Sphagnum survey walks

The Big Moss Map

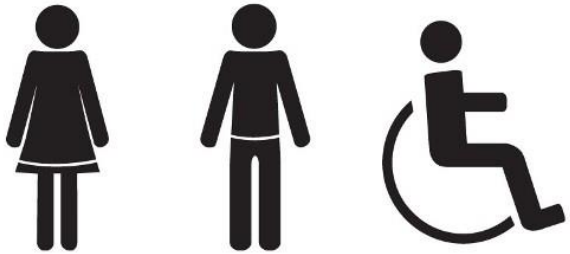


LOTTERY FUNDED

Housekeeping

- Emergency Exits

- Fire assembly point
- Toilets



Today's Session

1. Presentation
   - Peak District moorlands
   - Damage to our moorlands
   - Conservation Works
   - Why *Sphagnum*?
   - **Meet the mosses!**
   - *Sphagnum* ecology & ID
   - Upland habitats
   - Photo quiz

   SHORT BREAK

   - How to conduct a survey
   - Submitting your records
   - How data will be used

2. Practical session to practice survey methods and field ID

3. Feedback

Peak District & South Pennine moorlands

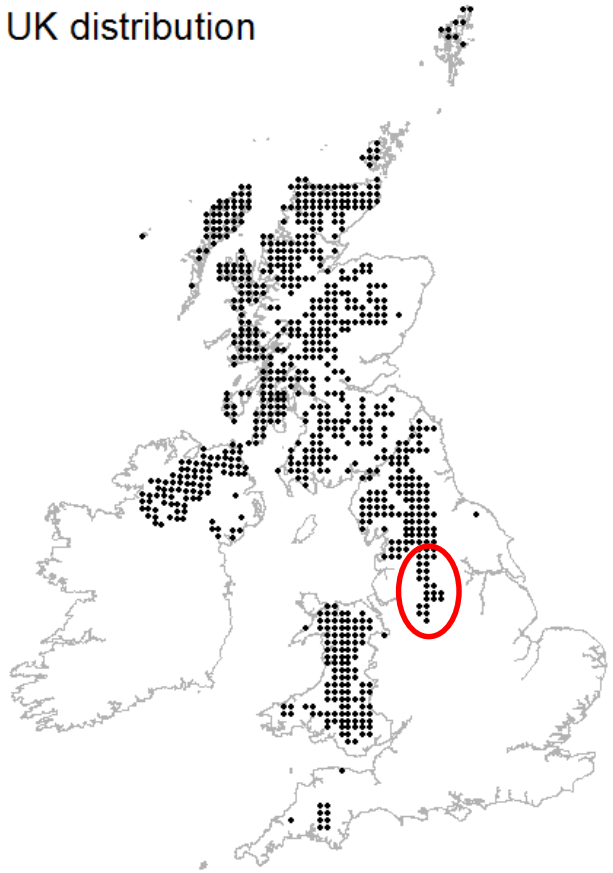
- Peak District is within 1 hour's drive for 20 million people
  (Alan's Ramblings, 2004).

- Probably most visited moorlands worldwide with tradition of access across wide areas.

- First UK National Park created in 1951.

Moorland habitat: Blanket bog

- Water and mineral source comes from rainwater, mist & cloud-cover (ombrotrophic).
- Nutrient-poor and acidic; dominated by acid-loving plants, especially Sphagnum.
- 10–15 % global resource in UK.
- South Pennines represents most south-easterly occurrence in Europe.



Damage to our moorlands

- Air pollution
- Wildfires
- Weather
- Drainage
- Grazing levels
- Access by people
- Peat harvesting
- Competition from non-native plants

Conservation works

Sphagnum facts

- A group of closely related mosses essential for the formation of healthy peatlands.
- There are 34 species of *Sphagnum* moss in the UK, around a third of which are found in bogs.
- *Sphagnum* mosses can hold up to 20 times their own weight in water.
- Some species grow in hummocks, which can be a meter high. Others grow in lawns or wet hollows.



Photos: Rosser1954, John Fielding, Johannes Bergsma

Why Sphagnum?

- Lower parts of *Sphagnum* plants die but resist decomposition.
- This leads to the accumulation of organic material and the formation of peat.
- Peat can be several metres deep and have accumulated over thousands of years.
- Healthy peatlands support a range of wildlife, store carbon, help prevent flooding and provide high quality water.

Re-introducing Sphagnum

- Various methods:
  - *Sphagnum* beads – 'BeadaMoss'
  - Liquid gel – 'SoluMoss'
  - Propogated plug plants – 'PlugaMoss'
  - Hummocks harvested from Sphagnum rich sites

- Climate change threatens peatlands because:
  - *Sphagnum* mosses can suffer damage if exposed to temperatures above 15 °C
  - Peat only forms when bogs are saturated

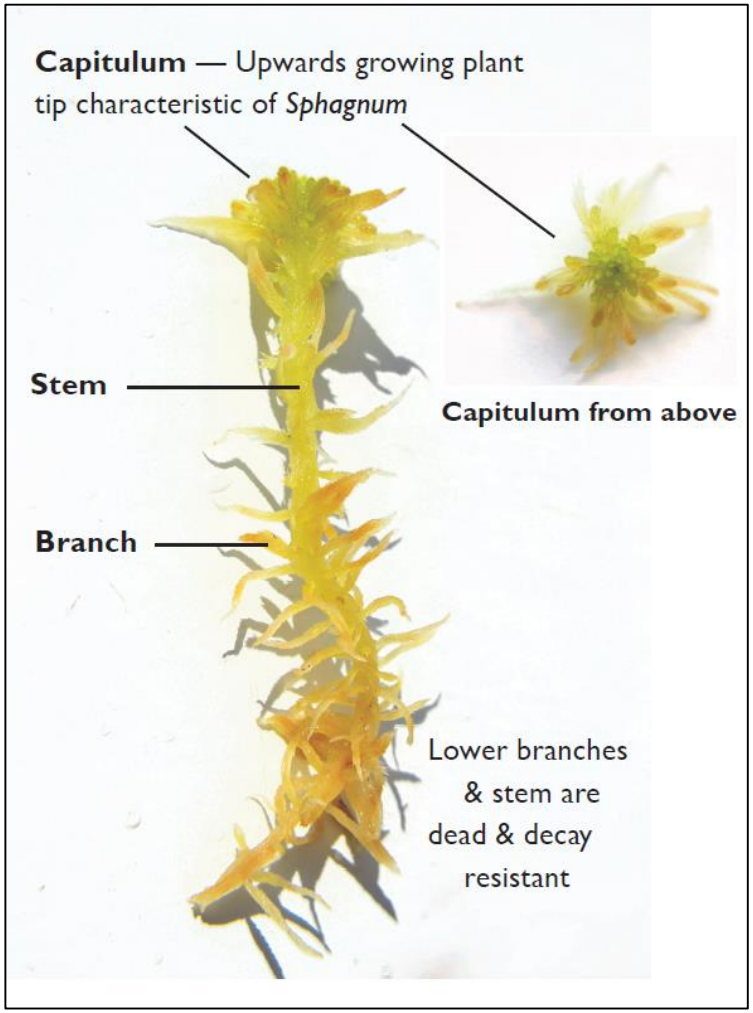
- Multi-purpose monitoring
  - Monitoring the re-introduction
  - Monitoring general trends due to a changing climate

Meet the mosses!

Can you sort the *Sphagnum* from the other moss types?

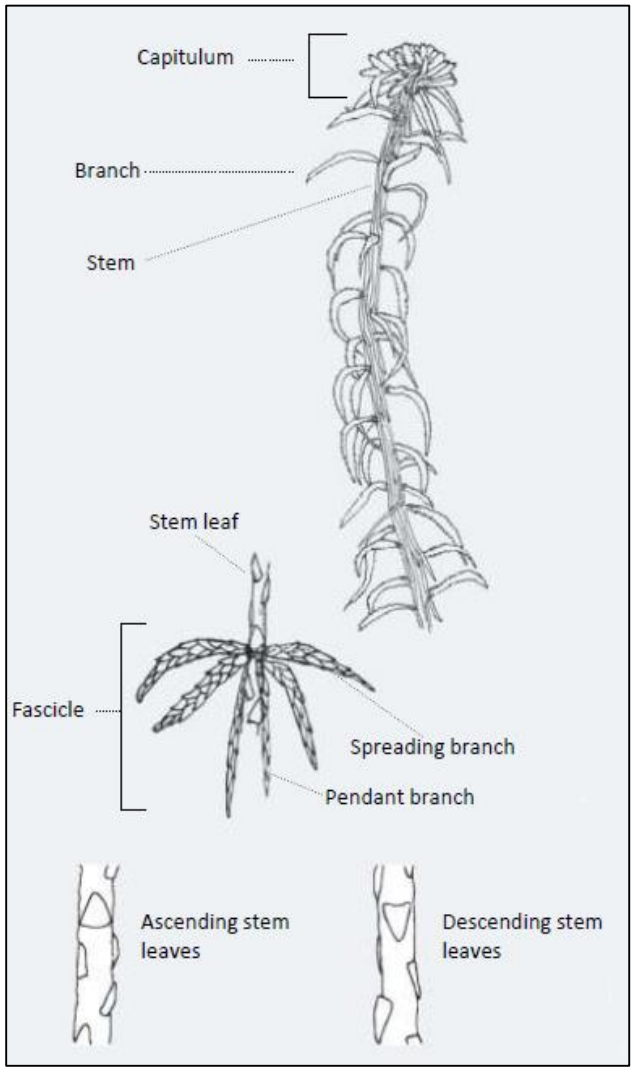
Sphagnum ID

- Each individual plant has a stem, branches (spreading and pendant) and a compact cluster of new branches called a ‘capitulum’.
- All new growth occurs from the capitulum at the top of the plant.
- Occasionally a plant may split and a second capitulum grows.



Sphagnum ID

- Groups of branches leave the stem at the same point – this is called a fascicle.
- The stem and branches are covered in small leaves – visible with a hand lens.
- On some species these leaves point upwards and on others they point down.
- They also vary in shape between species.



Sphagnum ID

- All *Sphagnum* species share the same basic structure.

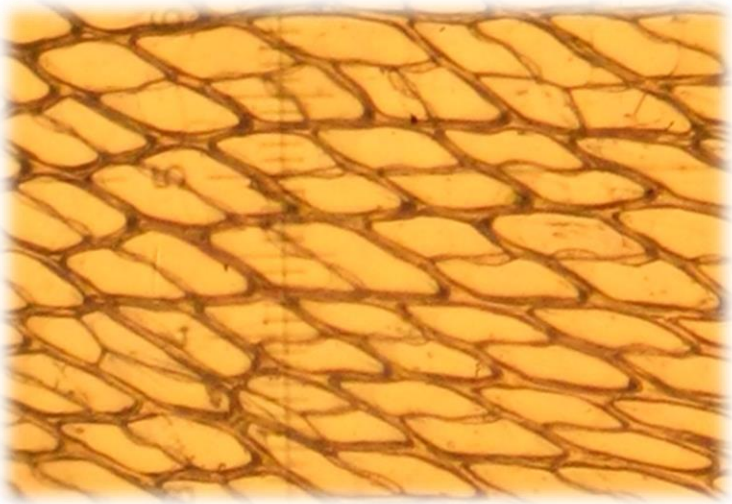
- Some species are skinny while some are chunky – chunky species hold the most water.

Sphagnum ID

- Wide variety of colour between species and even within species!
- Colour varies with growing conditions – plants in shade often greener even in same patch.
- May become bleached in dry weather.
- Often found growing with other mosses.

Sphagnum ID & structure

- Two types of cells:
  - Living green cells that photosynthesise
  - Large, empty, dead cells called ‘Hyaline’ cells – these enable *Sphagnum* to hold large quantities of water. They don’t collapse when empty thanks to spiral thickening.



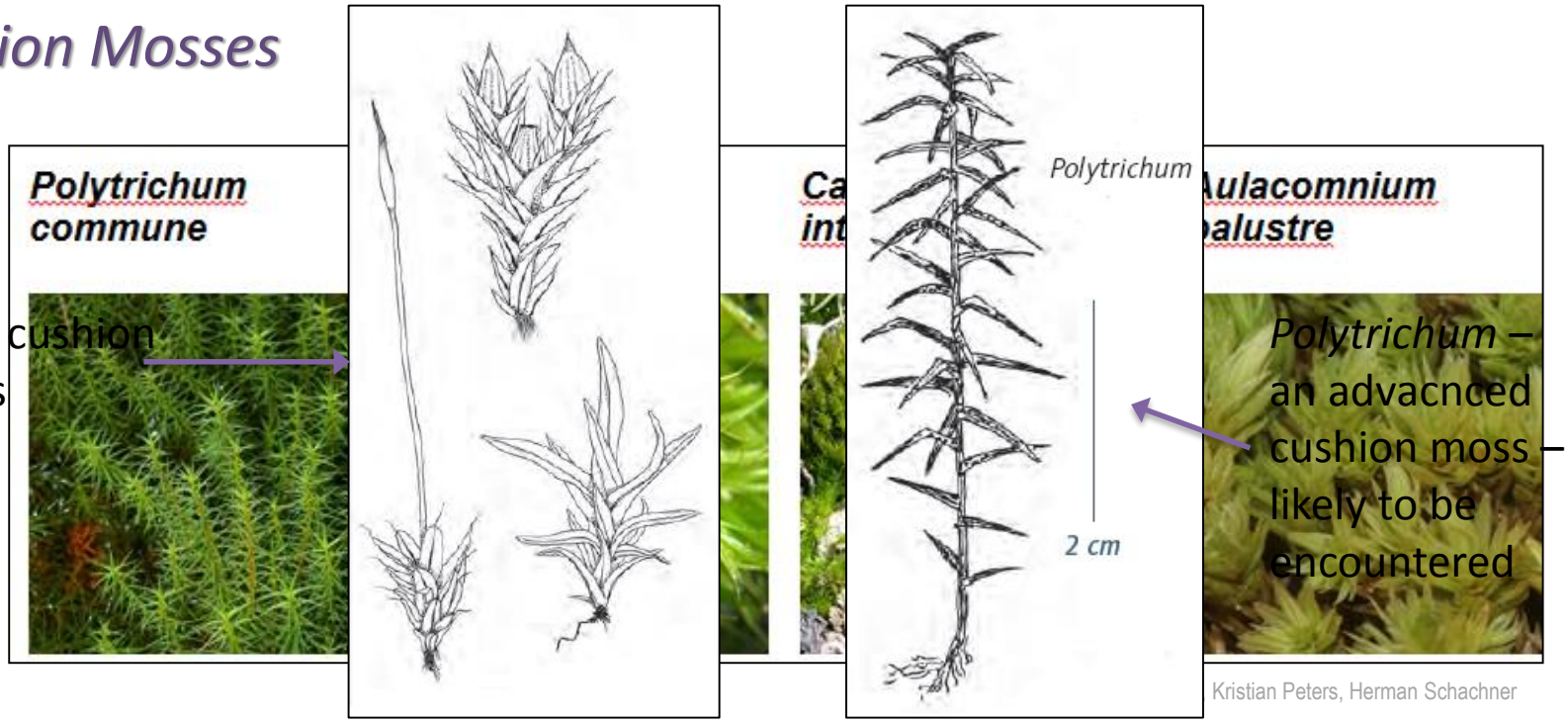
- *Sphagnum* reproduces by producing spores – the capsules containing the spores are sometimes visible.

- Can also reproduce vegetively.

Other mosses you may see

Cushion Mosses

Typical cushion mosses



Polytrichum – an advacnced cushion moss – likely to be encountered

- Like *Sphagnum* they grow in patches, cushions or carpets.
- Shoots and branches always point upwards, unlike in *Sphagnum* where they often hang down.
- Shoots are usually unbranched, but sometimes may have one or two branches.

Other mosses you may see

Feather Mosses

Typical feather mosses

- Also found in bogs.
- Tend to sprawl along the ground.
- Shoots often divide into branches (may look fern-like).
- Have red or green stems.

Habitats

Acid bogs

- Wet, peat forming sites created by the build-up of *Sphagnum* mosses that retain water and decay slowly.
- Blanket bogs atop the hills in the Peak District.
- Mix of vegetation, but most commonly seen with cotton grasses and other mosses like *Polytrichum spp.*
- Shrubs also found but do not dominate as on dry-heaths.

Common cotton grass

Polytrichum

Sphagnum moss (S. papillosum)

Habitats

Heaths / Moorlands

- Dominated by heathers and dwarf shrubs like bilberry and crowberry and larger bushes such as gorse.
- Typically found on poor, acid, often sandy, well drained soils, hence known as “dry heath”.
- Waterlogged moors become peat generating bogs, some can be rich in *Sphagnum* mosses.

Typical heathland

Heather

A tasty crop of bilberries

Habitats

Acid Grasslands

- Dominated by grasses and herbs.
- Found on a range of lime-deficient soils derived from acid rocks such as sandstones and gritstones.
- Usually species-poor, but some patches are home to rarer plants such as the greater butterfly orchid.
- Often dominated by Purple moor grass (*Molinia caerulea*), Mat grass (*Nardus stricta*) and Wavy hair grass (*Deschampsia flexuosa*) in the Peak.

Purple moor grass and rushes

Wavy hair grass

Greater butterfly orchid

Habitats

Bracken hillsides

- Bracken is a species of fern common in the hills of the Peak District.
- It is a very successful plant (it is poisonous) that dominates, creating a distinctive habitat lacking in many other species.
- Its thick cover provides nesting sites for birds and invertebrates alike.

A bracken covered hillside

Bracken dying off in autumn

A stand of bracken

Habitats

Flushes

- Wet areas where water from underground flows out onto the surface.
- Often enriched with minerals leading to a different plant community than the surrounding area.
- Sedges and rushes often grow above a layer of mosses and liverworts.
- Sometimes host to rarer plants.

A flush

Sphagnum fallax – A species commonly found in flushes

Habitats

Woodlands

- Sphagnum is most likely to be found in **wet woodland**.
- These are most widespread on flushed slopes, valley sides and moorland cloughs.
- Wet woodlands often form a mosaic with other habitats such as upland oakwoods – or in transition with acid grassland or heath.
- Conifer plantations may also host *Sphagnum*

Wet woodland

Sphagnum mosses in wet woodland

Useful resources & further information

Field Guides

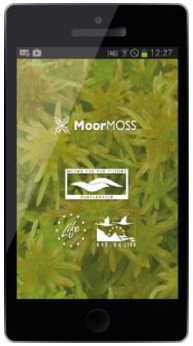
- FSC laminate guide “Sphagnum mosses in bogs”- http://www.field-studies-council.org/publications/pubs/Sphagnum-mosses-in-bogs.aspx
- A more detailed key to identifying *Sphagnum* species can be found at http://jncc.defra.gov.uk/pdf/Sphagnum_a_field_guide_PRINT.pdf
- *Mosses and Liverworts of Britain and Ireland: A Field Guide* by Atherton, Bosanquet and Llawley and published by the British Bryological Society.

Websites

- The British Bryological Society has a wealth of information about mosses, liverworts and hornworts, including species guides and details of training courses - www.britishbryologicalsociety.org.uk
- Community Science - www.moorsforthefuture.org.uk/community-science

Apps

- MoorMoss app produced by Moors for the Future – Information about the mosses you might encounter on our moorlands - http://www.moorsforthefuture.org.uk/node/704



Quiz Time!

Not Sphagnum

Quiz Time!

Sphagnum

Quiz Time!

Not *Sphagnum*

Quiz Time!

Not *Sphagnum*

Quiz Time!

Sphagnum

Quiz Time!

Sphagnum

Quiz Time!

Not Sphagnum

Quiz Time!

Sphagnum & not *Sphagnum*!

Quiz Time!

Not *Sphagnum*

Quiz Time!

Sphagnum

Quiz Time!

Not *Sphagnum*

Quiz Time!

Sphagnum

Tea break!

- Resume in 10-15 mins

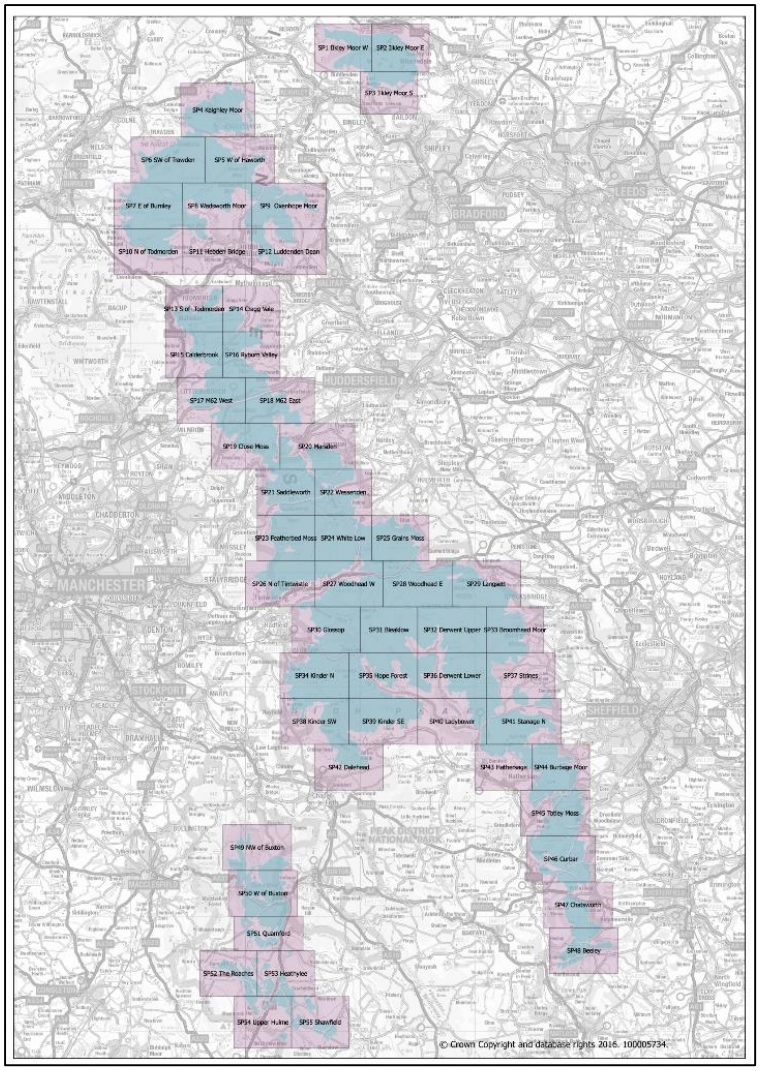
Surveying

- Surveys are conducted along Public Rights of Way and alternative routes.
- We are aiming to maximise coverage of the project area each year.
- Record the presence and absence of *Sphagnum* along the route you have selected rather than the species present.
- Record different features of any patches of *Sphagnum* you find.
- Enter your records online – whether you find any *Sphagnum* or not.
- The standardised methodology will provide high-quality, long-term data to reliably detect changes in abundance and distribution.

Surveying

Where and when to survey

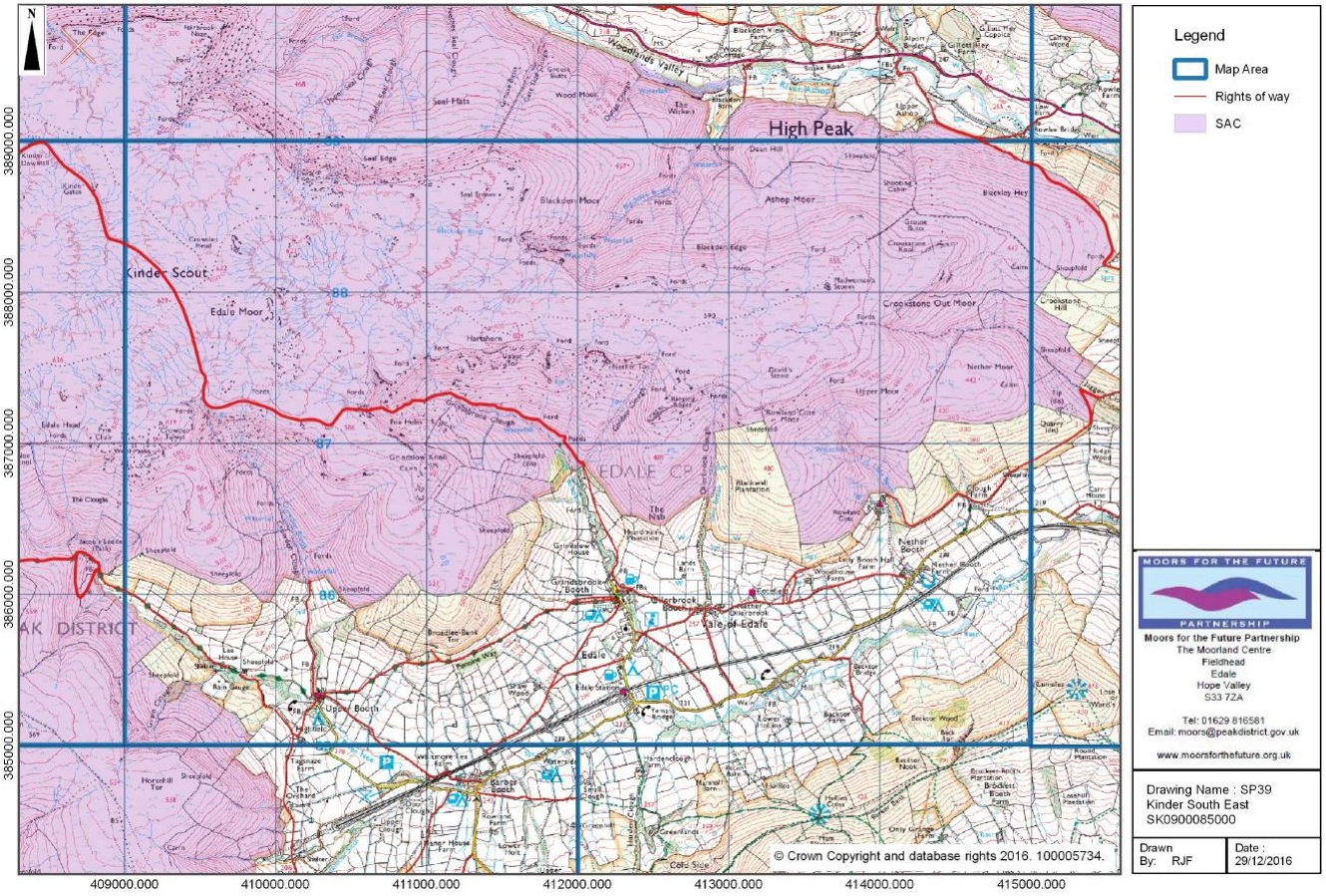
- We have split the SAC into boxes and are allocating volunteers a numbered area to cover.
- Choose a box in a convenient area for you to survey.
- Each year walk and record *Sphagnum* on all the rights of way within that box, both in the SAC and just outside.
- We are happy to put you in touch with other existing volunteers if a box you would like to survey is already allocated.



Surveying

Where and when to survey

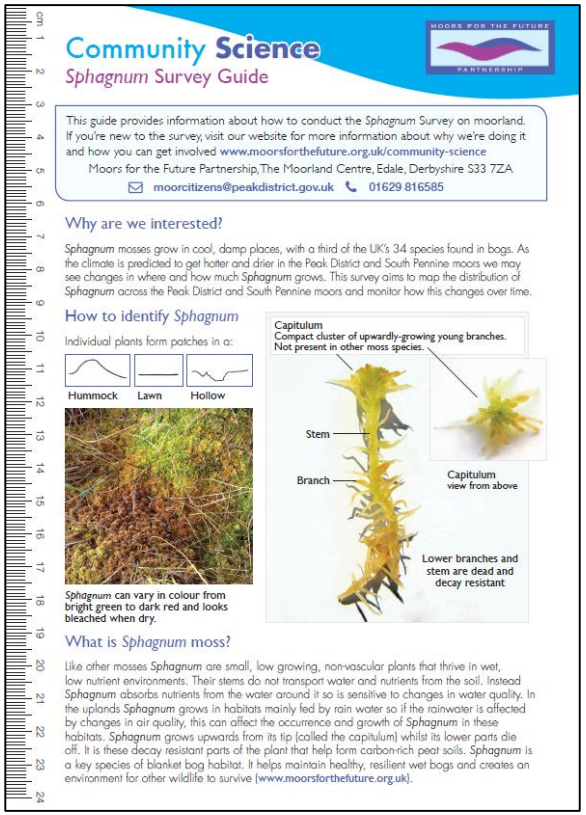
- The blue box shows the square boundary.
- The purple represents the SAC.
- Red lines are rights of way to survey.
- Some squares will have more rights of way than others.



Surveying

What to take with you

- Survey guide
- Map of your route/s (OS map and/or print out of satellite image e.g from iRecord)
- Survey form
- Guide for identifying vegetation types
- Camera to take photos for verification
- GPS unit (if you have one) or a GPS app on your smartphone e.g. GridPoint GB (iOS) / Grid Reference (Android)
- Health & safety guidelines



Community Science

Sphagnum Survey Guide

This guide provides information about how to conduct the *Sphagnum* Survey on moorland. If you're new to the survey, visit our website for more information about why we're doing it and how you can get involved www.moorsforthefuture.org.uk/community-science

Moors for the Future Partnership, The Moorland Centre, Edale, Derbyshire S33 7ZA

moorcitizens@peakdistrict.gov.uk 01629 816585

Why are we interested?

Sphagnum mosses grow in cool, damp places, with a third of the UK's 34 species found in bogs. As the climate is predicted to get hotter and drier in the Peak District and South Pennine moors we may see changes in where and how much *Sphagnum* grows. This survey aims to map the distribution of *Sphagnum* across the Peak District and South Pennine moors and monitor how this changes over time.

How to identify *Sphagnum*

Individual plants form patches in a:

Hummock Lawn Hollow

Sphagnum can vary in colour from bright green to dark red and looks bleached when dry.

Capitulum
Compact cluster of upwardly-growing young branches. Not present in other moss species.

Stem

Branch

Capitulum view from above

Lower branches and stem are dead and decay resistant

What is *Sphagnum* moss?

Like other mosses *Sphagnum* are small, low growing, non-vascular plants that thrive in wet, low nutrient environments. Their stems do not transport water and nutrients from the soil. Instead *Sphagnum* absorbs nutrients from the water around it so is sensitive to changes in water quality. In the uplands *Sphagnum* grows in habitats mainly fed by rain water so if the rainwater is affected by changes in air quality, this can affect the occurrence and growth of *Sphagnum* in these habitats. *Sphagnum* grows upwards from its tip (called the capitulum) whilst its lower parts die off. It is these decay resistant parts of the plant that help form carbon-rich peat soils. *Sphagnum* is a key species of blanket bog habitat. It helps maintain healthy, resilient wet bogs and creates an environment for other wildlife to survive (www.moorsforthefuture.org.uk).

Transect monitoring

Health & Safety

Please ensure that you are aware of the risks involved in moorland surveying and use your common sense.

Don’t forget to:

- Wear appropriate footwear for rough ground.
- Check the weather forecast before you go out.
- Wear appropriate clothing, and take additional layers.
- Take a hat and/or sunscreen – it is easy to get burnt on the hill.
- Let someone know where you are going, and carry a mobile phone.
- Please take care of the moors – do not smoke, and take your litter home.

Surveying

Conducting the survey

Fill in the details at the top of the survey form first. This information will help when analysing the data.

Each form has 10 sections. Take a few forms in case your path is rich in Sphagnum.

The Big Moss Map
***Sphagnum* Survey Form**

CommunityScience

MOORS FOR THE FUTURE PARTNERSHIP

Date		Number of surveyors	
Recorder Name			
Start time		Start grid reference	
Finish time		Finish grid reference	

Patch no.	Patch location *(10 fig. grid ref. or notes to help you identify location on aerial photo)*	Patch width *(to nearest 25 cm)*	Patch length *(to nearest 25 cm)*	How was the *Sphagnum* growing? *(hummock, lawn, hollow or unknown)*	Dominant vegetation type	Photo file Numbers *(if using a digital camera)*	Sphagnum Species *(if known)*
1							
2							
3							
4							
5							
6							
7							

Surveying

Conducting the survey

- Navigate to the starting point of your survey route – Record the grid reference.
- Look for *Sphagnum* **2 m to each side** of the edge of the footpath you are walking along.
- On wide paths (>2 m) you may need to walk up one side and then down the other.
- Some patches may be continuous, others made up of small, less distinct patches. If patches are <2 m apart, treat as a single patch.

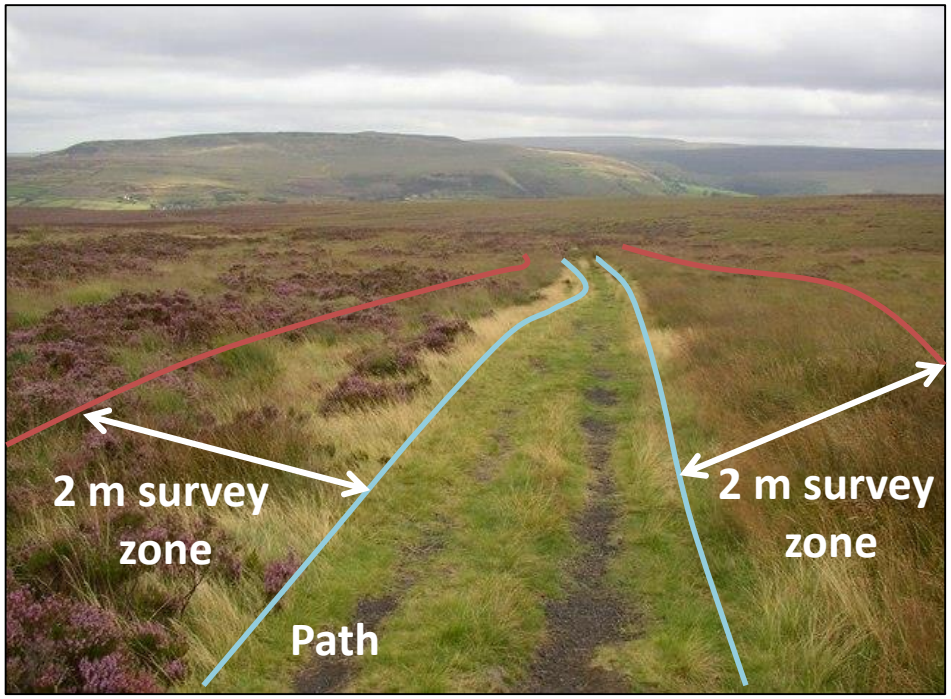


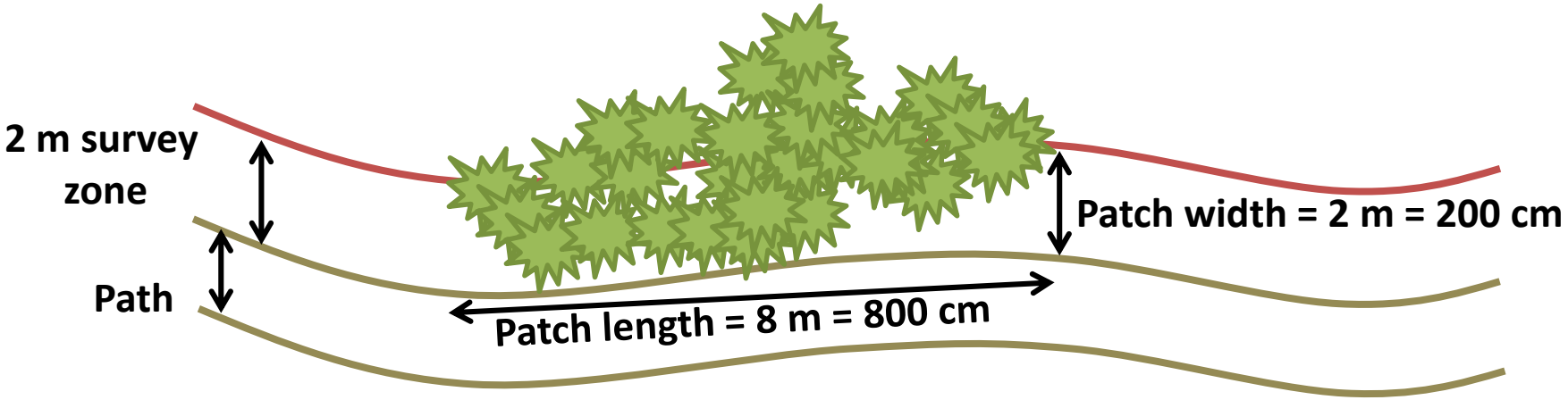
Photo: Humphrey Bolton

Surveying

Conducting the survey

For each patch of *Sphagnum* you find, record:

1. The location of its **centre point**. Mark as accurately as you can on your map or take a GPS reading.
2. How wide the patch is (up to 200 cm) to the nearest 25 cm.
3. How long the patch is to the nearest 25 cm.



Surveying

Conducting the survey

4. Whether the *Sphagnum* is growing as a hummock, lawn or in a wet hollow.

Photo: Rosser1954

Photo: John Fielding

Photo: Dominicus Johannes Bergsma

5. Record the dominant surrounding vegetation type using the accompanying guide.

Surveying

Conducting the survey

6. If you have a camera, take photos (1) up close to help verify your findings and (2) of the whole patch to compare with findings in future years.

   Note down the photo ID from your camera on the form so when you get home you know which Sphagnum patch each photo relates to.

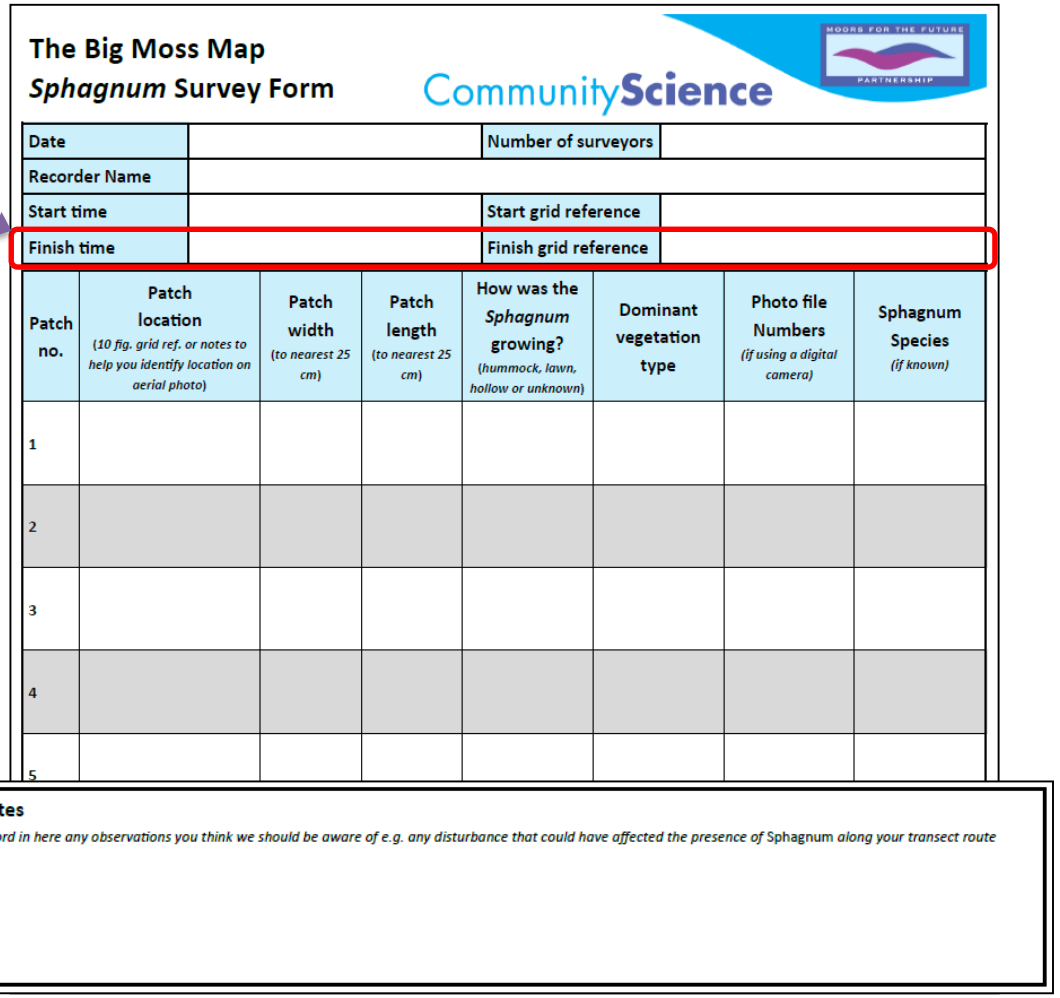
7. Identifying *Sphagnum* to species can be tricky, even for experts. However, if you are confident in identifying them, please note down the species of *Sphagnum* present in the patch (There could be multiple species in a single patch).

Surveying

At the end of the survey

Enter your finish time at the top of the form along with the end grid reference.

In the notes section include anything that might have affected the presence of Sphagnum *at each patch location e.g. recent path widening or erection of fencing or tree planting*



The Big Moss Map
***Sphagnum* Survey Form**

CommunityScience

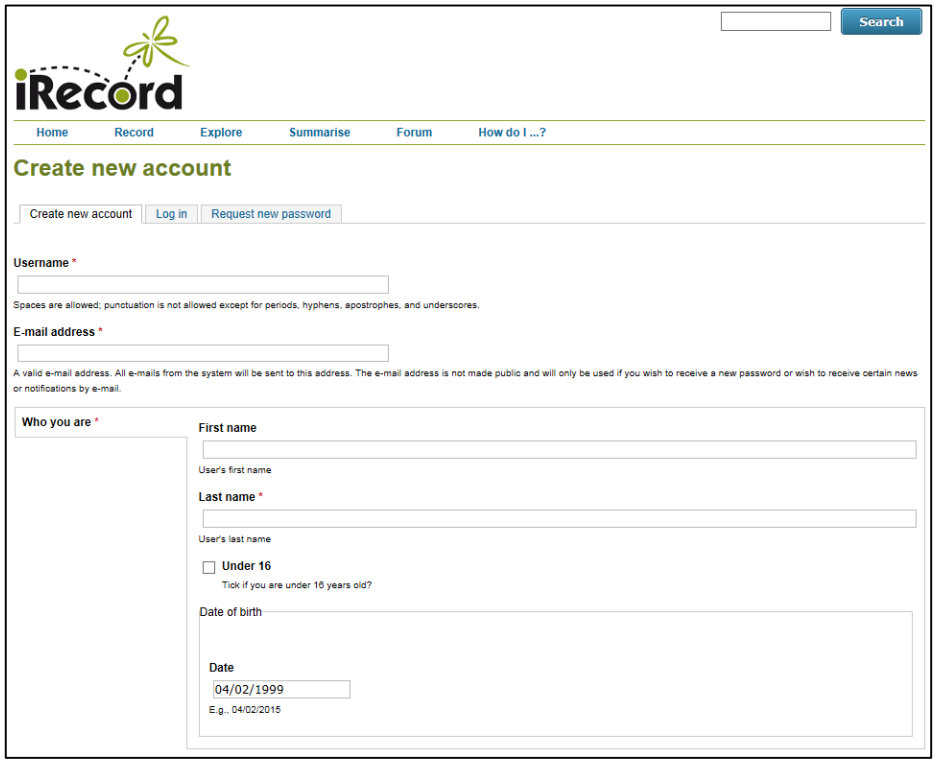
Date		Number of surveyors	
Recorder Name			
Start time		Start grid reference	
Finish time		Finish grid reference	

Patch no.	Patch location *(10 fig. grid ref. or notes to help you identify location on aerial photo)*	Patch width *(to nearest 25 cm)*	Patch length *(to nearest 25 cm)*	How was the *Sphagnum* growing? *(hummock, lawn, hollow or unknown)*	Dominant vegetation type	Photo file Numbers *(if using a digital camera)*	Sphagnum Species *(if known)*
1							
2							
3							
4							
5							

Notes
Record in here any observations you think we should be aware of e.g. any disturbance that could have affected the presence of Sphagnum *along your transect route*

Submitting your records

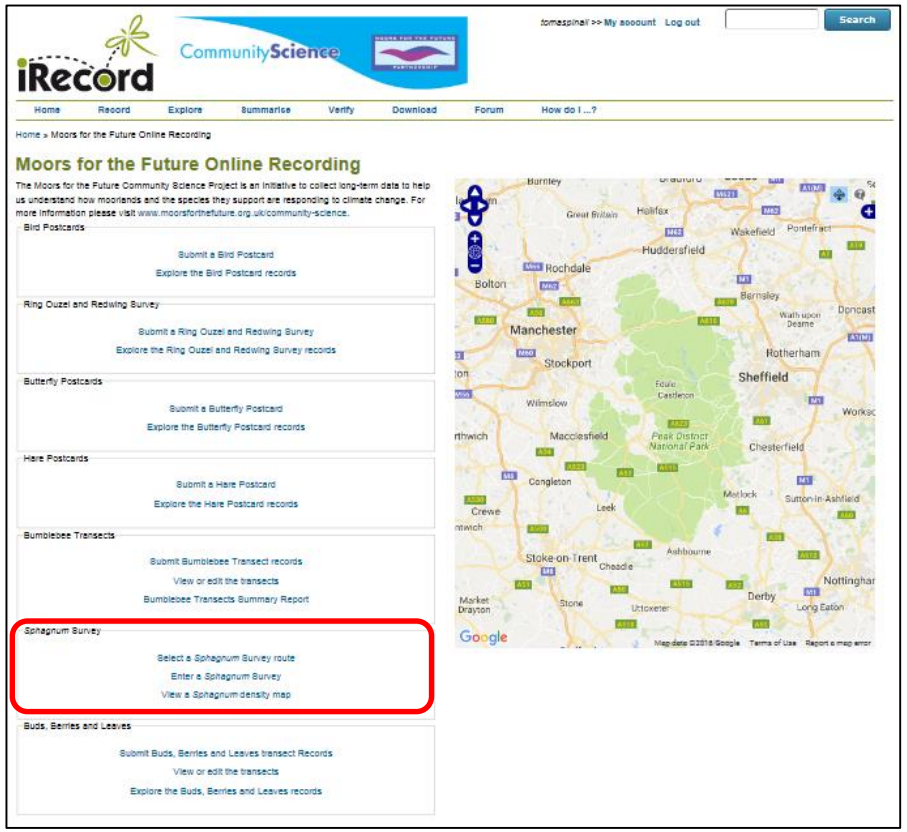
- It is important to submit your records even if you saw no *Sphagnum* along your survey route.
- All data will be put on to the biological recording website iRecord (www.brc.ac.uk/irecord).
- Records are passed on to the Biological Records Centre.
- We encourage all recorders to use this facility by setting up an account.
- Alternatively, you can post the recording form to Moors for the Future – fill in details on reverse.



Submitting your records

- Once logged in, navigate to the dedicated Moors for the Future recording form at www.brc.ac.uk/irecord/moors-for-the-future and click on ‘Enter a *Sphagnum* survey’.

- You can add this form to your ‘activities’ so that you have instant access to it.



Submitting your records

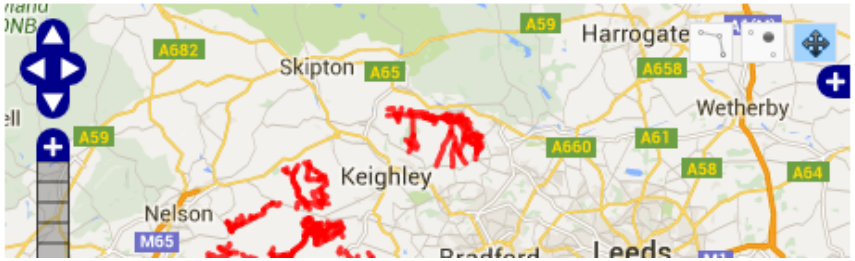
Enter the survey details

- The date of the survey.
- The number of surveyors.
- Change the recorder name if the person who did the survey is different from the person logged into iRecord.
- The start and finish time of your survey.

Enter a Sphagnum survey

First, we'd like you to tell us about the length of path you surveyed. Please tell us about the surveyed area whether or not you found any *Sphagnum* patches along the stretch as it will help us to identify paths that need to be surveyed in future.

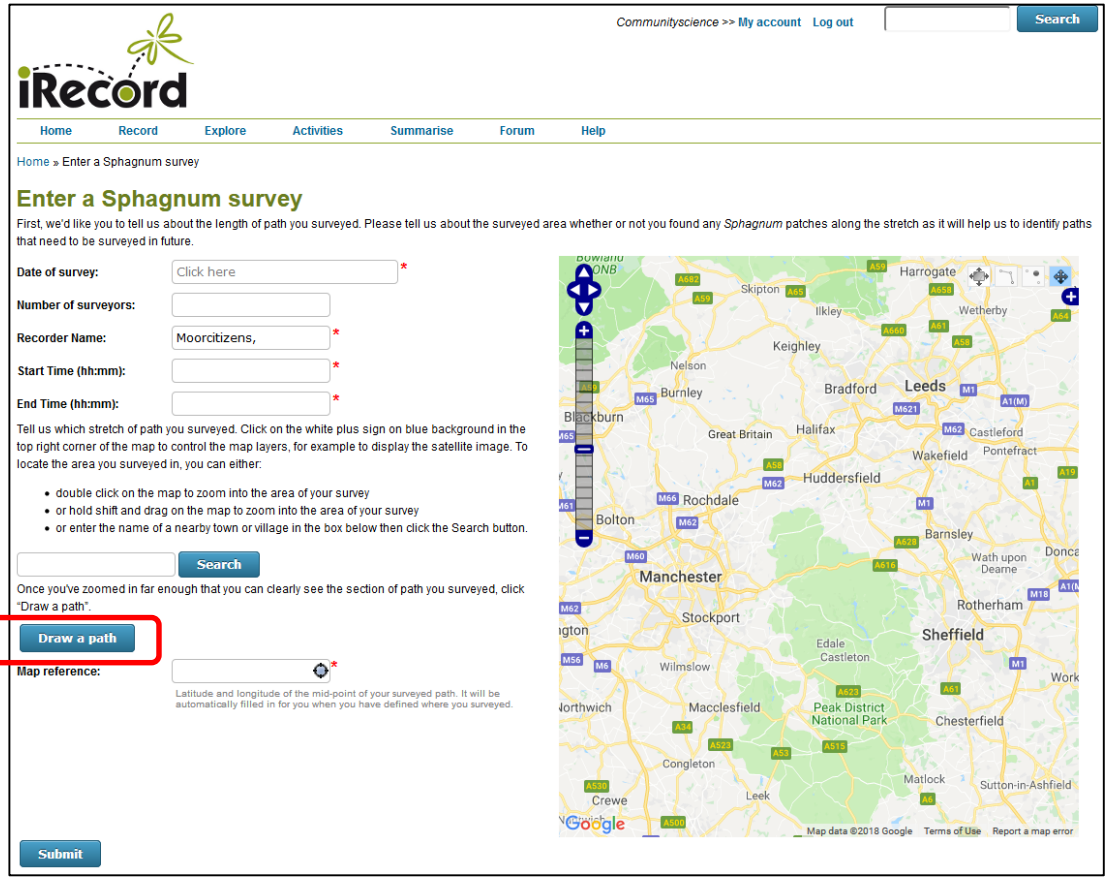
Date of survey:	Click here *
Number of surveyors:	
Recorder Name:	Aspinall, Tom *
Start Time (hh:mm):	
End Time (hh:mm):	



Submitting your records

Mark your survey route

- On the map, zoom into the area where you did your survey.
- To enter the route you walked, select **Draw new path.**

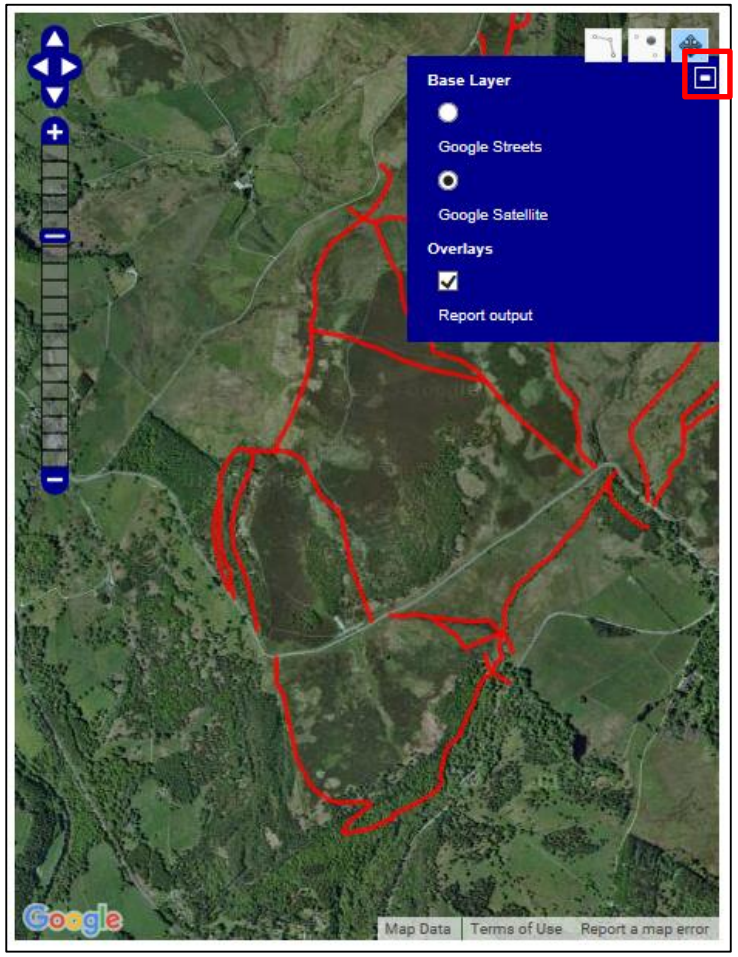


Submitting your records

Mark your survey route

- To make marking your route easier and more accurate switch to the satellite map view.

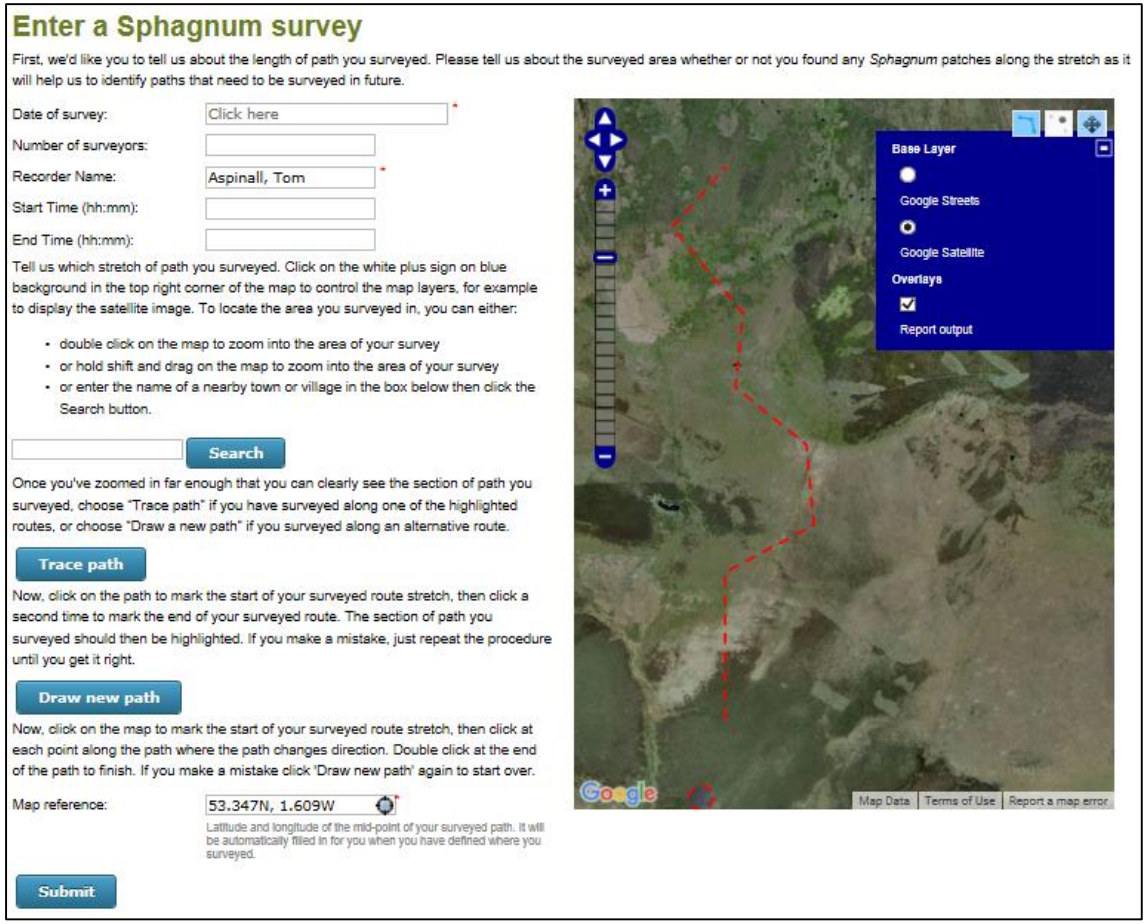
- Click on the white plus sign on blue background in the top right corner of the map and select the button above Google Satellite.



Submitting your records

Drawing a new path

- Click on the map at your starting point.
- Click every time the route changes direction.
- Double click at the end point of the survey route.
- If you make a mistake, click **draw a new path** again to start over.



Submitting your records

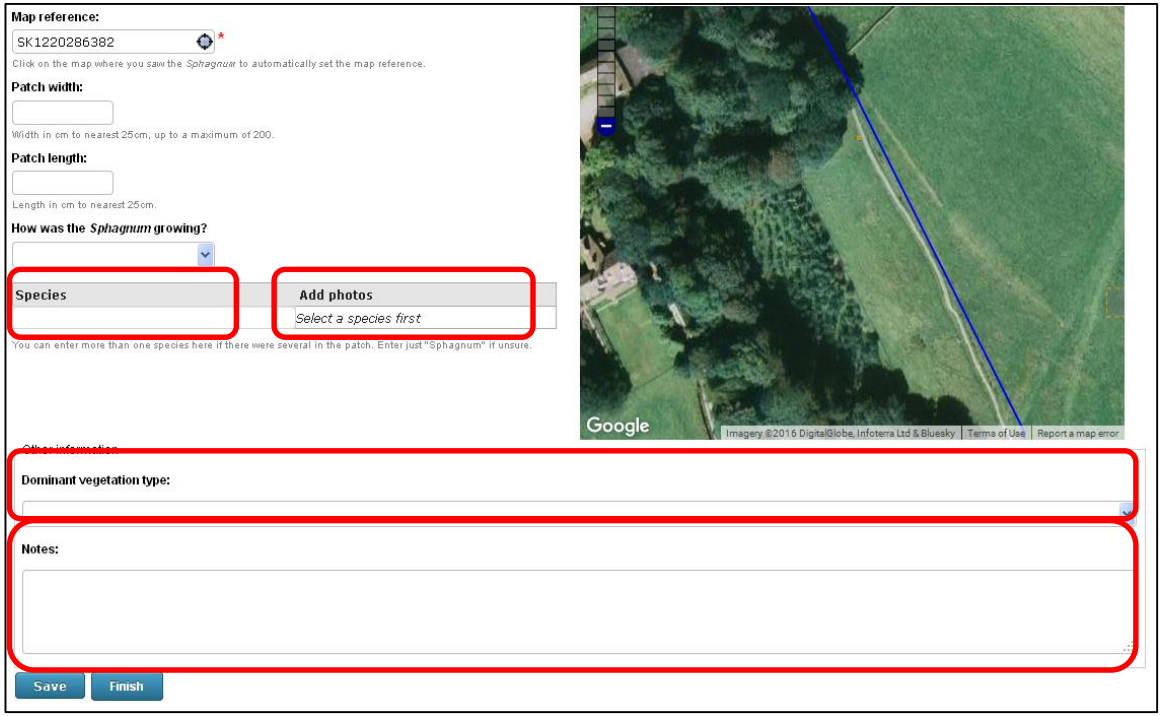
Patch details

- Select centre point of patch on map or enter grid reference. Zoom in to select a more accurate location.
- Patch width to nearest 25cm to max 200cm.
- Patch length to nearest 25cm.
- Enter the growth form: hummock, lawn or wet hollow.

Submitting your records

Patch details

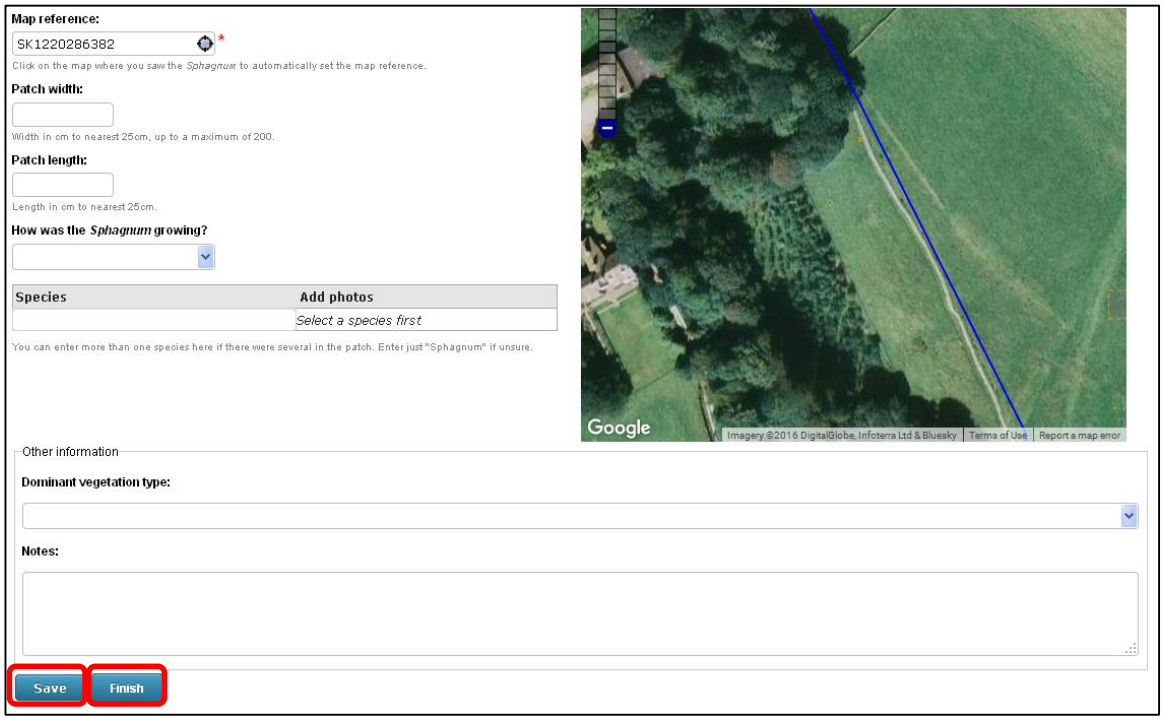
- Enter the species of *Sphagnum* present, if known or just enter *Sphagnum*.
- Add photos, if available.
- Select dominant vegetation type.
- Enter notes about factors that might affect *Sphagnum* growth e.g. path widening.



Reviewing your records

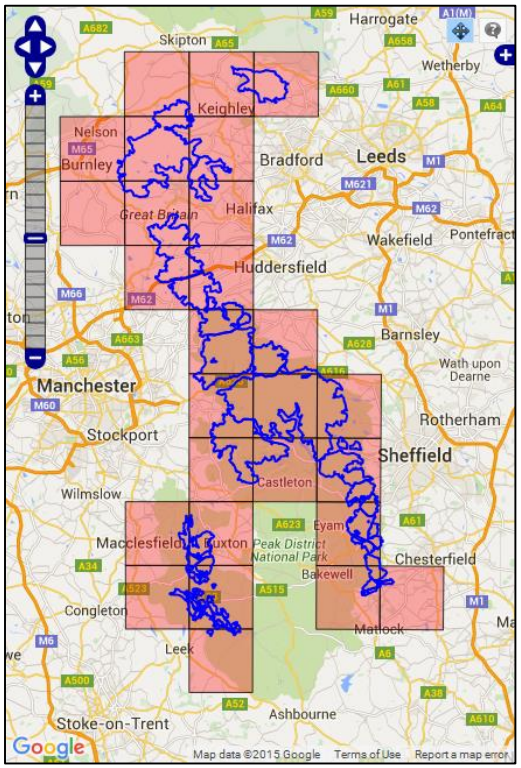
Finishing off

- Click **Save.**
- If you saw another patch, complete another record page.
- Once you have entered details of your last patch, click **Save** again and then click **Finish** to submit your records.
- If you didn't see any patches, just press **Finish** on the first page.



What will your data tell us?

- *Sphagnum* presence and absence in the project area.
- What affects *Sphagnum* presence or absence – habitat, elevation, management?
- Over time, is *Sphagnum* distribution increasing or decreasing? Is it moving uphill, northwards or westwards?
- What might be causing these changes? Changes in climate, management?
- How might *Sphagnum* distribution change in the future? If we know how climate affects this, future climate change projections could be used to project potential future distributions of *Sphagnum.*



Other surveys















Supporting you

www.moorsforthefuture.org.uk/community-science

We are here to help you and our website offers all the support you should need including:

- **A downloadable PDF of this presentation**
- Further information and guidelines
- Updates on which transects need surveying
- Survey forms, transect guides and maps for download
- Help on submitting your records online
- How to establish new transects

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www.facebook.com/MoorCitizens

moorcitizens@peakdistrict.gov.uk

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