Long Term Monitoring Network Newsletter

5th edition, April 2021

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LTMN 2021

This summer (2021), we are hoping to do in-house vegetation surveys at Ainsdale Sand Dunes, Derbyshire Dales and Fenn's, Whixall & Bettisfield Mosses NNRs. The roadmap out of the pandemic is helping the LTMN team to plan ahead, with the vegetation surveys scheduled for after 'Step 4'. By then we are hoping for relative freedom, although this depends on various things as you'll appreciate; hence we are planning to two scenarios: Scenario 1 - key staff only allowed overnight accommodation, with a reliance on local surveyors, implementing Covid best practise measures, and Scenario 2 - anyone taking part can use overnight accommodation, still implementing Covid best practise measures.

If you might be interested in volunteering, and haven't already done so, please contact us at: LTMN@naturalengland.org.uk

We will continue to provide updates to colleagues, partners and external volunteers via our intranet and e-mail.

WHAT IS LTMN?

The Long Term Monitoring Network is the daughter project of the Environmental Change Network (ECN), which aims to track long-term environmental change across a range of habitats, as well as the possible drivers of change.

We record vegetation, birds, butterflies, soils, climate, air pollution and land management through regular surveys and on-site monitoring.

There are 37 sites representing 10 target habitats across England. Some of them have been monitored since 1992.

Data is available through Natural England's Access to Evidence catalogue.

Long-term data like this is key to tracking the impacts of things like climate breakdown on our environment.

LTMN 2020 Survey Season

Last summer (2020) we cancelled the in-house vegetation surveys but did manage to get some surveys done using experienced and local contractors, at Lower Derwent Valley, North Walney and Wyre Forest NNRs. It was a high standard of work and the three surveys have just been published on Access to Evidence catalogue bringing the total number to 83, with all sites on at least two and nine sites on three surveys now.

Photo: Lower Derwent Valley NRR, North Yorkshire - looking picturesque

In the autumn, it was time for the soils sampling and some of us were over-joyed at the opportunity to get out and dig holes! Dr. Matt Shepherd, our soil biodiversity senior specialist, ran the sampling at Burnham Beeches, Fenn's, Whixall & Bettisfield Mosses, Old Winchester Hill and The Stiperstones NNRs.

Story Map

Our 'LTMN Story Map' is now up and running since being published recently. It's great if you want a general introduction to the project but aren't a fan of streams of text and like information presented in an interesting and visually stimulating way.
We have some interactive maps in there, which allow you to see where the sites are and the locations of vegetation and soil plots.

We'll be building on this over time, adding more information as new data is collected and new graphics as we learn new ways of using and presenting the data.

Photo: Ainsdale Sand Dunes NNR, Merseyside - see below for an interesting Spotlight by Dan Pedley

SPOTLIGHT ON A SITE – AINSDALE

What connects 460 species of flowering plants, a tepee used to dry out rain-soaked LTMN surveyors, a dystopian landscape stalked by Martian invaders (*in War of the Worlds*), and a (much) less dystopian landscape of dunes and slacks stalked by sand lizards, natterjack toads and a small-car-sized robot mower? It's Ainsdale NNR!

Ainsdale Sand Dunes NNR was established in 1965 to protect "the finest example of lime-rich sand dunes on the North West coast". The reserve now forms part of Sefton Coast SSSI / SAC, the largest sand dune system in England which stretches for 21km from Liverpool to Southport. Habitats found on the NNR range across dune succession, from embryo and mobile dunes through to humid dune slacks, fixed dune grassland and even dune heath further inland. The dunes are backed by large Corsican pine plantations that date from the early 20th century.

Dune habitats along Sefton Coast had been used historically for livestock grazing and the rearing of rabbits in managed warrens, along with some small-scale agriculture on the back-dune areas. As these activities declined over the last century large parts of the dune system were lost to development or modified by coastal defences, tree planting, sand extraction, tipping, military activities, recreation and scrub encroachment. Some of these factors remain the key restrictions to sediment transport, coastal dynamism and habitat diversity within the dune system.

Areas of dunes in Ainsdale (and nearby Cabin Hill NNR) have been managed by grazing for over twenty years within large fenced enclosures, using Herdwick sheep and a small number of Shetland cattle. This helps maintain a low, open and diverse sward within the dune grassland and slacks (and conditions suitable for specialist dune species). The aforementioned robot mower is used to manage slacks that have become dominated by creeping willow. Wider initiatives including Gems in the Dunes and Dynamic Dunescapes are looking to address the lack of dynamism and open habitat within the dune system across Sefton Coast. At Ainsdale capital works are being undertaken to remobilise areas of sand.

Ainsdale has been part of the Long Term Monitoring Network since 2009, with all protocols monitored (though weather now uses a representative station at Crosby). Of our 50 permanent vegetation plots 35 are open dune and 15 are woodland. So far vegetation surveys have taken place in 2012 and 2016, with the scheduled 2020 survey postponed due to Coronavirus.

Data collected from previous LTMN surveys has already been put to innovative use as part of 'Space2Eye Lens', a collaborative project between Manchester Metropolitan University and Natural England to test the suitability of Earth Observation Sentinel-2 Satellite products to map habitat extent and condition, with Ainsdale being use as one of the pilot sites.

This year we hope to finally undertake the postponed 2020 vegetation survey. Due to ongoing Covid-19 restrictions this is likely to be a quieter affair than the 2016 survey (that featured a BBQ / mini-festival with NNR manager Dave Mercer's band!) though after a difficult year for everyone LTMN staff and volunteers alike will no doubt be glad to be back at one of our favourite LTMN sites. We'll just hope we get better weather than the 2016 survey!

The Information Today
By Kieran Fox

The natural environment is constantly in flux - seasonal variation and changes in the way humans manage the land cause year by year fluctuations. Events like wildfires or disease can have dramatic effects on species populations, and there are the more long-term effects of pollutants. Behind all of this we have a changing climate, disrupting an increasingly unstable ecosystem. It is crucial to understand these effects and to identify their cause. In this, long term monitoring is an invaluable tool, enabling us to filter out the more short term changes from the long. Having a spread of different sites allows us to compare different conditions and different land management practices, helping to identify the causes of change. Long Term Monitoring Network is surveying 37 sites over many years to build up a picture of how our natural spaces are changing, and to help us understand the key processes behind it all.

After 12 years of surveying, we are starting to get three vegetation surveys done for most of the sites, enabling us to look for the beginnings of a trend. We can combine our lowland or upland heath and look for changes in bell heather coverage, or spot any decreases in the species diversity on our chalk grassland sites. We have a wealth of vegetation data to draw from, all stemming from the plant species found in two-by-two meter plots. However, we are still in the early days of LTMN, with three data points perhaps forming the beginnings of a trend, but it is difficult to have confidence that they aren't the result of seasonal fluctuations and any changes to land management.

We do, however, have a detailed account of the individual sites and are building a reporting and feedback mechanism for the site managers on the LTMN National Nature Reserves. We have plant species lists per plot, Broad and Priority Habitats, NVC communities, mean Ellenberg and Grime values, richness and diversity scores, and vegetation structure measures, that tell us about the character, condition and possibly change on each site.
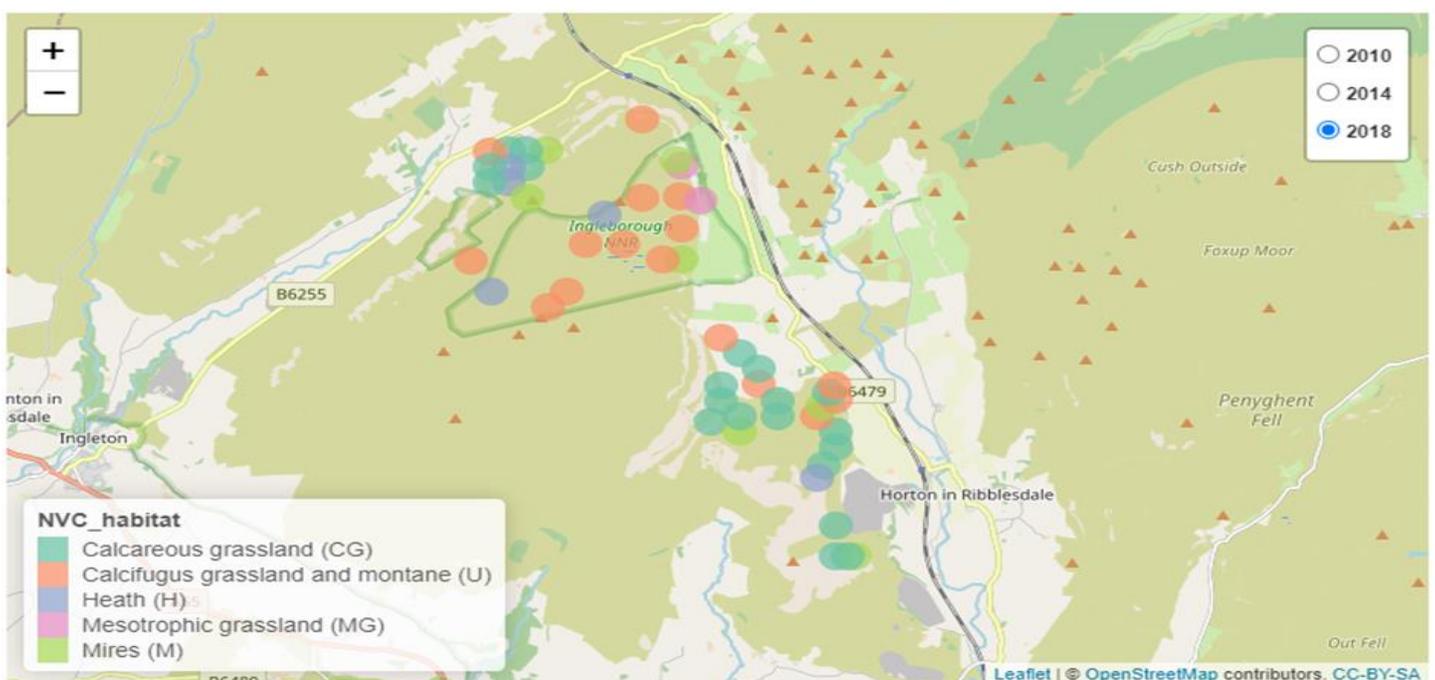
Above, we have a map of Ingleborough NNR, with each circle representing a plot and the colour indicating the habitat. This particular view shows the results from the survey in 2018, but the site manager is able to switch between views for each survey and look for changes in habitat. Changes between the years can give an early indication of a general shift, maybe from heathland to grass or from grass to scrub.

We are also able to gain insight into the environment at each plot. Plants will have a natural affinity for certain conditions e.g. acidic soil, plenty of water or low levels of light. We can therefore make assumptions about these conditions from the plant species present and their associated 'Ellenberg' scores.
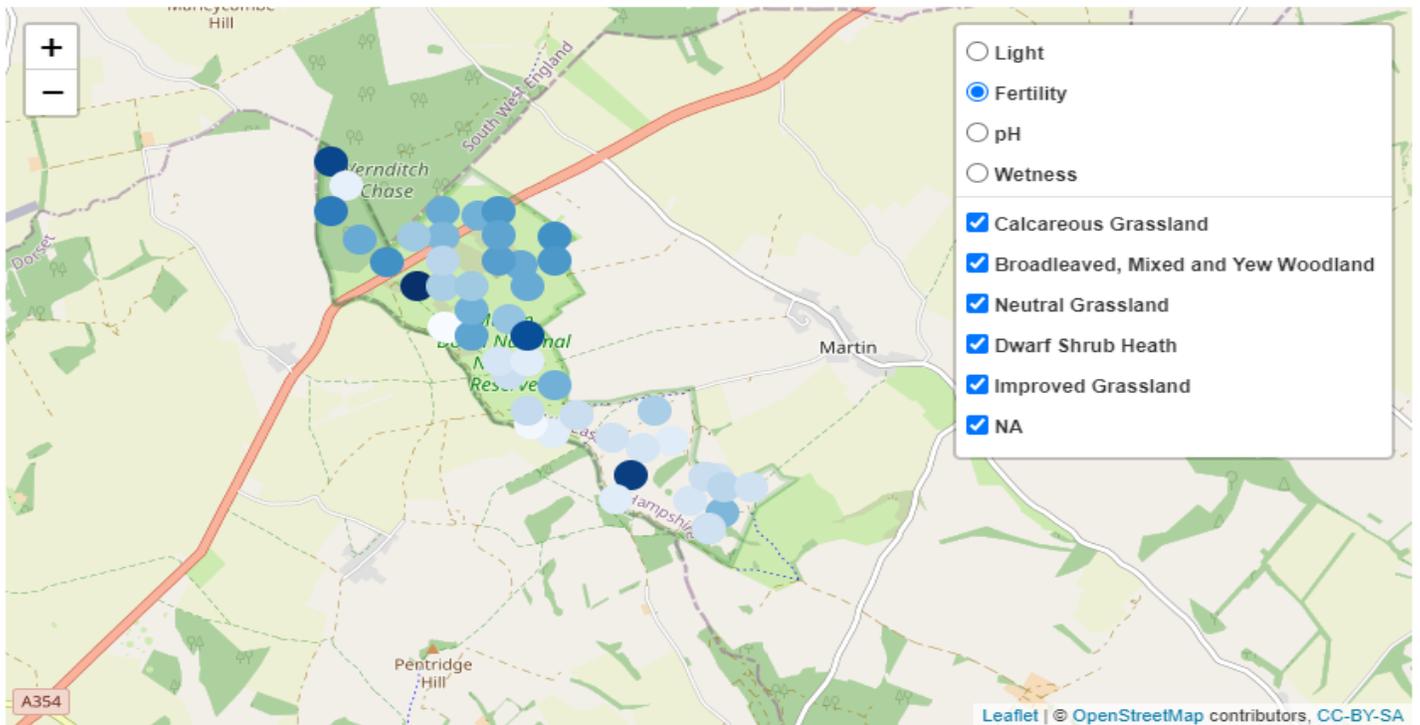
Here we demonstrate fertility levels in the soil, indicated by the plants growing in each plot and their affinity towards fertile soils. This is a map of Martin Down NNR, a chalk grassland site with a high biodiversity of flowering plants and insects, where it is essential to keep nutrient levels low. Each circle represents a plot, with the darker blue colour indicating higher nutrient levels in the soil, as generally appears to be the case towards the north of the site - likely reflecting the land-use history of the site.

The march towards a picture of how climate change is affecting our natural environment, moves steadily onwards. As of yet, we are only able to describe changes due to land management with any degree of confidence, but as more and more surveys are completed we can start to identify the long term trends.

Update on how we're using LTMN data

In our last newsletter we explained how we were quality checking the data from LTMN vegetation surveys ready for publication as open data, and developing a Data Analysis Framework to look at how we summarise and present the data collected for each protocol in a way that others can use to answer research questions.

We've made really good progress and now published 83 vegetation surveys. We've also quality checked and published butterfly data for 62 transects on or immediately adjacent to 31 out of the 37 LTMN sites, and we are working on quality checking and filling gaps in the data for our other protocols. All the published data can be found on our Access to Evidence catalogue here by following the links to individual sites.

Photo: Dersingham Bog, Norfolk

One of our weather stations hard at work

We also previously outlined a partnership project with the UK Centre for Ecology & Hydrology (UKCEH) which is investigating whether LTMN heathland and bog vegetation data can be used in combination with other long-term vegetation datasets (ECN, Countryside Survey and National Plant Monitoring Scheme) to increase our ability to detect change by effectively creating a larger dataset for analysis. This will help us understand whether there are changes in vegetation that can be attributed to climate change or air quality for example.

The project completed at the end of March and has indeed demonstrated that there is considerable potential for integrating data for these surveys, and possibly others, in order to shed new light on the nature and causes of vegetation change. For example, it has added considerable strength to a developing evidence base that suggests that terrestrial vegetation in the UK is changing progressively, albeit very gradually, in response to long-term shifts in the deposition and accumulation of air pollutants.

We will provide a more detailed summary in the next newsletter.

Staff Changes

So much has changed in the last year – and LTMN is no exception!

Victoria Benstead-Hume has moved to the NE Field Unit (NEFU), but she's keeping close ties with LTMN. NEFU staff provide vital botanical expertise on our in-house surveys, and Victoria will be coordinating the link between the two teams – and should continue to be a regular presence on in-house vegetation and soil surveys in the future.

Wendy Holland has also moved on to become a team leader, but has retained close links with the LTMN team. She remains a firm friend of the project and we're hoping to see her in person taking part in the in-house surveys this summer.

Although Victoria and Wendy have left very big walking boots to fill, LTMN has some fantastic new team members:

Kieran Fox has brought impressive coding skills to a temporary data analysis post in LTMN, and he's been making excellent progress. Initially he's automating the QA processes for all the LTMN data, which will save us staff time and allow us to publish the data much more quickly than we have in the past. He is also producing reports for each site showing vegetation changes over time (see his article in this newsletter for more).

Fiona Freshney has a spread of skills and experience that seems almost tailor-made for LTMN. She is an experienced plant surveyor, but she is also a particularly keen birder and has good mapping skills too. After just a few weeks she is fully up-to-speed; she'll be taking part in the summer surveys, and leading her first at Fenn's, Whixall and Bettisfield Mosses.

Natural Capital Ecosystem Assessment (NCEA) has been taking up a lot of Ruth's time, so ***Kate Fagan*** has joined the team temporarily to help with the project management and to lead an evaluation of the project over the next 6 months.

We're lucky to have another Manchester Metropolitan University student on placement with us this year: ***Jake Holmes.***

My NE experience.

My name is Jake Holmes and I am a 2nd year Environmental Science student at Manchester Metropolitan University. I have been on placement with Natural England since September 2020.

I began my time at Natural England working on the vegetation protocol with Sarah Grinsted, doing Quality Assurance on the three vegetation surveys that were contracted in 2020 for Lower Derwent Valley, Wyre Forest and North Walney.

Although it is unfortunate that Covid meant I missed the 2020 surveys and had to work from home throughout my placement, I am grateful for the opportunity to work with the Long Term Monitoring Network team and meet some wonderful people.

I am hopeful that the 2021 surveys will go ahead and I would like to join at least one of the three to get some hands-on learning experience, have some fun in the field and also to properly meet and spend some time with the team as it would be a shame to go back to university in September having only seen their faces via MS Teams

In January I began work on the birds protocol, with Wendy Holland initially, then Sarah Grinsted and Fiona Freshney later on. We produced an audit of the bird data to assess the format and identify what needed collating. Subsequently, emails were sent to each of our 37 LTMN sites enquiring about the state of Breeding Birds Survey at each site and if the site manager would be interested in setting up a BBS square or sending their historical data. I would like to thank the site managers who were all so keen to help and were very positive about BBS in general which was really great to see and allowed us to make substantial progress.

As I write this I have around six weeks left of my placement (not including summer work or fieldwork) and I would like to thank everyone who has been on the other end of a computer screen during this time and say well done for getting through a tough year. I am looking forward to what summer 2021 and beyond has in store, best of luck to you all in the future.

Some heather plants looking fabulous on a sunny day on The Stiperstones NNR, Shropshire