

A rapid method for basic peatland condition and national-scale satellite analysis

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Rapid Peatland Assessment

This method has been developed to assess the condition of peatlands, now and in future, using up to date freely available satellite imagery. Accurate and reliable interpretation of satellite imagery requires ground-truthed validation data of peatland condition. Therefore, this field method is designed to give a **rapid basic site condition assessment** for the user, while collating required data for **national satellite image analysis**.

We are asking **all peatland restoration projects and land managers** to adopt this strategically aligned assessment as a minimum baseline method for a local scale rapid site condition assessment that feeds into the national satellite image assessments.

Benefits for project and land managers:

- A tested, robust and widely used method of monitoring peatland condition that ensures data longevity and usefulness for change over time.
- Value added data use beyond own aims with contribution to national assessments.
- Adopting a standardised method will enable a comparison of data to freely available national assessments, informing the best practice guidelines and latest management developments.

The data outcomes will provide a **localised rapid site condition assessment** to help inform the direction of future management and interventions, while **driving the national scale assessments** of peatland condition, carbon store estimates, GHG emissions and intervention effectiveness.

The Rapid Peatland Assessment acts as a minimum baseline method useful for satellite imagery analysis. With the **Peatland Monitoring Manual** developed for greater understanding of site specific peatland condition. Furthermore, the **IUCN Eyes on the Bog** citizen science method for basic peatland monitoring guidance is very useful and worth referring to during site assessment planning.

Please note this '*rapid*' assessment does not conform to Common Standards Monitoring (CSM) guidance. To undertake the CSM would require a higher level of vegetation identification, not deemed as essential for these assessment outcomes.

There are **3 steps to undertaking the Rapid Peatland Assessment**:

- 1) Site selection & history**
- 2) Field data collection**
- 3) Assessment & reporting**

Benefits for national peatland assessment:

- Broad spatial coverage of data to produce a reliable and robust assessment.
- National standardised method for recording peatland condition that informs national level assessments, leading to a strategic and targeted future development of restoration and maintenance.

Below is a **step-by-step guide** to preparation, on-site data collection, assessment and reporting, with related documents and reference guides for data formatting and quality assurance.

Step 1: Site Selection & history

Summary

To begin it is important to select the site, develop a map with where you plan to collect field data and gather site wide information and history.

It is essential to view the site before you go out into the field to get a grasp of what you might expect when you are out there, primarily for access and safety, but also to ensure time efficiency during the field data collection (**Step 2**).

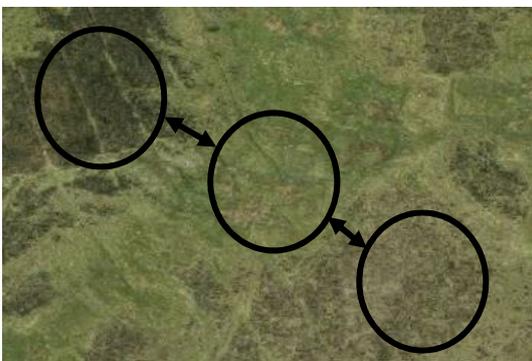
Investigating site wide information, including its history, provides an excellent background to the site to help interpret the field data and plan an effective site assessment, because you will have an idea of what to expect and what to look out for when in the field (although take care as some things might surprise you!).

To complete *Step 1* you will need:

- Access to digital imagery software (e.g. Google Earth)
- Access to spreadsheet software (e.g. Microsoft Excel)
- To collate coordinate data for your site.

Select site & produce an annotated map

- 1) Find the site location **using a digital imagery software** (i.e. Google Earth or a GIS platform) and **produce a map** of your area of interest.
- 2) **Annotate the site map** with site access, peatland boundary and the area you wish to conduct field data collection.
- 3) Using the spreadsheet provided, list the **coordinates** of where you will conduct field data collection – **aka each 'plot'**. The field data collection design is a grid of 10m x 10m plots, spaced 100m apart across the site. Predetermining the grid locations ensures a good spacing between plots and is much easier while in the field to locate the next plot.
- 4) **Annotate the site map with key features** evident on the imagery that you can investigate when in the field, noting the location code of each to help direct for investigation while on site. For example:



Transitions in vegetation – you can see evidence of different vegetation that could be a sign of changing drainage or peat condition.

Straight lines – could signal active or historic drainage channels.



Shadowing – could be a hag or a gully, a sign of peat subsidence and erosion.

Alternative plot recording using the Q field App

Uploading the plot locations onto the Q field app has been used to good effect during assessment development and testing. The app will help guide you to your next plot location, input the required data and save a picture that is geo-tagged to the plot. This not only saves time in processing the data at the end of the day, but can also be quicker in the field (as long as the battery on your phone or tablet survives).

Details of how to prepare and use the app is provided in '**Peatland Assessment: Using the Q field App**'.

Site information, history & background

Finally (yet very importantly!), complete the '**Appendix 1: Site Information**' sheet as best as you can to record the background of site history and management. Most of this information you will be able to gather as a desk based exercise and confirm while out in the field. The information will help interpret the field data and can help prepare you to know what to look out for in the field.

Below are some **helpful tips to answer the Site Information sheet**:

Name – quite simple (hopefully), it is always good to know who filled in the sheet in case there are any questions in the future.

Organisation – again simple, good to know where to contact for more information.

Date – preferably in the format *dd/mm/yy* to save any confusion.

Visit no. – the assessment can be repeated over time to see if any changes have occurred and to update satellite imagery analysis, so state the visit no. so you can be reminded there might be more historic data to compare to.

Site size – estimate the whole site area in km². Easily measured on Google Maps, by: finding your site location, right click on the map and choose ‘*measure distance*’, left click points around the perimeter of your site until you reach the 1st point, the area will show at the bottom of the screen.

Elevation – this can be recorded using Google Earth, or there are lots of free elevation finder tools on the internet with a quick search. An average estimate for the whole site is suitable.

Site description – this maybe takes a little more knowledge... if you are unsure of the differences between the types of peatland, try a google search for a terminology description.

Context – what typography does the site lie in? A basin, valley-bottom, a ridge? Use your map to make a judgement and confirm while out in the field.

Current land management – again, a little tougher to determine. Speaking to the land manager / owner might help. Also, looking for signs of drainage ditches (open or blocked), animals, burnt vegetation, etc, will help guide your answer.

Known land management changes – once more, speaking to the land manager / owner could help here. Also, looking at historic images and aerial photographs could shed light on what has happened on site historically.

Evidence of peat erosion – most evident near gully edges if the peat is subsiding into the gully revealing hags.

Evidence of peat cutting – maybe clear in digital imagery or should be evident on site if there are large straight cuts down into the peat revealing a cliff face of peat (note this maybe different to subsidence or a hag revealing a peat face cliff).

Evidence of peat drainage and condition – looking for straight lines in the landscape and ditches are the clear sign here. It may be more difficult to determine if they are still open or blocked on imagery, so check some out when on site, look for areas where the ditch has been filled in with surrounding peat so it blocks the flow of water.

Evidence of peat / vegetation burning – it should be quite clear if vegetation or peat is burnt, be careful not to label it as a prescribed burn as it possibly could be natural (or accidental) fire.

Grazing – simply are animals present or at least the impacts of them present.

Grazing evidence – how do you know grazing has been happening, are they there now or just evidence of them having been there.

Recent weather of note – extreme weather can influence results, such as drought can lead to a much drier site than would be expected that can easily be wrongly attributed to drainage, or a recent storm might overwhelm the drainage making the site wetter than it would usually be.

Notes – a space to write anything else you think would be useful to know (maybe a reminder to take lunch... or other useful information).

You are now ready to get out into the field in Step 2!

Step 2: Field data collection

Summary

Having prepared well in **Step 1**, it is now time to get out into the field! While out on site you will be finding the predetermined plots and recording the data presented in '**Appendix 2: Plot Assessment**'.

Step 2 is where the core data required for peatland condition assessment and satellite imagery analysis is collected. The information collected has been tested ensuring it is **robust and inclusive** of all minimum information required.

To complete **Step 2** you will need:

- Site Information sheet
- Annotated site map
- Data input spreadsheet *or* printed copies of Appendix 2 *or* Q field app
- List of plot coordinates
- GPS / internet enabled mobile phone *or* tablet *or* GPS
- Peat probe (or potentially a long length of steel rod would be ok depending on site peat depth)
- Vegetation identification guide
- Suitable personal equipment (inc. clothing, food, drink, first aid, location tracking, etc)

Plot data collection

- 1) **Find the plot** using the coordinates direction, this marks the centre of your 10m x 10m plot.
- 2) Record the **slope & aspect** (i.e. which direction is the slope facing, e.g. North-East)
- 3) Looking north, **take a photograph**. It might be a good idea to take a whiteboard out to site with you to write the plot number, take a picture of this first before the image looking north.
- 4) **Identify the vegetation** present and **estimate the percentage cover**. Use the vegetation identification sheet in '**Appendix 3: Basic vegetation identification guide**'. Is sphagnum present? If so, are the species mixed? Is there heather present? If so, measure the approximate height. *Note:* Estimated percentage cover of vegetation is sufficient as the assessment is not designed to capture all vegetation information, its purpose is to verify what is "seen" by satellite imagery.
- 5) **Measure peat depth** using a peat probe. Push probe vertically into the peat until either solid or increased resistance is met. Mark the rod at the peat surface, pull the rod out and measure the length. Repeat 3 times within half a metre of the first depth recording.
- 6) **Surface wetness** of the plot. Press down on the surface with your foot to categorise how wet the peat surface is.
- 7) **Peat softness** is how the peat feel beneath your feet. Is it bouncy as you walk across it, or firm? You may also get a feel for if it's soft or firm when measuring peat depth. Does the probe push in and pull out easily?
- 8) **Notes** is a space for you to comment on anything you would like to come back to check in the future or any interesting finds or comments on the plot.

Repeat at each plot and confirm your annotated map and site information. Remember to keep your data safe and when you are finished, move to **Step 3...**

Step 3: Assessment & reporting

Summary

Now you have your field data it is important to think about data management and quality assurance (although this probably should have been thought about earlier than now...). Once your data is inputted, you can begin to assemble a basic site condition understanding and report your data to the national database to feed into the satellite imagery analysis and other key national assessments.

Data entry

To begin make sure your **field data is inputted accurately into the spreadsheet provided**. Check all the columns are properly attributed, there are no missing cells where there should be data and save a copy labelled with the site name and date.

Fill in the Site Information sheet with your confirmed site details on the spreadsheet tab provided.

Finally, **complete the 'read me'** spreadsheet tab, that keeps a log of all the edits made to the current version of the spreadsheet. This allows future users to check what has been done with the data and if they should be aware of any changes made.

If you are using the Q field app, you will be able to download a spreadsheet of your data really quickly and easily. See '**Peatland Assessment: Using the Q field App**' for more information.

Assessing the basic site condition

The spreadsheet has been developed to automatically update a separate tab with an average site condition assessment based on the peat and vegetation plot data. If there are errors or gaps in the data input this might not work properly and your data input will need to be checked.

The initial output of site condition is an average whole site assessment. However, with comparison to the site background and history (site information task), **the assessment can be made more robust** as justification can be added to the output. For example, if the surface wetness is mostly dry the site information might show there has been a history of drainage that would confirm the peat is likely in an unfavourable hydrological condition.

If you would like more information from your site, it would be a good idea to consider adding some more assessments and monitoring to the site using the '**Peatland Monitoring Manual**'.

Reporting data to national database

Feeding in your data is vital to the national assessments, plus it can really add some value to your data and site. Reporting your data will strengthen the national imagery assessments that are increasingly important for broad scale peatland assessment and management recommendations. The better informed these assessments are the more they will directly feed back into the practical applications on the ground for land managers, owners and interested parties.

Appendix 1: Site Information

Use this sheet to compile site data or fill in details directly onto excel file provided. This data is very important for effective field data assessment and general condition overview.

Name:		Organisation:	
Date (dd/mm/yy):		Visit no.:	
Site name:		Site location:	
Site size (km²)		Elevation (average):	
Site description:	Blanket bog Lowland fen Lowland raised bog Upland fen	Context:	Basin Valley-bottom Hill slope Ridge
Current land management:	Drained Rewetted Grazed Cropland Peat extraction Forestry Forest clearance Prescribed burning Other (specify)	Known land management changes and approximate date of change:	Drained Rewetted Grazed Cropland Peat extraction Forestry Forest clearance Prescribed burning Other (specify)
Evidence of peat erosion	Yes No	Evidence of peat cutting	Yes No
Evidence of drainage and condition	Deep Shallow ----- Blocked Open	Evidence of peat / vegetation burning	Yes No
Grazing	None Sheep Cattle Horses Deer Mixed Other (specify)	Grazing evidence	Animals present Droppings present Other (specify)
Recent weather of note		Notes:	

Appendix 2: Plot Assessment

Use this sheet to compile plot data or preferably use a print out of the excel spreadsheet provided.
This data is vital for condition assessment and national satellite ground-truthing.

Plot number:		Coordinates:	
Name:		Date (dd/mm/yy):	
Site name:		Site location:	
Slope:	Flat Gentle Steep	Aspect (e.g. North-East):	
Vegetation present:	Sphagnum	Est. Percentage cover: (please make note if Molinia present)	
	Heather and other ericoids		
	Grass (not inc. Molinia)		
	Molinia		
	Sedge (not inc. cotton grass)		
	Cotton Grass		
	Rush		
	Trees		
	Bare ground		
	Other (specify)		
If Sphagnum present, is species mixed?	Yes No N/A	If heather present, provide approx. height:	
Peat depth (3 measurements):			
Surface wetness:	Dry Squish Water pooling Surface water present	Peat softness:	Quaking Soft Firm
Image taken (looking north):	Yes No (reason)	Image location (file path):	
Notes:			

Appendix 3: Basic vegetation identification guide

This is a basic guide to vegetation identification. You may want to use a more in depth resource for greater clarity or to record individual species for greater site detail.

Sphagnum	Heather	Grass (inc. Molinia)	Sedge
			
Cotton Grass	Rush	Bare Ground	Woodland
			