



# National Plant Monitoring Scheme

## NPMS Annual Report 2021

Plants are the foundation of our habitats and ecosystems, and understanding the effects of growing pressures on our wild plants and habitats is a big task. Built on partnership and government-funded research, the National Plant Monitoring Scheme is providing a growing dataset across the UK, with the help and dedication of hundreds of trained citizen scientists carrying out surveys annually. These long-term botanical surveys in random 1 km squares enable us to look at the abundance and diversity of plants within 30 different habitats. They help us to understand their health whilst also investigating growing pressures on our environment.



[www.npms.org.uk](http://www.npms.org.uk)





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Overall

Number of records overall  
**187,135**

Total number of  
volunteers with squares

**1,682**

Total number of  
squares allocated  
**1,923**

Total number of  
squares with data

**985**

Total number of  
plots with data

**4,533**

Number of  
surveys overall

**5,973**

Number of species  
/species groups  
recorded overall

**1,624**

Top 3 habitats  
surveyed overall

- 1 Dry deciduous woodland
- 2 Hedgerows of native species
- 3 Neutral pastures and meadows



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2021

Number of plots  
with data in 2021

**1,510**

Number of squares  
with Data in 2021

**342**

Number of species/  
species groups  
recorded in 2021

**1,048**

Number of surveys  
conducted in 2021

**740**

Number of records in 2021

**23,417**



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## Top 10 species/taxa recorded in 2021:

NPMS indicator species recorded for each habitat type have been selected as either positive or negative indicators of habitat health, thereby enabling the quality of a habitat to be monitored over time. The top species/aggregates recorded in 2021 are all very abundant or dominant species within a range of habitats. With the exception of heather (*Calluna vulgaris*), they all have a high tolerance of fertile soils, and therefore are more resistant to human modifications to habitat.



### 1 Common nettle

#### *Urtica dioica*

This is a negative indicator across many habitats; typically an indicator of local eutrophication (locally increased fertility).

©Andrew Gagg



### 6 Hogweed

#### *Heracleum sphondylium*

This is a positive indicator and typical of various eutrophic habitats.

©Marc Cruise



### 2 Bramble

#### *Rubus fruticosus agg.*

This is a negative indicator across many habitats; it could be indicative of a number of things, including under-grazing, lack of management, and eutrophication.

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### 7 Common ivy

#### *Hedera helix*

This can either be a positive or negative indicator, dependent on the habitat

©Rachel Murphy



### 3 Cleavers/ Goose grass

#### *Galium aparine*

This is a negative indicator across many habitats; typically suggesting local eutrophication.

©Luke Morton



### 8 Ribwort plantain

#### *Plantago lanceolata*

Taken as positive indicator across all habitats for which it is listed in the NPMS.

©Marc Cruise



### 4 Hawthorn

#### *Crataegus monogyna*

This is a negative indicator in grasslands, but also a positive indicator for hedgerows. For the NPMS, our records primarily relate to hedgerows.

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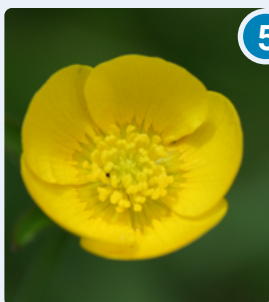


### 9 Yorkshire fog

#### *Holcus lanatus*

Taken as positive indicator across all habitats for which it is listed in the NPMS.

©Andrew Gagg/Plantlife



### 5 Creeping buttercup

#### *Ranunculus repens*

This is mostly a positive indicator in NPMS habitats, except for one upland grassland type.

©Cath Shellsell



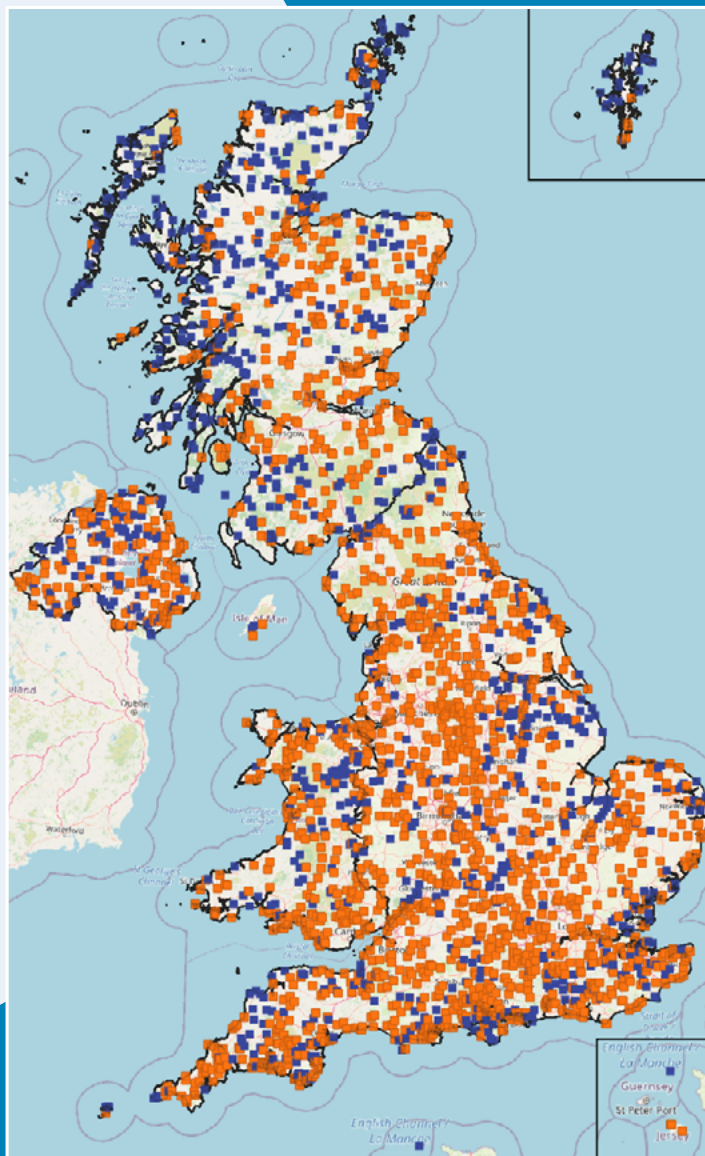
### 10 Heather

#### *Calluna vulgaris*

This is a positive indicator, typical in heathland, as well as some types of bog and acid grassland.

©Andrew Gagg/Plantlife

There are currently 2,886 NPMS survey monads (1 km<sup>2</sup>) nationwide, from the Channel Islands to the northern-most Shetland Islands, and west to Northern Ireland, with 66% of these monads currently allocated to volunteer surveyors. These monads are randomly selected, weighted towards the semi-natural habitats that the scheme is investigating and to minimize surveyor selection bias. Each time ~70% of survey monads are allocated in a region, more monads are released. As shown in the NPMS square map, survey coverage is spread across the UK, although some areas are under-allocated and require greater square uptake, such as in western Scotland, north Wales and the East Midlands.



NPMS survey monads across the UK  
Orange = Allocated, Blue = Available

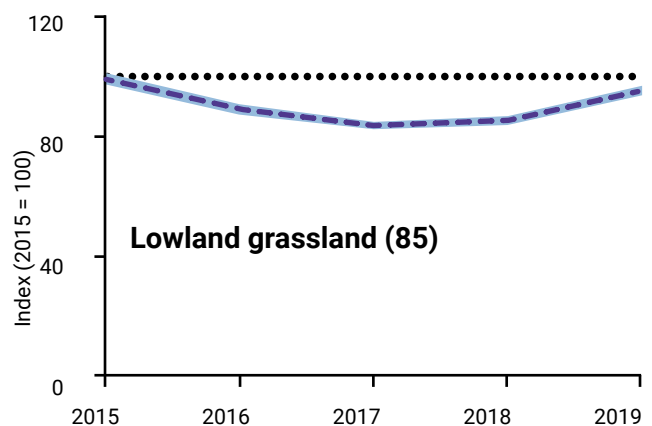
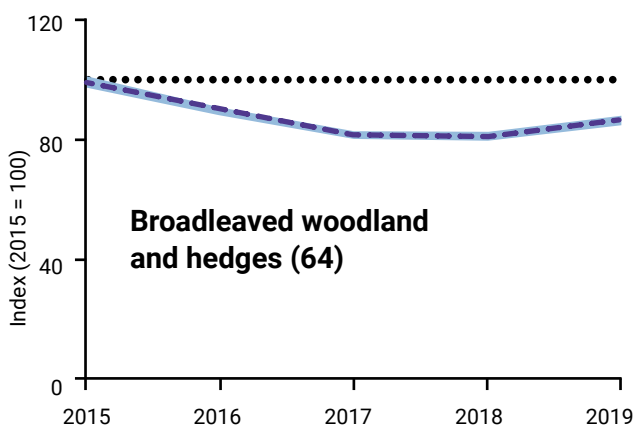
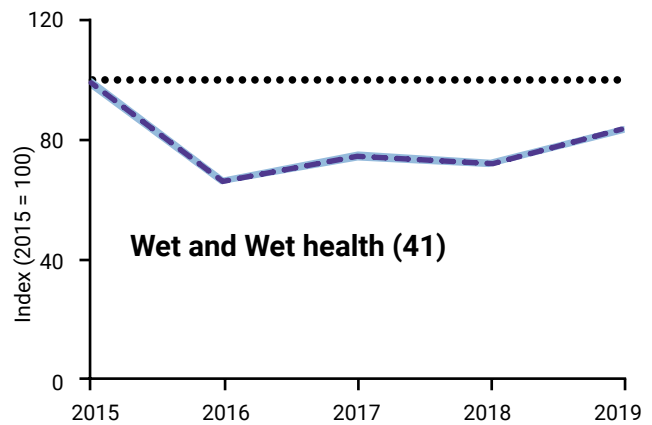
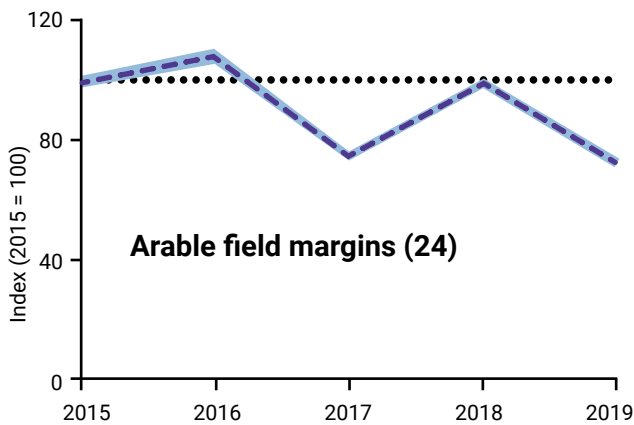
Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA).  
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Overall	England	Scotland	Wales	N. Ireland
Total number of squares allocated	1263	331	183	146
Total number of volunteers with squares	1117	290	161	114
Number of surveys overall	4510	967	600	195
Number of records overall	130,548	30429	19,121	5228
Number of species/species groups recorded overall	1427	794	750	385
Number of squares with data submitted in 2021	272	55	28	11
Number of plots with data submitted in 2021	1077	217	390	38
Number of surveys conducted in 2021	575	105	55	18
Number of records in 2021	17,025	3914	1677	525
Number of species/species groups recorded in 2021	905	480	352	119

## NPMS Indicator news Dr Oliver Pescott (UKCEH), Anna Robinson (JNCC)

As scheme supporters will no doubt be aware, NPMS data contributed to the first ever volunteer-based habitat quality indicators in 2019 – a fantastic achievement. These indicators capture information about the average abundance (in terms of percentage cover) of positive indicator species within four of the NPMS broad habitats. The indicators were designed as ‘Experimental Statistics’, a form of ‘Official Statistic’ where feedback on the metric is sought to ensure that it is fit for purpose. As with other Official Statistics, this demonstrates commitment to value, quality, and trustworthiness, as set out in the Government’s Code of Practice for Statistics. This also raises the profile of these outputs, so that volunteer recording effort will have greater impact.

In 2022 we will take the next step with these indicators, by adjusting for biases in the uptake and survey of NPMS squares. The indicator was not updated last year using 2020 data because COVID-19 restrictions had reduced both the quantity and representativeness of NPMS data. This was particularly true for upland habitats, such as those within the “Bog and wet heath” broad habitat category. This re-emphasises the need to adjust for differences in the representativeness of data between years. Our current indicator development work on bias adjustment will therefore make NPMS outputs more accurate in the future.



The line graphs show the unsmoothed trends (dashed line); the variation around the lines shown (the shaded area) is the standard deviation of 1,000 simulated trend indices.

The figures in brackets indicate the number of species or species aggregates included in the composite index for that particular habitat type.

**For more information on the indicators please see:** <https://jncc.gov.uk/our-work/ukbi-c7-plants-of-the-wider-countryside/>

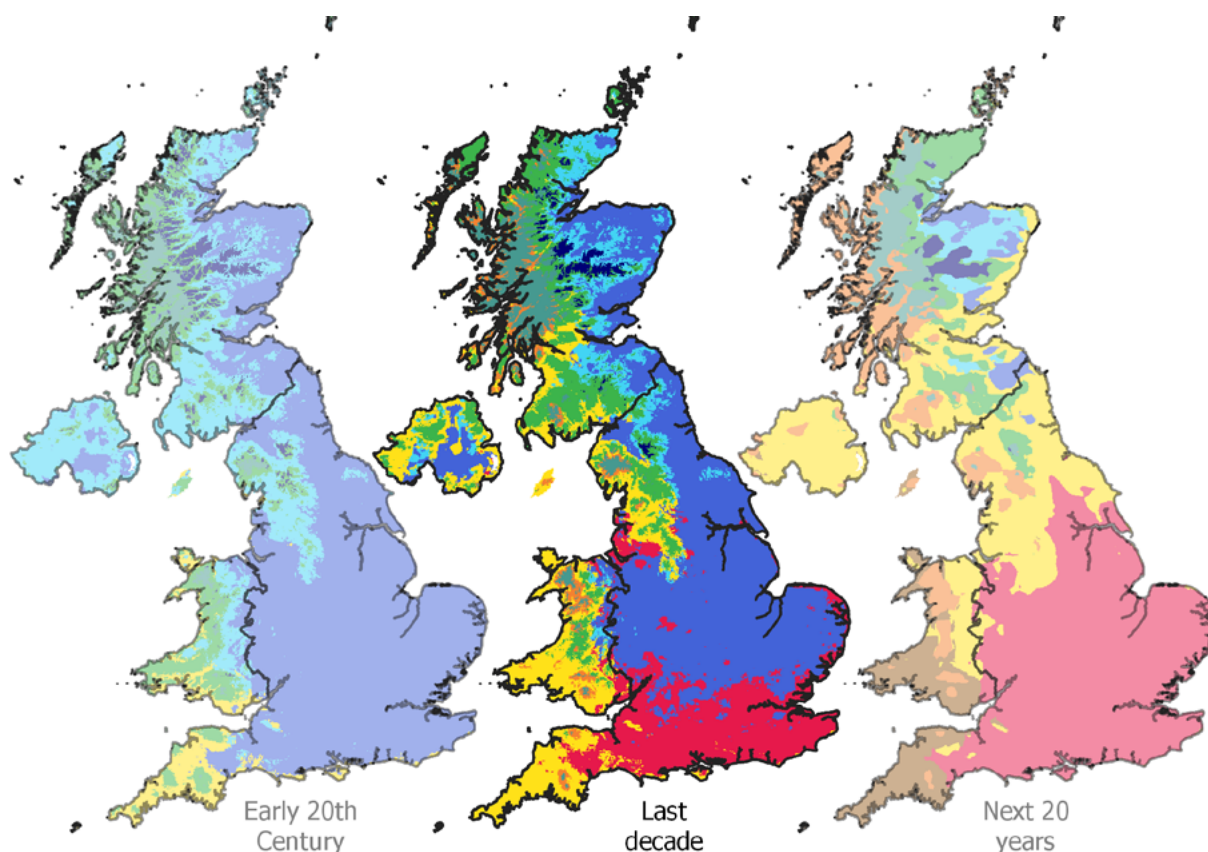
## UK habitat exposure to climate change Oliver Wilson (Plantlife)

With accelerating climate change, Earth's biodiversity is reorganising itself at breakneck speed, and the natural world is moving further away from its recent historical state. Monitoring these shifts – as NPMS volunteers do every year – can provide crucial information for managing those changes.

Working with NPMS surveys and Met Office climate records, we aim to uncover which UK habitats are most and least exposed to anticipated climate changes. The analysis is still underway, but early results suggest that our natural – especially calcareous – grasslands are likely to experience among the greatest climatic shifts through the 20th and 21st Centuries. We are also investigating how effectively the NPMS (and other ecological

monitoring schemes) cover these gradients of climate change: as the UK's ecosystems respond to these disruptions, we want to ensure we can keep track of what is happening.

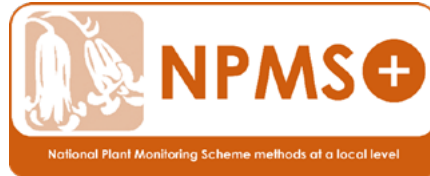
But climate change isn't just a future concern – the natural world has already experienced a century or so of rapid changes. We will shortly start analysing NPMS data to see where and how UK habitats are changing in response to temperature and rainfall shifts – and whether surveys in areas that have experienced greater past climate change are changing more today. UK Countryside Survey data from 1978, 1990, 2000 and 2007 will also help to put the last seven NPMS-recorded years of change in a longer context, and help us work to adapt to our changing natural world over the decades to come.



### Past and future climate change in the UK.

Each colour represents a cluster of similar climate conditions, tracked from 1901-1930 (left) to 2010-2019 (centre) and modelled for 2021-2040 (right). Data from HadUKgrid and UKCP18 (Met Office).

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The NPMS+ pilot project, begun in 2021, is exploring the potential for using protocols from the National Plant Monitoring Scheme at a local level. The need for long-term monitoring of habitats and biodiversity has become a significant focus for many organisations. With ecological targets a prominent feature of the Environment Act 2021, monitoring is now more important than ever. NPMS methodology has attracted much interest since its launch in 2015, with an increasing desire from surveyors to use it in areas outside of the main scheme monads. NPMS+ has been proposed as a solution for creating a consistent method for long-term monitoring on a local scale, with all the benefits of the NPMS but without the restriction on location. NPMS+ uses a consistent monitoring method that is tried and tested, and removes the need to invent new techniques and infrastructure. Additionally, the more widely this methodology is used, the greater our potential ability to compare and contrast datasets that could yield information on habitat management, restoration, and re-wilding, for example. Another advantage is that the existing resources are already in place to support the survey methods and data capture, and these are continually enhanced and updated. Developed by the NPMS partnership, the methodology is accessible to volunteers and repeatable. Longer-term aspirations include the potential to compare results and indicators from local NPMS+ projects with those from the national NPMS dataset.

During early 2021 a series of workshops were run to explore the monitoring needs of potential regional stakeholders, and to investigate how the NPMS+ could fulfil the needs of interested organisations. Case studies were also produced along similar lines. The main areas of focus for the NPMS+ pilot is to allow organisations to self-select 1 km<sup>2</sup> locations, as well as additional habitat and species recording options to reflect local needs. This allows organisations to monitor areas of specific interest, for example within management or restoration project boundaries. This would complement the core NPMS, which uses randomly selected 1 km<sup>2</sup> with a bias towards semi-natural habitats. This randomisation process removes bias from site selection, and so is essential for achieving a representative view of the state of habitats across the UK.



#### NPMS+ Brownfield habitat online training with Joshua Styles

The NPMS+ pilot will use a website called the Plant Portal, hosted by one of the NPMS partner organisations – UKCEH. This will be used for all those taking part in NPMS+. This is where the project administrators (the person within the organisation assigned to this pilot project) will set up their NPMS+ project, set up squares, manage participants, support participants, and access data. Participants (volunteers or staff carrying out the surveys) will also use the Plant Portal to create accounts, select squares, create plots, and enter data. All training for using the Plant Portal will be housed on the Plant Portal website, but training on NPMS methodology and core habitats will remain accessible via the main NPMS website.



# NPMS Training 2021

## 2021 training events

**Digital: 25**  
(18 webinars, 2 data surgery events, 5 regional meets)

**In field: 9**

**Total: 34**

### Range of training categories including:

- Methodology and data entry
- Habitat specific
- Regional meets
- Q&A sessions



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### Most popular training:

Arable field margins webinar

All training webinars and videos have been made available to view any time on the NPMS YouTube Channel: [NPMS Support – YouTube](#)

## 2021 training attendance

**Digital: 1146 unique views**  
**In field: 60**



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## 19 Mentors In 6 Regions

Mentor Directory:  
[NPMS Mentors | National Plant Monitoring Scheme](#)

*“Training was very clear and thoroughly interesting! And explained about help etc if needed! Thank you”*

*“I thought the webinar was fantastic, one of the best I've attended in terms of knowledge transfer as the presenter was so good at explaining things in an accessible way but with plenty of key info”*

## Social Media engagement

Twitter: 2078 followers  
 Instagram: 476  
 Facebook: 1125 followers  
 Facebook support group: 359 members  
 YouTube Channel: 420 Subscribers  
 >11,000 video views



# NPMS News

## Impact of COVID-19 on surveys

The COVID-19 pandemic that so abruptly impacted our lives in 2020 has had far reaching effects: personally, economically, and environmentally – including the impact on biodiversity monitoring schemes. When the first COVID-19 lockdown came in spring 2020, we were all prevented from going out except in very limited circumstances, and biodiversity monitoring schemes across the UK asked their recorders to pause their usual monitoring activity. As a silver lining, many people really started to appreciate the local wildlife on their doorstep as they took their daily exercise. Monitoring schemes adapted to maintain engagement with volunteers in these difficult circumstances, but inevitably ended up having a dip or gap in data points. As restrictions were eased at different rates across different parts of the UK, this has also had to be taken on board by schemes when considering whether there was sufficient data to be able to publish representative trends. Whilst the situation has

undoubtedly been a challenge for monitoring schemes, we are encouraged that in the wider context of monitoring in the UK, a blip in data availability for a year or two will not be a major issue for long-term datasets. Indeed, whilst this is the first time that national restrictions have hit the NPMS, it is not the first time that such a challenge has been faced by the wider monitoring community. Back in 2001, the Foot and Mouth outbreak in livestock led to restrictions on access to the countryside being put in place to control its spread. We saw a dip followed by a rebound in recording effort at that time, and are encouraged that again we are seeing many people return to monitoring as they are able to do so.

Indeed, while 2020 saw all NPMS spring surveys cancelled and around a 35% reduction in squares returning late summer surveys data, activity increased again in 2021, nearing pre-COVID-19 levels.

## NPMS App and Website

Whilst we are continually updating and monitoring the performance of the NPMS website and app and correcting any bugs, 2021 was particularly noteworthy for the leap in app usage following updates in 2020. Only around 80 samples were submitted via the NPMS app in 2020, whereas 2021 saw over 330 samples sent to the database via this route. We also included new prompts for species' photos to help with data validation, and access to surveyor's 1 km square maps through the app itself.

Website work included further integration of useful information about land use into the site (e.g. locations of SSSIs and National Nature Reserves), speed-ups to the "My Visits" page, and improvements to the training event functionality. Thanks are due to our developers for always going above and beyond in keeping the site running!



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Free NPMS survey App, available for both Apple and Android

## Quality Assurance

2021 saw the first field “Quality Assurance” event since the launch of the NPMS in 2015, although some surveyors may remember our “QA online quiz” from the winter of 2019. Planned originally for 2020, our field QA was postponed for obvious reasons. The event was held over 3 days in June 2021 at RSPB Arne in Dorset, with ten NPMS volunteers taking part in person. Four different habitat locations were selected by experts from UKCEH and the BSBI, with each location chosen to represent a different NPMS habitat. Surveyors were then asked to record the same plots, participating at whichever level they normally record at within the scheme. The results will help us to understand different types of variation and error between surveyors (as well as between the experts!) and will contribute to our understanding of (and our ability to model) scheme data. The results should also indicate where we may need to be cautious with regards to our interpretations. Many lovely plants were seen on the exercise, including populations of White-beaked Sedge, Nordic Bladderwort, and a host of rare clovers, and we thank again all the participating surveyors.



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# Thanks!

Thanks to all the stakeholders who have supported the NPMS in recent years and have organised or attended workshops across the UK, including: Yorkshire Dales National Park, South West Scotland Environment Information Centre, Cairngorms National Park, National Trust, Natural England, Ministry of Defence and all the AONBs, National Parks and Record Centres who have promoted the scheme. An enormous thank you for the effort by all our dedicated volunteer surveyors who make the scheme and this important research possible.



## National Plant Monitoring Scheme

To discuss the scheme, how data are used or volunteer involvement, please contact [support@npms.org.uk](mailto:support@npms.org.uk)

Full list of NPMS publications:  
[www.npms.org.uk/content/conservation-and-research](http://www.npms.org.uk/content/conservation-and-research)

**[www.npms.org.uk](http://www.npms.org.uk)**

**07711 922098**



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Twitter: @theNPMS



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NPMS App available to download for Apple: <https://apple.co/2HTySPJ>  
and Android: <http://bit.ly/2VkJdRf>

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Design: [evansgraphic.co.uk](http://evansgraphic.co.uk)

National Plant Monitoring Scheme (2022) NPMS Annual report 2021

The National Plant Monitoring Scheme (NPMS) is organized and funded by the [UK Centre for Ecology and Hydrology](#), [Botanical Society of Britain and Ireland](#), [Plantlife](#), [the Joint Nature Conservation Committee](#), and [The Department of Agriculture, Environment and Rural Affairs for Northern Ireland](#). The NPMS is indebted to all volunteers who contribute data to the scheme.

