

## Potential applications of the National Plant Monitoring Scheme data and methods for conservation organisations

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### Purpose of document:

This document outlines the current and future use of the National Plant Monitoring Scheme (NPMS) by a range of organisations including: the country Statutory Nature Conservation Bodies and the devolved administrations and their departments; National Parks and AONBs; Local Record Centres; Biosphere Reserves; Defence Infrastructure Organisations; Conservation NGOs.

It demonstrates the scope of the NPMS, and the data it collects, to add value and benefit to the goals of these organisations, and illustrates the way in which some organisations have already ‘adopted’ the NPMS as their monitoring tool of choice.

Since the launch of the scheme in 2015, development of partnerships and delivery of stakeholder workshops have enabled the NPMS delivery partnership to increase understanding of the NPMS within organisations, and identify actions that would facilitate the use and utility of the scheme. The delivery partnership recognises that this is an important step in sustaining the scheme in the long term and optimising the benefits it brings to all.

### What has the NPMS achieved to date?

- ✓ Delivered data on 619 1km squares in 2 years
- ✓ Delivered data on 1224 plots in 2016
- ✓ 1128 volunteers signed up
- ✓ 21 stakeholder organisations engaged
- ✓ 86 training workshops delivered to 734 people in the first three years of the project
- ✓ UK-wide geographical coverage

### What are the ecological benefits of the NPMS?

A short technical scoping report by [CEH \(2016\)](#) identified a number of ways in which NPMS data could be used. This included its use in identifying key drivers of change such as air pollution, climate change and invasive species, as well as potential uses for habitat inventories and remote sensing. Further work is underway within the NPMS partnership to develop data applications, and NPMS data is already being evaluated in other ecological research (see Box A).

**Box A: NPMS in ecological research [note that this does not include research that has included NPMS data via NBN or GBIF downloads]**

Walker, K.J., Pescott, O.L., New, H., Harris, F., Cheffings, C.M., Newton, N., Jitlal, M., Redhead, J., Smart, S.M. & Roy, D.B. In prep. The design and launch of a new volunteer-based plant monitoring scheme for the United Kingdom.

J.T. Staley, M. Lobley, M.E. McCracken, H. Chiswell, J.W. Redhead, S.M. Smart, O.L.

Pescott, M., Jitlal, S.R., Amy, H.J., Dean, L., Ridding, R., Broughton and J.O. Mountford. In review. *The environmental effectiveness of the Higher Level Stewardship scheme; Resurveying the baseline agreement monitoring sample to quantify change between 2009 and 2016*. Natural England project ECM 6937.

O.L. Pescott, K.J. Walker, S.M. Smart, and D.B. Roy. 2017. *NPMS Air Pollution Data Review WP1 Report*. Unpublished report to JNCC. CEH Wallingford & BSBI. [Available at <http://www.npms.org.uk/content/conservation-and-research>]

Carvell, C., Isaac, N. J. B., Jitlal, M., Peyton, J., Powney, G. D., Roy, D. B., Vanbergen, A. J., O'Connor, R. S., Jones, C. M., Kunin, W. E., Breeze, T. D., Garratt, M. P. D., Potts, S. G., Harvey, M., Ansine, J., Comont, R. F., Lee, P., Edwards, M., Roberts, S. P. M., Morris, R. K. A., Musgrove, A. J., Brereton, T., Hawes, C., and Roy, H. E. 2016. *Design and Testing of a National Pollinator and Pollination Monitoring Framework*. Final summary report to the Department for Environment, Food and Rural Affairs (Defra), Scottish Government and Welsh Government: Project WC1101.

Pescott, O.L., Jitlal, M., Smart, S.M., Walker, K.J., Roy, D.B. & Freeman, S.N. 2016. A comparison of models for interval-censored plant cover data, with applications to monitoring schemes. *PeerJPrePrints*. <https://peerj.com/preprints/2532/>

Pescott, O.L., Walker, K.J., Pocock, M.J.O., Jitlal, M., Outhwaite, C.L., Cheffings, C.M., Harris, F., Roy, D.B. 2015. Ecological monitoring with citizen science: the design and implementation of schemes for plants in Britain and Ireland. *Biological Journal of the Linnean Society*, 115(3), 505-521.

In addition, some of the 1km squares selected for the National Pollinator Monitoring Scheme are being co-located with those from the NPMS, ensuring that the datasets are more comparable. This also highlights that the method for 1km square selection used by the NPMS is viewed as logical and valid.

In addition to the above scoping report, workshops were held in England (2016) and Wales (2017) with over 30 stakeholders in total to identify how they felt they could use the NPMS data. The workshops outputs identified a wide range of possibilities, including:

**1. To establish national trends:**

The scheme collects plant data annually. This will help to rapidly indicate trends in habitat condition of semi-natural habitats across the UK countryside beyond protected sites, which are already the focus of a lot of other monitoring. The NPMS, with further analyses, will contribute towards:

- UK and country biodiversity indicators, to track progress against national strategies and plans
- Understanding drivers of change e.g. climate change/N deposition/CAP/agri-environment schemes/disease e.g. Ash dieback
- Statutory reporting requirements such as the EU Habitats Directive and potential future Biodiversity 2020 reporting

**2. To support and enable improved reporting against stakeholder objectives and work plans.**

NPMS has great potential to contribute to government stakeholder objectives and strategies (see Box B). There is also potential for data to be used to assess, for example, the impact on certain habitats of different land uses or protection of riparian habitat. Alongside this, NPMS data and methods are already being integrated into strategy in non-government organisations (see case study 1).

#### **Box B: NPMS in government strategy**

Collection of information on plant populations contributes towards the data needs outlined in Defra's *Biodiversity Monitoring and Surveillance Strategy*. This states that Defra's direct engagement with the voluntary recording sector will be coordinated by the JNCC's strategic surveillance partnership programme, of which the NPMS monitoring forms a key component. In addition, NPMS data can contribute to Evidence Outcome 1 of Defra's *Evidence Action Plan*: 'robust assessments of change in the natural environment and rural communities'.

The *Environment (Wales) Act 2016* states that Natural Resources Wales must report on the state of natural resources in Wales and the main trends and factors affecting these. As the NPMS collects annual data on plants and habitats, it is very well placed to contribute to assessments of condition and trends for these aspects. JNCC volunteer monitoring schemes, including NPMS, are valued by Welsh Government and will provide integral evidence within its new *Environment and Rural Affairs Monitoring & Modelling programme*.

The Scottish Government is aware of the benefits of the NPMS and recognises the value of the data in providing a measure for the *Scottish Biodiversity Strategy Report (2017)* as detailed here: "The diversity of plant species across different habitats has declined by 10% between 1998 and 2007 as shown in the Countryside Survey data. This overall loss was reflected in butterfly numbers over the same period as they rely on many plant species, such as wild thyme, as a food source. Competitive species such as nettle increased significantly. The National Plant Monitoring Scheme is intended to replace the vascular plant indicator C7. Volunteers began collecting data in 2015 which will provide a baseline dataset following completion of an initial three year period." (Scottish Biodiversity Strategy Report to the Scottish Parliament 2014 - 2016)

The importance of working with volunteers for biological monitoring to support reporting on progress towards targets is emphasised in both *2020 Challenge for Scotland's Biodiversity* and *Scotland's Biodiversity - a route map to 2020*.

The *Biodiversity Strategy for Northern Ireland to 2020* sets out a number of targets for the environment, with associated actions to achieve them. The NPMS has the potential to contribute to many of these actions, including those relating to biodiversity monitoring, increasing individuals engaged with citizen science, and informing positive land management. NPMS data will constitute a valuable part of the NI surveillance and monitoring evidence-base.

### **3. To monitor the impact of management:**

By sampling across the UK countryside, NPMS could help to provide a contextual ‘baseline’ of habitat condition, against which protected sites can be compared. This could help to understand whether targeted management efforts are working effectively to maintain site condition relative to the wider countryside. In addition, the scheme could provide vegetation data to ground-truth earth observation work aiming to detect habitat condition changes. This could help to monitor the impacts of management interventions on habitat condition, or identify where insufficient intervention was occurring.

#### 4. How to add value to/augment other datasets

Additional surveying effort (e.g. top-up sampling in under-sampled regions or habitat) could enable better reporting at a regional or landscape scale. Establishing a good relationship with Local Records Centres will also help to maximise the benefits and uses of the NPMS dataset.

These identified opportunities reflect the perceived value of the scheme by others. For some stakeholders, this high utility is reflected in their early adoption of NPMS within their own operations. For example, the National Trust estate incorporates 7.5% of the UK NPMS 1 km squares (153 squares across England, Northern Ireland and Wales). This high coincidence has resulted in them utilising NPMS data as a means of verifying their own outcome metrics and comparing them to the wider national picture (see Case study 1). These opportunities also allow us to conduct effective future planning, involving stakeholders, including the Defence Infrastructure Organisation where we are planning to work with their relevant conservation groups and Galloway and Ayrshire Biosphere Reserve (see case study 2).

**Case study 1:** Where there are sufficient squares within an organisation’s boundary or management area, the NPMS may be a useful tool to compare the condition of habitats on the organisation’s land compared with national trends. In 2015, the National Trust (NT) identified the scheme’s potential to do this, using the 153 NPMS squares coinciding with NT land. They have pursued this by:

- Allocating someone to oversee the take up of NPMS squares on NT land
- Exploring whether NPMS volunteers on NT land could receive the same benefits that NT volunteers receive
- Linking NPMS volunteers with their local ranger
- Committing to having all squares on their land taken up (currently 60% are allocated)
- Adopting the scheme methodology across their estate (e.g. holding a training day for their staff at the North Devon estate and across the south-west region)

The NPMS partnership is now actively working with land advisors across the NT estate to ensure the scheme is further embedded locally, and will be developing an action plan in September 2017.

*“In 2015, National Trust launched its 10 year Strategy, **Playing our Part**, through which we aim to deliver healthier, more beautiful natural landscapes. Working closely with our tenant farmers and others, we will change land use to make it better for nature. We will be tracking our success through a series of Outcome metrics, one of which is the changes in the composition of vegetation. For this, alongside existing estimates of the condition of our land, we have adopted the National Plant Monitoring Scheme as a way of tracking the distribution and abundance of wild*

*flowers into the long term.”*

– David Bullock Head of Nature Conservation, National Trust

**Case study 2:** The Galloway and Ayrshire Biosphere reserve is overseen by a partnership of organisations, and has 39 NPMS squares coinciding with it, with only 4 squares currently taken by volunteers. The Biosphere Reserve believes that NPMS data can contribute to two of their main themes - biodiversity and research and learning, and aligns with their habitat priorities. The NPMS partnership is currently developing a work plan with the reserve to increase monitoring of unallocated squares.

## What are the wider benefits of the scheme?

### Increase botanical recording skills

The NPMS team have been monitoring participant experiences using annual participant questionnaires. In 2016 the volunteer participant survey revealed that 76% of those surveyed felt that they had gained new skills or knowledge through participation in the NPMS. Eighty-three (7%) NPMS surveyors have taken plant in the ‘Identiplant’ course (a BSBI-linked initiative) in the past two years, highlighting a real commitment from NPMS volunteers to furthering their botanical knowledge.

Stakeholder workshops revealed that the NPMS was also felt to be a useful tool for continuing professional development within the conservation sector—for example as personal development for junior rangers at the National Trust, country agency staff, or site wardens. David Bullock (Head of Nature Conservation, National Trust) feels strongly that this is likely to be a mutually beneficial collaboration. Also, the use of a ‘national method’ for training allows for squares to be surveyed which might be on another organisation’s land.

### Health and well-being

Sixty-seven percent of recorders reported that they spend more time outside in their local environment because of the NPMS. This has known health and well-being benefits, as well improving surveyors’ understanding and appreciation of their local environment. At the Welsh stakeholder workshop, a representative from Welsh Government highlighted how important the Social Services and Well being Act (2014) is to them and other organisations across Wales. In response, further benefits to wellbeing of the NPMS are being explored to increase its attractiveness to partners.

### New recorders

The participant questionnaire also highlights how many of our volunteers are new to biological recording—33%. This has shown the positive response to advertising the scheme outside of the existing biological recording community.

### Engaging a younger demographic with biological recording

The demographic split of volunteers currently taking part in the NPMS is 12% aged 25-40, 54% aged 41-64 and 34% aged over 65. Continuing to engage a younger demographic, by exploring new audiences such as outdoor educators and those who take part in outdoor recreation, is important to ensure there are skills to maintain the scheme into the future.

## Social benefits

The NPMS has provided the public with more opportunities to engage in volunteering and citizen science. This is evidenced by the participant surveys where 23% of volunteers met new people, 67% gained a greater understanding of their local environment, and 39% reported that the NPMS gave them a reason to get outside and explore.

## What are the plans to develop use and utility further?

There is no doubt that the NPMS will provide high quality evidence that can inform decisions that affect the environment. In addition, it is clear that the NPMS is a scheme that supports the UK countries' priorities.

There are a number of measures that can be built into the scheme to develop use and utility even further. These include:

### Maximising data access and use by organisations

- Facilitating data sharing and use by enabling different data export and import options within the NPMS website
- Creating a data hub to give people the option to share what analyses they are doing (note that the NPMS datasets on the new NBN Atlas partially provide this functionality, although this could be developed as the Atlas develops)
- Helping to mobilise data back to landowners and land managers to help them feel invested in the scheme
- Linking NPMS volunteers with relevant organisation staff on the ground

### Optimising data quantity and quality

- Working with organisations to provide local hubs for volunteers
- Working with organisations to maximise access to squares
- Enabling volunteers to record at the more advanced recording levels
- Working to quality assure the data and understand any limitations, to facilitate robust analytical use

## Conclusion

A modest investment in the NPMS has led to an array of benefits for a wide range of stakeholders working across UK conservation; these are likely to increase with time as volunteer engagement grows and more years of data are collected. Investment has been cost effective in engaging stakeholders to contribute their own resources, enhancing the scheme's data collection, organisational integration, utility and longevity. However, benefits also extend beyond direct data uses to include enhanced volunteer engagement with wildlife and well-being, and the development of the UK botanical skills base.