting with your archaeologist, and use the mitigation hierarchy (as described in **Creating Integrated Proposals**) to ensure that this impact is considered. Work can now also proceed in these areas in Year 2 onwards.

Understanding impact

Impacts of peatland restoration on historic features can be both positive and negative.

Positive impacts can include:

- halting or repairing erosion
- restoring water tables on historic features that were once waterlogged (and are not yet fully dry)
- removing woody or deep-rooted vegetation

Any positive impacts identified should be included in your NCPGS Restoration Grant application under Environmental Benefits - Non-carbon as historic environment benefits. This may improve your application scoring.

Negative impacts are often referred to as damage. A range of activities undertaken during peatland restoration may cause negative impacts including:

- vegetation management
- machine access
- ground disturbance
- excavation
- altering soil chemistry, such as liming
- redistribution or removal of historic material
- dumping
- altering water levels on fragile or dried-out archaeology
- encouraging woody or deep-rooted vegetation

Some activities are complex to assess and may have both positive and negative impacts. For example, encouraging peat growth is usually desirable as, alongside its carbon capture benefits, it protects historic features. But it may also obscure these features from view, and reduce their accessibility to the public.

Managing the way in which restoration activities are undertaken can often change the impact from negative to neutral or even positive. Negative impact should also be seen in the context of climate change; short term or minor negative impact to historic features may sometimes be acceptable in order to avoid long-term, major impacts, or complete loss of the feature, due to loss of the peatland itself.

When considering the impacts restoration proposals will have on the historic features, this must include the entire area of peatland proposed for restoration alongside all other land that may be impacted, including:

- the footprint of works including site access routes
- the area which will experience change, such as raised water levels
- donor sites, such as (for collection of heather brash, sphagnum, or other restoration materials)
- adjacent monuments (where their setting is affected)

Impacts depend on the types of activities and historic features present. For example, vehicles could clip above ground earthworks, but are less likely to affect a below ground feature.

Impact may also depend on peat depth. Some types of archaeology, like flint scatters, may be concentrated at the base of the peat where it meets mineral soils. Shallower interventions can avoid these layers. In some peatland, extensive peat cutting/milling or erosion means that older peat layers are now closer to the surface because the more recent peat has been removed. This older peat is more likely to be archeologically significant and therefore vulnerable to restoration works. As such you need to discuss restoration proposals with your archaeologist early in planning so that they can help you to understand the potential impact of works, both positive and negative, on historic features.

You must discuss the impact of proposed works on historic features in your HEA, or in your restoration plan, referring to information from your HEA. You must use this impact assessment to inform your restoration proposals. You should present your impact assessment either as a summary table (see Figure 6 and 7) or text description.

If you do not adequately explain how you plan to avoid negative impacts this may negatively affect your application scoring.

This type of archaeological impact assessment does not replace a Cultural Heritage Impact Assessment (CHIA) for world heritage sites – see Permissions and consents.

An example of an impact assessment table and worked peatland restoration example are provided here for reference:

Value of heritage asset	Scale of change/impact					
		No change	**Negligible change**	**Minor change**	**Moderate change**	**Major change**
	Very high/international value (WHS)	Neutral	Slight	Slight/moderate	Large/very large	Very large
	High/National value (SM, Listed buildings & RPG, Registered Battlefields, Military sites & High Priority SHINE, undesignated sites of national value)	Neutral	Slight	Slight/moderate	Moderate/large	Large/very large
	Medium/Regional value (Locally Listed sites, undesignated sites of regional value, medium priority SHINE)	Neutral	Neutral/slight	Slight	Moderate	Moderate/large
	Low/Local value (undesignated sites & Low Priority SHINE)	Neutral	Neutral/slight	Neutral/slight	Slight	Slight/moderate
	Negligible	Neutral	Neutral	Neutral/slight	Neutral/slight	Slight

Figure 6 - Assessing the severity of impact (value x scale = severity); adapted from ICOMOS Guidance on Heritage Impact Assessments (2011)

Site reference	Feature reference	Type of feature	Proposed works	Type of impact	Value of heritage feature	Scale of impact	Significance of impact	Proposed mitigation
EXAMPLE - Mucky Bog	SM100543	Burial mound (above ground and below ground remains)	Peat dams x 100 (5m separation)	Ground disturbance	High (Scheduled monument)	Moderate	Large/very large (negative)	AVOID – Exclusion zone for peat dams on scheduled monument and 20m buffer surrounding it (see associated mapping, exclusion area A).
EXAMPLE - Mucky Bog	HER feature 12345	Peat cutting (above ground remains)	Reprofiling	Ground disturbance	Low (Undesignated HER feature)	Moderate	Slight (negative)	MINIMISE – Works in this area will make minimal interventions and will **not** take material from the edges of cuttings maintaining their shape. Blocks and bunds within the cuttings will not be higher than the edge of the cuttings. Peat for blocking will be taken from the base of features or from locations away from the cuttings.
EXAMPLE – Mucky Bog	HER feature 67890	Palaeoecological deposits within peat	Rewetting	Changes to hydrology	Low (Undesignated HER feature)	Major	Moderate (positive)	Positive impact, no mitigation required – rewetting the site will exclude oxygen, stabilise the hydrology, and improve preservation conditions.

Figure 7- Example impact assessment for historic features within peatland restoration working zone, also showing proposed mitigation to avoid, minimise or mitigate impact

Creating integrated proposals

Your archaeologist will provide information from the DBA and scoping surveys, plus information about impact in the HEA. You will need to discuss your peat restoration proposals with them. They need enough information about your proposals to identify possible conflicts and how to address them, see Understanding impact.

You must show any recommended areas of mitigation on either the HEA mapping or the restoration plan mapping. Your maps may either show individual mitigation proposals, such as exclusion areas around known historic features, or may use a zoning method, such as the 'traffic lights' method (*Thom et al 2020* p.60) where different areas of the site are shown to have different levels of sensitivity and protection.

Finalising your proposals may be an iterative process as your knowledge of the site grows and your plans develop. You could set milestones in the project to check your proposals with your archaeologist. You must have finalised your mitigation proposals by the time you submit your restoration plan.

Your archaeologist is unlikely to be an expert in peat restoration. Understanding peat restoration works well will help them recommend more practical solutions. You should allow time and costs for them to speak with peat restoration contractors and experts. This may include:

- a joint site visit to complex areas
- online or site meetings
- sharing images of machinery
- sharing guidance on peat restoration, such as **Annex 1 - Peatland restoration**

When proposing solutions your archaeologist must aim to:

- avoid damage to historic environment features and the peat deposits
- minimise damage where it is unavoidable
- mitigate damage as a last resort, as approved by the Nature for Climate Peatland Grant Scheme Senior Historic Environment Senior Adviser

They may also be able to help you identify non-carbon benefits, such as instances where the peatland restoration addresses issues with the historic feature, or where it may provide a future focus for recreation.

Avoiding damage

To avoid damage, you should:

- consult your historic maps when you plan where works will take place

- mark sensitive areas with exclusion zones of an appropriate size and ensure contractors are aware of these
- locate features such as bunds or borrow pits away from historic features where possible
- avoid crossing historic features to access the site
- avoid storing materials or vehicles on historic features
- consider temporary fencing where you have been alerted to very fragile sites
- explain to contractors in a Toolbox Talk what signs may indicate the presence of archaeology and when to stop work and seek additional expert advice
- use GPS enabled machinery to help contractors avoid features during work

Your exclusion zones should include a buffer around the feature of 10m for undesignated sites and 20m for designated sites, unless advised otherwise by the relevant authority as part of your permissions and consents, or by the NCPGS team. SHINE features already include a buffer so you do not need to add an extra buffer for this type of historic feature. Where an exclusion zone is large you must ensure that this does not compromise the restoration of site hydrology. In this case some impact on historic features may be unavoidable and you should aim to minimise damage.

Minimising damage

It may be difficult to avoid all damaging activities on very large landscape scale historic features, like mining landscapes, or where the feature itself is draining water, such as peat cuttings, historic leats and drains, or hushings (a form of mining feature).

Successful peatland restoration is likely to change the setting of a historic feature. It may make it more difficult to access and address its needs. It is unlikely to help the historic feature if you just exclude it from the restoration area without considering its needs, although sometimes a consenting authority may request this.

If you cannot avoid some activities, you can change how you do them in areas with historic features. You should aim to reduce damage to below moderate impact.

In these cases, your contractor should:

- identify areas of the feature of lesser significance for the activity, such as siting peat borrow pits away from areas where features overlap (these often show relationships between features)
- suggest methods with lower impact such as; blocking grips with another material rather than digging peat from borrow pits, revetting hagged areas rather than reprofiling them, or using coir logs – see **Annex 1 – Peatland restoration**
- change the machinery or methods used, such as using low ground pressure vehicles, and bog mats where machines need to cross historic features

Alternative methods may be less effective at restoring hydrology. You will need to balance protecting the historic environment with achieving the best possible results from your restoration activities. You do not need to alter your methods across the whole site, only where historic features are likely to be affected.

Mitigating damage

Mitigation should be a last resort. Always try to avoid or minimise damage first. Land in agri-environment schemes may have conditions around loss of archaeological features. It is usually not acceptable to plan for total loss and recording of an historic feature protected via an agri-environment scheme as this may cause a breach of the agreement.

Mitigation can be expensive. It requires an archaeologist to attend the site before or during works. For example:

- to survey and record a feature, or partial feature in advance of loss
- to collect artefacts, such as where finds are eroding from hagged peat and the area needs reprofiling, to avoid further loss
- to supervise machinery and record artefacts or features discovered during work, sometimes called a ‘watching brief’
- to conduct trial trenching in advance of work in an area of known archaeology

Your archaeologist or a local authority or National Park archaeologist will usually be able to advise on when mitigation is needed. If in doubt consult the Nature for Climate Peatland Grant Scheme Senior Historic Environment Adviser.

Any mitigation work should follow the appropriate Chartered Institute for Archaeologists (CIfA) industry standards and guidance.

Contingencies

Some types of archaeology are difficult to anticipate. Plan what you will do if your peatland contractors find something unexpected of historic significance and add this information to your risk register. For example, human remains known as ‘bog bodies’ are sometimes found in peat bogs. If you find human remains you should stop work immediately and seek further advice from your archaeologist and the relevant authorities.

You may need contingencies to cover unexpected discoveries. You are more likely to need further archaeological advice during a multiphase project, or one including experimentation or new techniques. You should include anticipated costs for this in your Restoration Grant application. These should be proportionate to your level of uncertainty about the historic environment.

Evidence

A completed HEA consists of:

- your DBA and any advice from the local authority or National Park archaeologist
- the results of any scoping survey (if required)
- evidence that you have systematically considered the impact of proposals on the historic environment
- evidence of any changes you have made to proposals to avoid, reduce or mitigate impact

The HEA aims to ensure that data and evidence support your understanding. You can show this data in the way that best suits your project. This may include:

- tables
- diagrams
- mapping, including GIS mapping
- written reports

You can have one large HEA covering multiple sites, or you can have smaller ones for each site. You may merge your HEA with your restoration plan providing all the elements are present, but you should tell us in your application if you have done so. It is up to you to ensure that costs are proportionate; if they are very low or very high the NCPGS team may ask for further information.

Identifying evidence gaps

An HEA for any proposed Restoration Grant must describe the historic environment in areas targeted for work in year 1. It can also include information about subsequent years. If you carried out your HEA during a Discovery Grant a copy must still be submitted with your Restoration Grant application.

For a one-year Restoration Grant application the HEA would cover all works.

For a multi-year application, along with the full HEA for the first year's works, the NCPGS team recommend that you complete the DBA for the entire area, even if you need to complete further surveys during the project.

This will mean you can:

- quantify areas where the historic environment is not yet fully understood
- submit costings for any scoping surveys to do before restoration work in years 2 onwards

Permissions and consents

If you plan to work on designated sites you need to get bespoke advice from the relevant authority.

Designated sites (and their setting) may include:

- military remains covered by the Protection of Military Remains Act 1987 (most air crashes)
- scheduled monuments
- listed buildings
- registered battlefields
- registered parks and gardens
- conservation areas
- world heritage sites

For world heritage sites you may be asked to complete a Cultural Heritage Impact Assessment (CHIA). Advice on the level of Cultural Heritage Impact Assessment required can be provided by World Heritage Site co-ordinators.

If the land is in a live agri-environment agreement and there are any non-permanent changes to SHINE or other historic features from restoration works, you may need to request a minor and temporary adjustment from the Rural Payments Agency (RPA). You should work with the agreement holder to do so, as RPA may refuse to communicate with third parties. See **Other schemes and grants** for more detail. The NCPGS team cannot help you with minor and temporary adjustments.

If a change to an historic feature in an agri-environment scheme would be permanent contact the Senior Historic Environment Adviser (Peatlands) with details of the overlap – they will assess your proposals and provide an expert opinion to RPA on whether changes to an historic feature in agri-environment are justified. For all other permanent changes to environmental features protected via agri-environment you must contact RPA direct, with the permission of the agreement holder.

You should liaise with consenting authorities, like Historic England, early on. They may have minimum timescales to respond to requests for advice. Their advice may affect costs and the nature of proposed restoration work. For example, consent may require changes in working practices and knowing this will help you estimate costs.

If you are given advice early on that the relevant authorities will not give consent for work on a designated site, you should not include this area in carbon calculations for a Restoration Grant application.

Legal requirements apply where works may affect human remains. You should follow established professional guidelines. You can find guidance on burials legislation from the Ministry of Justice and Historic England.

Monitoring

As part of your normal record keeping, you must maintain records of:

- the known historic features within the proposed restoration area (your HEA fulfils this requirement)
- any consents or permissions obtained relating to the historic environment
- spend on historic environment work (as part of your normal spend tracking)

You should only undertake further monitoring of historic environment features if:

- It is part of the way you intend to avoid, minimise or mitigate damage to historic features
- It says that you will undertake this work in your HEA or other grant application documents
- It is required as part of an agreement with a consenting or permitting body, for example Historic England
- it is needed to evidence societal benefits for cultural heritage proposed as part of your Restoration Grant application (for which you may have received enhanced scoring during the application process)

In these cases, you should ensure that you meet your own stated goals and keep appropriate records to evidence this in case of audit.

Where to get help

Your archaeologist should be your main source of archaeological advice.

The Senior Historic Environment Adviser (Peatlands) will give advice on live projects during the pre-application period. They will not give bespoke advice during live grant application windows other than via the clarifications system.

You can find more help:

- by finding a Local Authority archaeologist
- from Historic England's science advisors

There may be a charge for some of these services.

The NCPGS will not cover costs incurred before it is awarded, unless as part of a Discovery Grant project.

References

Historic England 2021 *Peatlands and the Historic Environment: An Introduction to their Cultural and HeritageValue* HEAG300a (version 1.1) Portsmouth Historic England

Natural England & Historic England 2022 *Peatland restoration and the historic environment: Standards for delivering environmentally sustainable peatland restoration projects* (version 2) York Natural England

Thom T., Hanlon A., Lindsay R., Richards J., Stoneman R. & Brooks S. 2020 Conserving Bogs The Management Handbook 2nd Edition.pdf (iucn-uk-peatlandprogramme.org) IUCN UK Peatland Programme

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