# Living England Specification for Ground Data Collection

**Amended for External Audiences**

July 2024

Natural Capital and Ecosystem Assessment (NCEA)
Earth Observation Service (EOS)
Natural England Field Unit (NEFU)

NATURAL ENGLAND

# Contents

# 1 Introduction

1.1 The Living England (LE) and Change Detection (CD) projects, led by Natural England, are multi-year programmes delivering satellite-derived national habitat maps and assessment of habitat change in support of the Defra Environmental Land Management (ELM) System and the Defra Natural Capital and Ecosystem Assessment (NCEA). Living England uses a machine learning approach to image classification, developed under the Defra Living Maps project (Kilcoyne et al., 2017). The method first clusters homogeneous areas of habitat into segments, then assigns each segment to a defined list of habitat classes using a Random Forest classification model (a machine learning algorithm). Through Phases I-IV (2018-2022) the LE project underwent a number of iterations to develop the methodology and in Phase IV released a habitat classification under the Open Government Licence (OGL). Living England 2022-23 (formally referred to as Phase V) standardised the methodology used in the classification to enable habitat change between iterations of the LE habitat maps to be assessed within the CD project, and Living England 2023-24 will implement the agreed standardised methods. The LE team intend to publish updated maps every two years with a CD assessment published in the intervening years to provide evidence as part of the Natural Capital Ecosystems Assessment (NCEA) classifying the distribution, extent and change in England's natural capital assets.

1.2 NCEA is a transformative programme to understand the extent and condition of England's terrestrial and marine environmental assets over time, supporting the government's ambition to improve the environment within a generation.

1.3 To accommodate the phenological and habitat variation across England and to facilitate the acquisition of cloud-free image mosaics, LE divides England into 14 Biogeographic Zones (BGZs, Figure 1).

1.4 While the LE output is primarily derived from satellite data, the LE methodology does not in any way replace the need for field survey. It is a tool which requires input of recently captured field data to inform a classification model. It is a tool which compliments field data and allows for the revision of habitat data at a national scale. The production and improvement of the map would not be possible without the regular provision of high-quality robust field survey data to train the model and carry out the model validation.

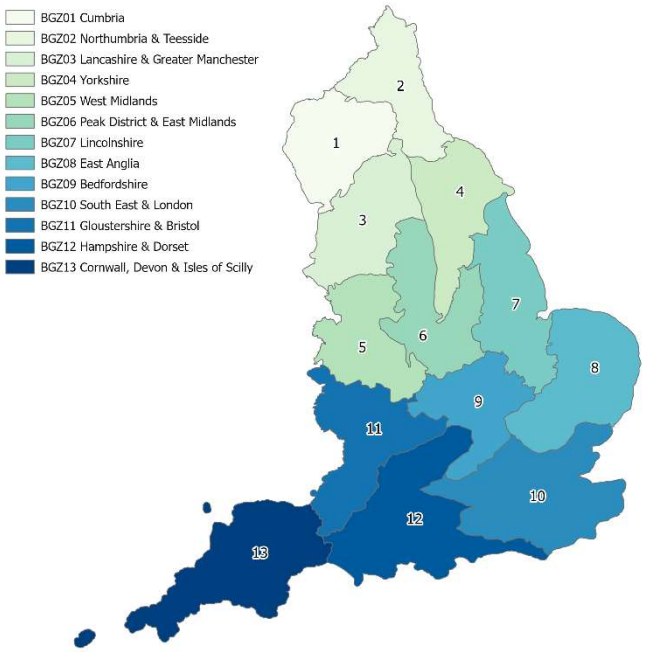



**Figure 1: Biogeographic Zones**

1.5 This document describes and supports the field data collection method that should be used for recording LE and CD ground data points, using a mobile device and the ArcGIS Field Maps app (Esri, 2024).

1.6 For any enquires about this guidance or the LE or CD projects, please contact the LE enquires mailbox:

livingenglandenquiries@naturalengland.org.uk

# 2 Habitat Types

## Living England

2.1 The LE project has developed its own classification framework, which largely follows the UK Biodiversity Action Plan (UKBAP) habitat classification system, albeit with some adjustments. Using the UKBAP habitat system ensures that the classification framework used by LE remains available under an OGL.

2.2 The **LE UKBAP Classification Framework (2023) V3** spreadsheet sets out the relationship between ecosystems, broad and priority UKBAP habitats, and the "Broad" and "Sub-class" (or "Detailed") LE Classification. This spreadsheet is included within the information pack provided.

2.3 An extract from this spreadsheet, showing the resolution each broad habitat is captured at within the LE project is also shown in Table 1.

**Table 1: LE UKBAP habitat classification framework**

| LE Broad Habitat | Capture resolution |
|---|---|
| **Arable and Horticultural** | UKBAP Broad |
| **Bare Ground (Bare Soil/Silt/Peat & Inland rock)** | EO Resolution |
| **Bare Sand** | EO Resolution |
| **Bog** | UKBAP Broad |
| **Bracken** | EO Resolution |
| **Broadleaved, Mixed and Yew Woodland** | UKBAP Broad |
| **Built-up Areas and Gardens** | UKBAP Broad |
| **Coastal Saltmarsh** | LE Sub-class / UKBAP Priority |
| **Coastal Sand Dunes** | LE Sub-class / UKBAP Priority |
| **Coniferous Woodland** | UKBAP Broad |
| **Dwarf Shrub Heath** | UKBAP Broad |
| **Fen, Marsh and Swamp** | UKBAP Broad |
| **Improved and Semi-improved Grassland** | UKBAP Broad |
| **Scrub** | EO Resolution |
| **Unimproved Grassland** | EO Resolution |
| **Water** | EO Resolution |

2.4 In most cases, Broad LE habitats equate to the broad UKBAP level. Exceptions are introduced where classes can or cannot be confidently mapped in relation to the resolution of Sentinel-1 and Sentinel-2 satellite imagery. These include:

2.4.1 Unimproved Grassland is a combined class grouping together the UKBAP broad habitats: Acid Grassland, Calcareous Grassland and Neutral Grassland.

2.4.2 Coastal Sand Dunes and Coastal Saltmarsh are mapped at the higher resolution priority habitat level.

2.4.3 There is a broad Bare Ground category, which incorporates areas of Bare soil/silt/peat in addition to Inland rock.

2.5 The LE Sub-class level incorporates more “detailed” habitats including UKBAP priority habitats with some additions to reflect how habitats are viewed by the Sentinel-2 satellite, including:

2.5.1 Lowland / Upland heath (dominating bog) used where heathland is growing on top of (or dominating) a bog. Heathland will give a different reflectance value compared to the bog due to the difference in plant species. It is therefore important to record this type of habitat separately to train the LE model effectively.

2.5.2 Various grassland habitats that may in some instances be “rush-dominated” are also recorded separately due to the different reflectance values of rushes compared to other grassland species.

2.6 To improve the transferability of ground data collected for LE for use by other mapping products and to aid validation of the probability map, a higher level of habitat resolution than LE Sub-class / UKBAP priority habitat level is also collected using the European Union (EU) Habitats Directive Annex 1 habitat classification framework (EU, 2013). The relationship between these habitats and the remainder of the LE classification framework is also set out in **the LE UKBAP Classification Framework (2023) V3** spreadsheet.

2.7 Descriptions of UKBAP Broad and LE Sub-class (including UKBAP Priority) habitats are included within the **Living England Habitat Classification Dashboard for Surveyors V2.0** excel workbook. This is included in the information pack provided, in addition to copies of:

2.7.1 UKBAP Priority Habitat Descriptions pdf (JNCC, 2011).

2.7.2 Interpretation manual of EU [Annex 1] Habitats (EUR 28, 2013).

2.7.3 The Baseline Evaluation of Higher Tier Agreements (BEHTA) manual (Natural England, 2016). This provides information on indicator species for a range of habitat classes and is included to help with decision making and support accurate habitat recording. (Note that not all LE habitat classes are included within the BEHTA manual.)

2.7.4 An abridged BEHTA Grassland Key (Natural England, 2016). This is included to help guide differentiation between improved, semi-improved and species-rich (unimproved) grassland habitats.

2.8 Specific queries about where certain habitats fall under the adjusted LE UKBAP classification framework, with information about how to record them at LE Sub-class and EU Habitats Directive Annex 1 level, are provided in Table 7 in Annex 3.

## Change Detection

2.9 Ground data points incorporating CD information in addition to core LE data are accepted on all LE broad habitat classes. However, there should be a focus on those habitats which are likely to have changed in the past two years or may change in the next two years.

2.9.1 The types of habitat change (change classes) recorded under CD methodology are set out in Table 2.

**Table 2: Mechanisms of habitat change recorded under Change Detection**

| Category of habitat change | Change class |
|---|---|
| Natural | Wildfires |
| Natural | Natural transitional change / succession |
| Natural | Pests / diseases |
| Natural | Other: please specify |
| Managed | Controlled Burning |
| Managed | Felling |
| Managed | Coppicing |
| Managed | Planting |
| Managed | Mown |
| Managed | Grazed |
| Managed | Lime |
| Managed | Manured |
| Managed | Fertilised |
| Managed | Sown |
| Managed | Urban development |
| Managed | Quarrying |
| Managed | Other: please specify |

**Please note – before continuing you will need an ArcGIS Online account (for more information please see Section 4.1) and ensure that it has been activated (link in an email from notifications@esri.com).**

# 3 Planning Your Survey

## General approach

3.1 Where possible, surveys should take place within the main growing season or productivity period for each habitat. For ease of identifying deciduous habitats such as broadleaved woodlands or semi-natural grasslands, plan the survey when vegetation is (as far as possible) in full leaf or before diagnostic identification features of grasses become lost through weathering, coinciding with the main survey season for site monitoring. However, where ecologists are confident (can identify the LE classes out of season and correctly measure the percentage cover of the segment), data may be collected at any time of year. This is particularly the case for upland habitats and will help manage surveys to coincide outside game management periods. The Field Survey Calendar (provided in your information pack) has been developed with NEFU to help identify when certain habitats should or should not be surveyed.

3.2 Please record a minimum of the core LE and CD ground data for each point. The survey method for these data is designed to be a rapid, light touch approach and only requires a smartphone or tablet running ArcGIS Field Maps. It is therefore ideal to integrate with other survey methods, such as Common Standards Monitoring / Integrated Site Assessment surveys, or National Vegetation Classification surveys.

3.3 Where you have been asked to focus specifically on change detection, or you have additional time and there is habitat change evident that warrants additional attention, please also record more detailed CD information Any more detailed information collected is helpful, however we have developed a slightly more involved survey method to illustrate best practice and ensure consistency and scientific robustness. This detailed CD survey method has been designed to collect additional data (primarily dominant plant species) to help identify true habitat change / control points at various stages.

3.4 LE/CD ground data is captured in the field onto a mobile device (smartphone or tablet) using the ArcGIS Field Maps app (Esri, 2024). You must download and install “ArcGIS Field Maps” and configure it for use before going out on site (see Section 4 for details). Using the Field Maps app will make navigation to your survey points simple, as it uses your mobile device’s GPS location and displays a map showing the LE segments and habitat classification, as well as areas of land ownership and permissions status. Data capture is then a simple form-based process (see Sections 4 and 5 for details).

## Targeting habitats

3.5 Please target both any currently under-represented habitat classes in each BGZ, and areas of recent or likely habitat change. Please note that BGZ 14 (Isles of Scilly) does not require points to be collected unless specified by the LE team. The **LE Ground Data Dashboard** (Annex 2, **Error! Reference source not found.** - **Error! Reference source not found.**) should be used to identify current under-recorded classes in each BGZ and keep track of new data points recorded using ArcGIS Field Maps, as the dashboard updates automatically. Further details on the dashboard and ground data targets are provided in Annex 2. The dashboard can be accessed here: https://defra.maps.arcgis.com/apps/dashboards/63bda08c773f45f2a1585c13f7cb51a0 .

3.6 Detailed priority areas and habitats for survey may be supplied by the LE team throughout the year as the habitat classification maps are investigated for errors or areas of low confidence. These specific areas and habitats should be a priority for surveyors as they have the potential to significantly improve the LE classification in future iterations.

3.7 If habitats are not abundant enough in a BGZ to meet the target number of points, then this should be reported to the LE team.

3.8 In general, you will not need to collect points for the following habitats: Arable and Horticultural, Built-up Areas and Gardens, and Water (only collect if the area has changed from or to these habitats). LE points should only be collected in broadleaved or coniferous woodlands where Change Detection is the focus. These habitats are not a priority for survey as they have reliable ground data from an external source.

3.9 Please review the **Datasets** listed in Table 3 to identify locations of where habitat change is likely to occurred. These datasets should be used to help target habitats which have undergone recent (~2 years) change or area likely to change in the next 2 years (e.g., if an area has planned management that will change the habitat class, or where farmers are being paid to plant on arable fields. Discuss regularly with the LE/CD team who will update on habitats and locations to target for suspected change. Many of these datasets can be viewed using the map **Change Detection – Identifying broad habitat change.** You can access the map here: https://defra.maps.arcgis.com/apps/mapviewer/index.html?webmap=516b586f44154b75b96665ed36a0ef41

3.10 The spatial framework for the LE classification and thus also CD outputs is based on a segmentation process using Sentinel-2 satellite imagery. This process groups together pixels of similar spectral appearance into polygons, which are referred to as “segments” and should approximately relate to stands of homogenous vegetation on the ground. These segments are classified by the LE modelling process, and each is assigned the most likely LE habitat class. Examples of LE segments are shown in Annex 1. These segments provide the basis for areas of change to be identified under the CD project. Some whole segments may have changed, or sub-segments.

**Table 3: Datasets to help identify areas of habitat change (all OGL).**

| | Dataset | Type of habitat change | Link |
|---|---|---|---|
| **1** | JNCC Landscape Monitoring App | Various | jncc.shinyapps.io/CUULandscapeMonitoring/ |
| **2** | EA Priority Habitat Creation and Restoration | Various | Priority Habitat Creation and Restoration – data.gov.uk |
| **3** | National Moorland Change Map | Upland change | Moorland Change Map (England) 2020-2021 \| Natural England Open Data Geoportal (arcgis.com) |
| **5** | Forestry Commission Planting and Felling Public Register | National Planting and Felling | Forestry Commission Public Register for England – Approved Cases (arcgis.com) |
| **6** | Ancient Woodland | Stable woodland | Ancient Woodland (England) \| Natural England Open Data Geoportal (arcgis.com) |
| **7** | Conservation and Enhancement Scheme Agreements | Various | Conservation and Enhancement Scheme Agreements (England) \| Natural England Open Data Geoportal (arcgis.com) |

## Access Permissions

3.11 It is essential to ensure you have permission from landowners and tenants to visit the site and to record data for LE/CD, that all necessary risk assessments have been completed, and that you are in compliance with all health and safety requirements, including for lone working if appropriate.

3.12 To clarify access and data collection permissions for LE surveys:

3.12.1 You ***do*** need to get permission from the landowner/occupier to carry out stand-along LE surveys, even if it is on publicly accessible land.

3.12.2 You ***do not*** need to get permissions to carry out stand-along LE surveys on NE-owned NNRs or in areas that have agreed permissions with major landowners (although you ***do*** need to check for any actions required prior to visiting these sites).

3.12.3 You ***do*** need to get permission to carry out LE surveys on other designated sites including SSSIs and non-NE owned NNRs.

3.12.4 You ***do not*** need to get extra permission to carry out LE surveys on land that you already have permission to survey as part of the England Ecosystem Survey (landowner/occupiers have already granted this permission).

## Identifying landowners using the LE Permissions Map

3.13 The **LE Permissions Map** is designed to help you plan your LE survey and identify landowner ownership. The LE Permissions Map itself can be accessed here:

https://experience.arcgis.com/experience/ccd10ee07f5b4e37bfb6fc24ce15ddca/

3.14 All surveyors should use the **LE Permissions Map** before visiting a site. This will help surveyors to identify landowners and assess the current permissions status of land. Surveyors should also update the map to reflect their intention to survey areas, and again once surveys have been completed.

3.15 In summary, the **LE Permissions Map** shows:

3.15.1 LE segmentation

3.15.2 Habitats (including LE and the Priority Habitat Inventory (PHI))

3.15.3 Designated sites

3.15.4 Previous surveys (LE ground data points*)

3.15.5 Land ownership, with associated permissions status

3.16 Use the LE segmentation, habitats and designated sites layers, in conjunction with the other resources detailed in the ‘Targeting habitats’ section above, to locate under-recorded habitats within LE segments contained in your BGZ.

3.17 You could also use the ground truth points layers to help you identify locations that already have LE field data, and therefore where more points for that habitat might be located. This could be particularly useful for often under-recorded habitat like ‘Scrub’.

3.18 Once you have identified the location of habitats of interest within your BGZ, you can overlay these with the land ownership layer on the map, to ascertain who owns the segments you are interested in, and what their permissions status is.

3.19 *The LE ground truth points shown on the **LE Permissions Map** are the validated points used in the LE habitat probability map incorporating the Ground Data Master Dataset. The Master Dataset was built from existing Habitat Inventories, national and area team surveys, as well as points collected by the Natural England Field Unit (NEFU) for designated site monitoring and partner surveys (e.g. National Plant Monitoring Scheme (NPMS).

3.20 The Living England team may also be able to provide you with Rural Payments Agency land parcels data, which can provide useful information on land ownership. Once you have found habitat locations you wish to survey, this data should be overlaid either with software locally or within the AGOL environment, to select land parcel covering these areas. The selected land parcel information can then be used to inform the collation of access permissions, in order to survey the habitats of interest.

## Identifying land-owner/occupier/managers on designated sites (inc. NE owned NNR)

3.21 Designated sites layers, including those for SSSIs and NNRs can be found within the **LE Permissions Map** on the LE Field Maps app or via the desktop version of AGOL. These layers can aid identification of the name of the designated site in which field surveys may be conducted.

3.22 Use **Designated Sites View**, to identify the Area Team Responsible Officer (RO) for each designated site. The RO can then be contacted to gain their local knowledge to help identify potential survey areas within their site or enquire about other potential local sites outside the designated sites network. The RO should have good land manager relations and information on who to contact to gain survey permissions. Access the **Designated Sites View** here: Site Search (naturalengland.org.uk)

3.23 This information can be supplemented by using MAGIC maps to identify NE-owned NNRs in each BGZ and checking the below spreadsheet, which details the reserve warden and point of contact. The spreadsheet also shows the name of the NE site manager, whose contact details can be found on the Corporate Directory or Teams. LE currently have blanket permissions to collect LE data from NE-owned NNR (not NNR owned by other bodies) but **please contact NNR Reserve Managers before visiting the reserve as a courtesy when organising survey dates and assessing risks.** NNR list managing bodies and lead contacts.xlsx (sharepoint.com)

3.24 From these discussions, risk assessment information can be obtained, along with advice on timings of surveys to ensure there is no impact on land or game management practices, or ground nesting birds.

## Access for LE surveys on sites with previously agreed (blanket) permissions

3.25 The LE, Natural Capital and Ecosystem Assessment (NCEA) and the NEFU field coordination team have secured **blanket permissions** to collect LE data from selected major landowners, in addition to NE-owned NNR (not NNR owned by other bodies). You can find the spatial coverage of these areas on the **Living England Ground Data Capture v5 (External)** map and the **LE Permissions Map** on the LE Field Maps app or via AGOL on your desktop.

3.26 **In many cases these areas with blanket permissions will still require some surveyor action prior to your visit, such as contacting site managers.** Any conditions that apply before visiting sites are shown in the **LE Permissions Map**. Please discuss the details of this with the LE team as appropriate.

3.27 As stated above, **please contact NE-owned NNR Reserve Managers before visiting the reserve as a courtesy when organising survey dates and assessing risks.**

## Access for LE surveys on new sites

3.28 If the target site is not within an NE-owned NNR or blanket permissions area, you can check the Rural Payments Agency land parcels data for landowner contact details (if you already know the owner/occupier/land manager details, or can easily find them yourself, you can skip this step).

3.29 You can provide land owners with the **Guidance Note for Landowners** (included in the information pack) to explain what LE is and why LE surveys are carried out.

3.30 If you are planning to survey a new area, you must use the **Living England Access Permission Letter** included in your information pack) to ensure Living England and CD can continue to be released as an OGL product and data used for other mapping products. This has a return slip that can be attached to an email to enable easy auditing of the permission gained and ensure that the data points you collect can be used to inform the production of the LE habitat probability map.

# 4 ArcGIS Field Maps User Guide

## Living England & Change Detection

4.1 What you'll need – equipment and user account:

4.1.1 **Mobile device (phone or tablet) with GPS and camera.** Ideally your mobile device will have a SIM card although this is not essential, as maps can be downloaded for offline use over Wi-Fi. Your mobile device will need enough storage space available for installing ArcGIS Field Maps, storing offline map data, and storing your captured LE ground data points and photos.

4.1.2 **ArcGIS Online (AGOL) user account and group membership.** You will need a Defra AGOL user account and to be a member of the "Living England, NEFU and SSSI Monitoring" Group. If you do not have an AGOL user account, please request one from the NE ArcGIS Online Knowledge Hub SharePoint page (https://defra.sharepoint.com/teams/Team2093/SitePages/Home.aspx) or contact data.services@naturalengland.org.uk. Please CC your request to LE mailbox (livingenglandenquiries@naturalengland.org.uk) so that we can ensure your new AGOL account is added to the Group. If you already have an AGOL user account, but are not yet a member of the Group, please contact the LE mailbox to be added.

4.1.3 Note that all screenshots in this section were taken using an Apple iOS (version 17.4.1) mobile phone with ArcGIS Field Maps (version 24.1.1). If you are using an Android device or a different version of ArcGIS Field Maps then the menus may appear slightly different, but this will not change the functionality of the app. The screenshots are numbered and labelled by their relevant points as e.g., "[*Fig. 2-01, 2-02*]".

4.2 Getting and installing the ArcGIS Field Maps app:

4.2.1 On your mobile device, go to the appropriate app store (App Store on iPhone, Google Play store on Android) and search for "ArcGIS Field Maps". Click on the matching app name to go to its page. [*Fig. 2-01*]

4.2.2 Install ArcGIS Field Maps on your device, open the app, and click the "Sign in with ArcGIS Online" to log in with your Defra AGOL account. [*Fig. 2-02, 2-03*]

4.3 Configuring app settings:

4.3.1 Make sure to allow the app to use any of your device's services the app requests access to (e.g., GPS, Camera, Photos etc.). [*Fig. 2-04*]

4.3.2 From the app settings (click on the profile icon), you can configure the map download and sync options using "Cellular data" (sync & download when off Wi-Fi) and "Auto-sync" (automatically sync offline edits) depending on your preferences (see Sections 4.4 and 4.8 for details about offline working and synchronisation). [*Fig. 2-04*]

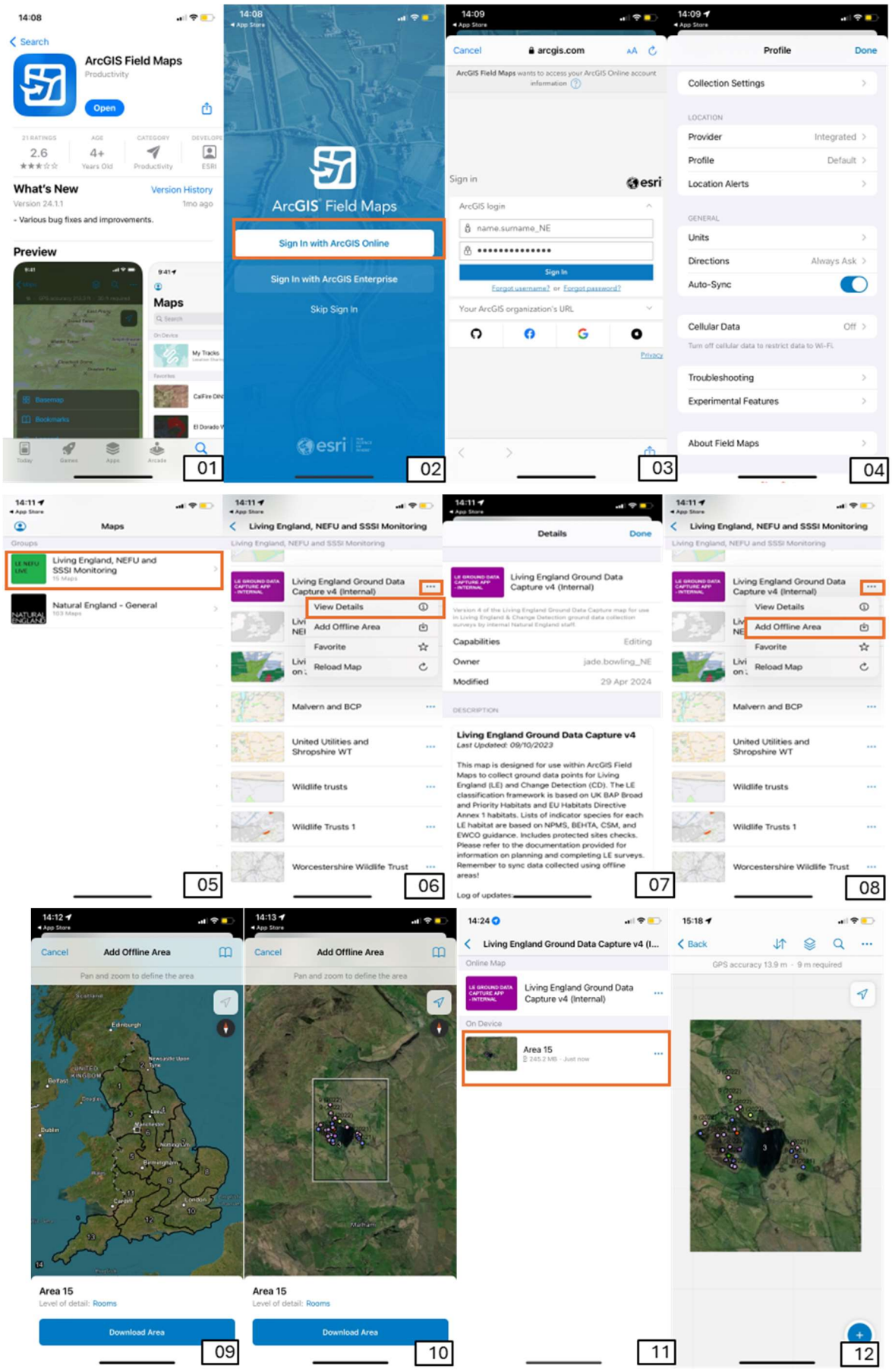



**Figure 2: Screenshots 01-31 showing ArcGIS Field Maps (Esri, 2024) and the LE Ground Data Capture map. Background source: Esri et al. (2024a, 2024b).**

4.4 Loading map and adding offline areas in Field Maps:

4.4.1 When opened, Field Maps will present you with lists of the Maps and Groups which you have access to. [*Fig. 2-05, 2-06*]

4.4.2 Within the “Groups” section of the app home screen, click on the Group called “Living England, NEFU and SSSI Monitoring”. If the group is not listed, then you will need to request membership (see Section 4.1.2). [*Fig. 2-05*]

4.4.3 Within the group there is a list of the maps this group can access. Click on the map called **Living England Ground Data Capture v5 (External)**. [*Fig. 2-06*]

4.4.4 If you are connected to the internet (Wi-Fi or mobile signal), when you click on this map it will open in Field Maps in **online mode** (by default, it will automatically zoom to your location). This will use your internet connection to load the map and any data points collected are synced automatically as they are created/edited.

4.4.5 The menu icon next to the Living England Ground Data Capture map allows you to view the map details, download offline regions, and refresh the online map. [*Fig. 2-06, 2-08*]

4.4.6 You need to download **offline areas** to use the map in the field where your mobile signal will be unreliable or absent. You can adjust the area to download by moving and zooming the map in and out. The size of the download region is set to “Small building” by default, but you can change it (to e.g., “Street”) if you need to download a larger region. Note that downloads can take a long time (30-45 minutes on a good Wi-Fi connection), and any disruptions can cause the download to fail. We recommend you download offline areas over Wi-Fi to avoid excessive use of your mobile data allowance. [*Fig. 2-08 to 2-11*]

4.4.7 When the download is complete, the progress indicator is replaced by a menu icon. This allows you to rename the offline area, synchronise your offline area to update it with new data points collected by other surveyors, or remove the area from your device. [*Fig. 2-11*]

4.4.8 Now that there is an offline area downloaded to your device, it will open by default when you click on the Living England Ground Data Capture map instead of opening in online mode. When disconnected from the internet, the downloaded region of the map is still visible. You can also synchronise the data from within the map using the arrows icon. [*Fig. 2-12*]

4.5 Using the Living England Ground Data Capture map:

4.5.1 When you open the Living England Ground Data Capture map in either online or offline mode, the map will show the LE ground data points, BGZs, and a basemap showing Esri high resolution imagery and mapping (Esri et al., 2024a, 2024b). Other layers such as, LE habitat classification and segmentation, areas of land-ownership with access & data collection permission status, designated sites such as Sites of Scientific Interest (SSSI) (Natural England, 2022a) and National Nature Reserve (NNR) areas (Natural England, 2022b) are turned off by default, You can centre the map on your location (blue dot) using the location button. [*Fig. 2-13*]

4.5.2 You can change which layers are visible by selecting the layers icon and switching them on and off. The permissions, segmentation, and classification layers are grouped so you can toggle all the whole layer easily without having to find the relevant BGZ. [*Fig. 2-14, 2-15*]

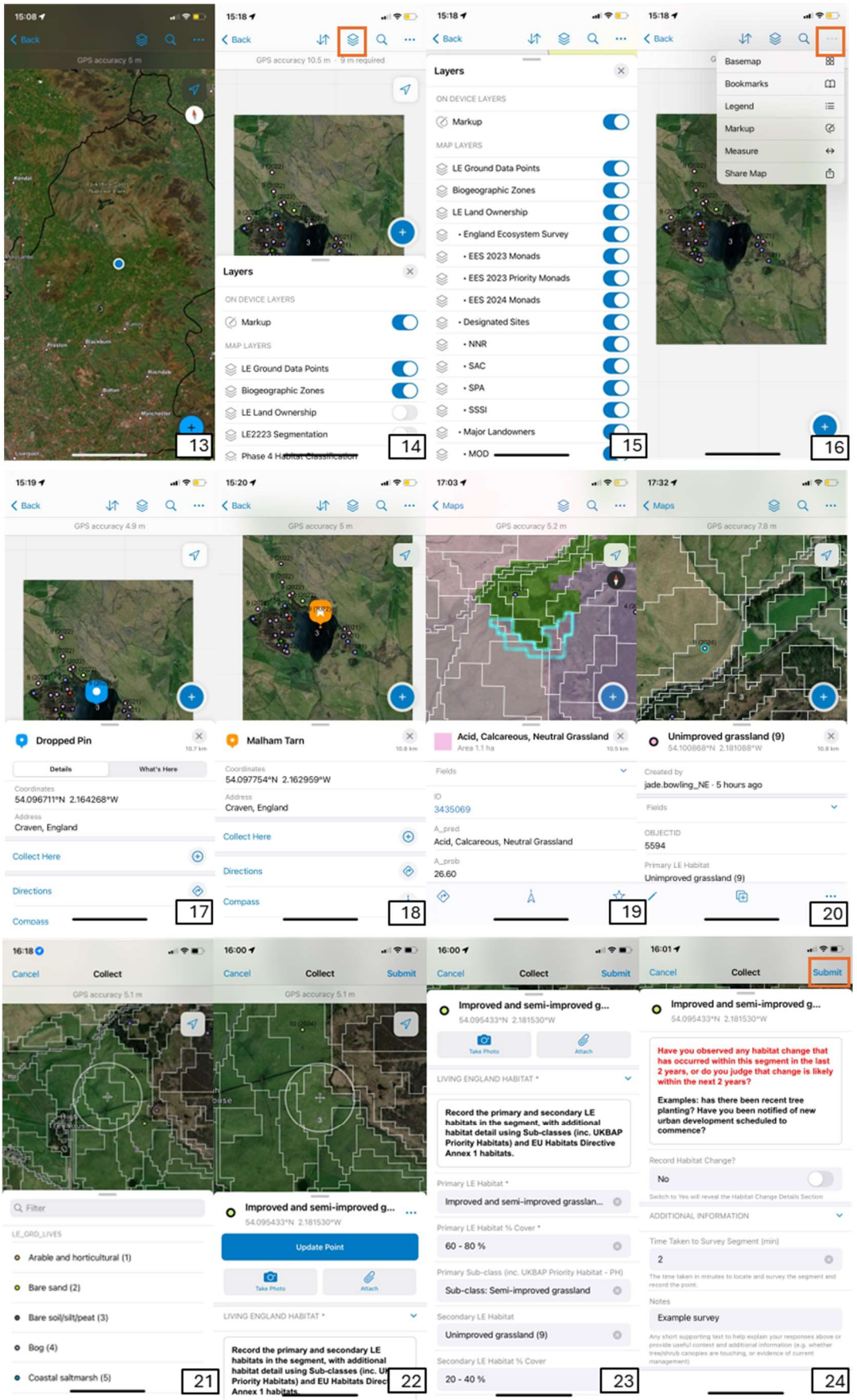



**Figure 2 (continued): Screenshots 01-31 showing ArcGIS Field Maps (Esri, 2024) and the LE Ground Data Capture map. Background source: Esri et al. (2024a, 2024b).**

4.5.3 From the map menu icon, you can also view the legend for the map, change the basemap (only in online mode), view the bookmarks, and activate markup. Markup is a freehand drawing tool for you to annotate the map and highlight areas you may wish to survey. You can then toggle its visibility within the layers tab. Remember to clear your markups using the bin icon before syncing your offline map. [*Fig. 2-16*]

4.5.4 You can use the search tool to find locations more easily. Hold a long press on the map at the location of interest to drop a pin, you can choose to save the pin location by clicking “Favourite” (“Add to my places” if using ArcGIS Collector). The pin will now stay on your device so you can easily find it again from the search tool (or within bookmarks if using ArcGIS Collector). [*Fig. 2-17, 2-18*]

4.5.5 You can view additional information about the habitat classification in the map based on the latest iteration of LE. First turn on the LE Phase 4 Habitat Classification layer in the layer list (it is turned off by default). When selected, the segment outline is highlighted in blue and its details show the predicted habitat class for the segment (A_pred), and the probability (as a percentage) that the segment is dominated by that class (A_prob). The second most likely habitat class for the segment and its probability (B_pred, B_prob) are also shown here. [*Fig. 2-19*]

4.5.6 Previously collected ground data points are shown on the map as coloured dots, labelled with a number representing the main LE habitat class. The codes (1-18, 999) and colours for each class are shown in the legend. When selected, the details of a ground data point appear with the primary and secondary habitat classes and segment coverage. [*Fig. 2-20*]

4.5.7 When collecting or editing data points, it is essential to follow the survey method developed for Living England Ground Data Capture, as shown in Section 5.

4.6 Adding a new point:

4.6.1 When you have arrived at the location of the point you wish to record, click the blue plus button in the bottom-right corner to add a data point.

4.6.2 A pop-up menu then appears to select the dominant LE habitat within the segment you are surveying. Once you have selected this, a second menu appears to fill out the remaining details for the data point and attach photos of your surrounds (see Section 5 for details). Sections of this form are grouped to easily distinguish between the main LE ground data collection, SSSI information, habitat change and the additional information. [*Fig. 2-21 to 2-24*]

4.6.3 When you have completed data entry, check that the “GPS accuracy” has stabilised on a value lower than 9 m. The ring around your location will show as blue if it is less than 9 m, and red if it is more than 9 m. [*Fig. 2-21, 2-22*]

4.6.4 To save the point, click “Submit” (iOS) or the tick icon (Android) in the top right of the screen. If you are working offline, this will store the point data locally on the device until you synchronise your map. If you are working online, the point data will be uploaded immediately. [*Fig. 2-21 to 2-24*]

4.6.5 You can cancel the ground data point collection at any time by clicking “Cancel” (iOS) or the cross icon (Android) in the top left of the screen. [*Fig. 2-21 to 2-24*]

4.6.6 You can change the location of the point you are recording by dragging the cross on the map to the desired location and clicking “Update Point”. This can be very useful if the location you want to record is inaccessible, but you can clearly identify the habitats within the segment. [*Fig. 2-22*]

4.6.7 Note that by moving the point location away from your position, the GPS information will be lost (the GPS accuracy ring no longer shows as blue or red).

4.6.8 You can also record points away from your location by dropping a pin on the map (see [*Fig. 2-17*]) and clicking “Collect here”. This will open a data collection form for a new training point at the location of the pin (see [*Fig. 2-21 to 2-24*]). This option should only be used when the vegetation is too difficult to pass through and can be done with accuracy e.g., a reed bed. Ensure that you take a clear photograph of the habitat showing where you have dropped the pin. [*Fig. 2-22, 2-25*]

### Surveying on a SSSI

4.6.1 If conducting a survey on a SSSI, you should also record your presence on each SSSI unit you visit (see Section 5 for details).

4.6.2 By switching the “Are you on a SSSI?” button to “Yes”, the short SSSI form will appear. Then record the reason for visiting the SSSI and any comments about the site. [*Fig. 2-27*]

### Habitat Change / Change Detection

4.6.3 When collecting a Living England data point, please also complete the Habitat Change section. This is a straightforward, short section, which allows you to highlight any habitat change that has occurred or is likely to occur within 2 years. This section should be completed in addition to the standard Living England section as described above (Sections 4.6.1- 4.6.8). [*Fig. 2-24, 2-25*]

4.6.4 By switching the “Record Habitat Change?” button to “Yes”, the short form section for habitat change data entry will appear. Record these details.

4.6.5 If you have additional time or have been asked to focus on the Change Detection project specifically, then switch the “Record habitat change details and species?” button to “Yes”. This will open the longer form section for further habitat change data entry. Record additional detailed data here, as described in Section 5. [*Fig. 2-25 to 2-230*]

### Living England & Habitat Change / Change Detection

4.6.6 Include an estimate for the time taken to survey the segment and add in any notes that may be helpful (see Section 5 for details). [*Fig. 2-30*]

4.7 Editing points:

4.7.1 When a ground data point is selected, you can use the icons near the bottom of the pop-up to edit or copy the point. You can only edit points you have created. From the edit (pen) icon you can change the form details, move the point, and attach photos as shown in Section 4.6. [*Fig. 2-20*]

4.7.2 You should only use the edit functionality to correct mistakes you may have made when collecting data. **If you encounter any previously collected points and the habitat type has changed you should not change the point's form details; instead collect a new point in the same segment and include details under the Change Detection section**. You may move points so that they are not directly on a segment boundary.

4.8 Syncing your offline data points:

4.8.1 You should sync the data when you have a stable network connection (preferably Wi-Fi), by clicking the circular arrows icon within the map. This indicates if you have data ready to be synced by showing a small dot under the icon. [*Fig. 2-31*]

4.8.2 Click the icon to access the synchronise screen, which shows you any offline edits that have been made so you can review your points before you sync by clicking the "Sync now" button. [*Fig. 2-31*]

4.8.3 Optionally you can choose to "Auto-sync" at defined time intervals defined under the app settings. If you use this option, Field Maps will synchronise when the device next connects to a network. [*Fig. 2-04, 2-31*]

4.8.4 You can also sync an offline area from the menu options in the offline areas screen. This also shows how many offline edits there are to sync. [*Fig. 2-32*]

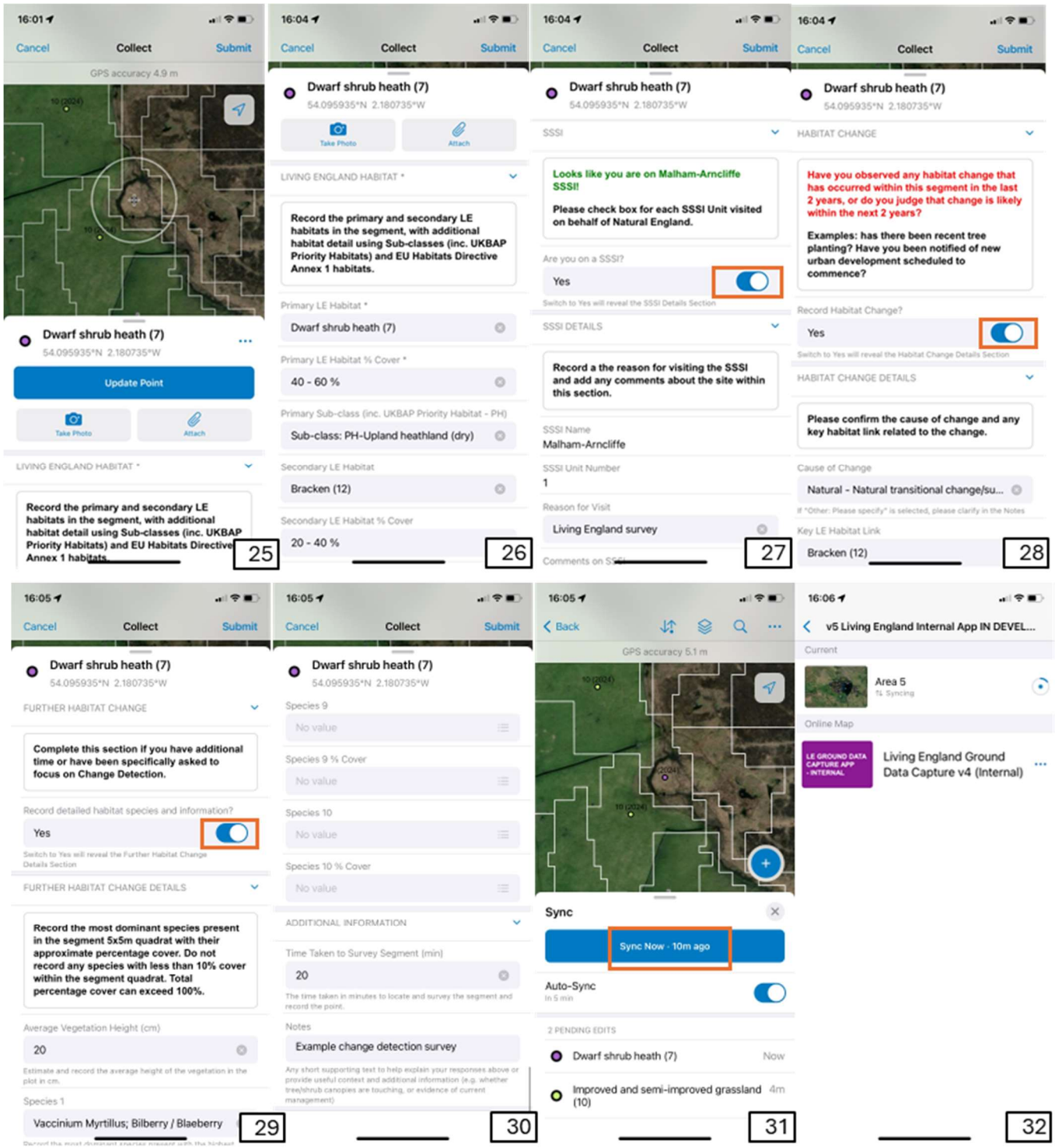



**Figure 2 (continued): Screenshots 01-31 showing ArcGIS Field Maps (Esri, 2024) and the LE Ground Data Capture map. Background source: Esri et al. (2024a, 2024b).**

# 5 Field Method

5.1 The method you use on site will differ slightly depending on whether your focus is core LE ground data points (including basic CD information), or more detailed CD data collection.

## General Approach

5.2 On site, your aim is to record a data point in each LE segment or sub-segment you survey using ArcGIS Field Maps, recording your point in a homogenous patch (ideally at least 30m x 30m in size) of the most abundant broad habitat class present within the segment, away from segment edges (at least 10m within the boundary). The LE habitat class you record in your survey may be different from the class currently shown in the LE classification. Where points are collected in areas of change, if practicable, these should be in the centre of the area that has changed.

5.3 With reference to Change Detection, where only part of a segment has clearly changed habitat class recently, you would ideally record one point at the centre of the area that has changed (i.e., a sub-segment), and one point in the centre of an area which has not (i.e., a different sub-segment).

5.4 Remember that LE segments were created automatically from satellite imagery, so they may have odd or unexpected shapes which will cross some of the vegetation types you will see on the ground. Give some thought to a rough route around the site, taking in all the segments you plan to survey. **You do not have to survey every segment. Concentrate on segments with wholly or predominantly homogeneous habitat cover**, and on areas that have changed or are likely to change within 2 years.

5.5 Use the map interface in the Field Maps app to orient yourself on the site, and to navigate to each segment or area to survey (drop a pin and use a compass function to help guide you to the centre of your next segment).

## Core Ground Data Collection Method: Living England & Change Detection

5.6 The initial methodology is the same whether you are conducting a core LE survey (with basic CD information) or detailed CD survey. For detailed CD surveys, it may be necessary to sub-divide segments into sub-segments representing differing ground conditions. For the purposes of this section, all areas to be surveyed are referred to as **segments**.

5.7 At the segment:

5.7.1 Observe the extent and shape of the segment using the Field Maps map. Identify the LE habitat classes within the segment from the vegetation around you. You should walk briefly across most of the segment to “get your eye in”, making a mental note of the different types present and their percentage cover across the whole segment. You must have been able to see the whole of the segment to record a point.

5.7.2 Although the segmented polygons should only contain one homogenous habitat class, this is frequently not the case. You should record the most abundant LE habitat class that has equal to or >60% cover, as the Primary Habitat (i.e., wholly or predominantly covers the segment) and if present record the second most abundant class if it covers >10% of the segment (this takes into account any minimal transition towards another habitat).

5.7.3 If after assessing the cover of a segment you have identified there are three or more habitat classes present, each covering >10% of the segment, record a point in a central part of the segment as having “MULTIPLE” LE habitat classes and move on to the next segment. **Add in the Notes** briefly which LE habitats have >10% cover in the segment and their approximate percentage cover.

5.7.4 Note that points collected as “MULTIPLE”, or points where the primary habitat has a coverage of <60% within the segment, will not be suitable for use as ground data as they do not represent a homogenous segment. These points can be used for validating the LE classification and CD analysis, but **it is better to collect fewer high-quality points than to survey every segment.**

5.7.5 Navigate to the area of the segment containing the largest homogenous patch of the most abundant habitat class. You will record the single point at this location. If you cannot locate the largest patch, navigate to a patch ideally at least 30 x 30 m in size, and in all cases at least 10 m inside the boundary of the segment.

5.8 At the point, record the following in Field Maps (see Section 4.6 for details):

5.8.1 **Primary (most abundant) LE broad habitat class (equal to or >60 % cover of the segment).** There are 17 Broad Habitat Classes, each name is followed by its code number in brackets, e.g., Bog (4). The additional class “MULTIPLE (999)” is available for recording a point in those segments where 3 or more habitat classes are significantly represented (>10% cover), and a dominant class is not apparent. In cases where there are two habitat classes that each comprise approximately 50% cover, then this may be recorded by choosing the 40%-60% option for each. However, only points where a dominant class with at least 60% cover is recorded can usually be used to train the LE model.

5.8.2 **Primary (most abundant) LE broad habitat class % cover across the segment.** Choose from: 40% - 60%, 60% - 80%, 80% - 99%, 100%.

5.8.3 **Primary (most abundant) LE Sub-class**. LE Sub-class, UKBAP Priority habitat and Annex 1 classes have been combined into a single list, which will be constrained to those LE Sub-classes which are appropriate for the Primary LE broad habitat class you have chosen for this point. Spend no more than 5 minutes determining this. If you cannot decide within this timeframe, don’t record an entry.

5.8.4 **Secondary (second most abundant, >10% cover) LE broad habitat class**. Leave blank if not required. This may only be the same as the primary LE broad habitat class recorded if the segment contains more than one LE Sub-class under the same primary LE broad habitat class (>10% cover).

5.8.5 **Secondary (second most abundant, >10% cover) LE broad habitat class % cover across the segment**. Leave blank if not required. Choose from: 10% - 20%, 20% - 40%, 40% - 60% (if it is >60% then it should be the Primary habitat).

5.8.6 **Secondary (second most abundant) LE Sub-class**. LE Sub-class, UKBAP Priority habitat and Annex 1 classes have all been combined into a single long list. Spend no more than 5 minutes determining this. If you cannot decide within this timeframe, don’t record an entry.

5.8.7 **% Cover Notes.** Include any additional information about the % cover within the segment.

5.8.8 **Record Habitat Change.** Complete this short section if habitat change has occurred within the last 2 years, or is likely to occur in the next two years.

5.8.9 **Cause of change.** Where it is evident that the segment or part of a segment has changed habitat class, record the cause of the change where possible. Choose from the Natural or Managed causes listed in Table 2. If the cause is not listed, select either "Natural – Other" or "Managed – Other" and provide details in the Notes.

5.8.10 **Key habitat links**. Select from the list of LE habitats the habitat type that the segment originally was before the change occurred, or is most likely to become if the detected change continues.

5.8.11 **BNG designated site.** This should be switched to 'Yes' if you are aware the site is on the Biodiversity Net Gain (BNG) sites register, or is otherwise designated as a BNG site.

## Detailed Habitat Change / Change Detection Method

5.9 Only use this method if you have been specifically asked to record detailed CD data, and/or if you have sufficient time to dedicate to this methodology.

5.10 Set out an X-plot (as illustrated in Figure 3) using pegs and a 30 m measuring tape with the centre of the plot at the location of the LE data point you are taking. One of the 'arms' of the plot should lie along a N-S axis. The square contained within the extent of the X-plot will provide a sample of species cover estimates from within the identified homogenous habitat patch and the primary habitat class recorded that can be used to set a baseline to identify habitat change in future years.

5.11 In open habitats (e.g., grassland, dwarf shrub heath etc), the square contained within the X-plot should be 5 m x 5 m (25 m²), whilst in woodland habitats it should be 30 m x 30 m (900 m²).

5.12 Please note that in woodlands, given only the upper-most vegetative strata (i.e., the canopy) is visible to satellites, the species recorded should be those at canopy level. You should also ensure that you select an area where the canopy (rather than the ground flora) is homogenous.

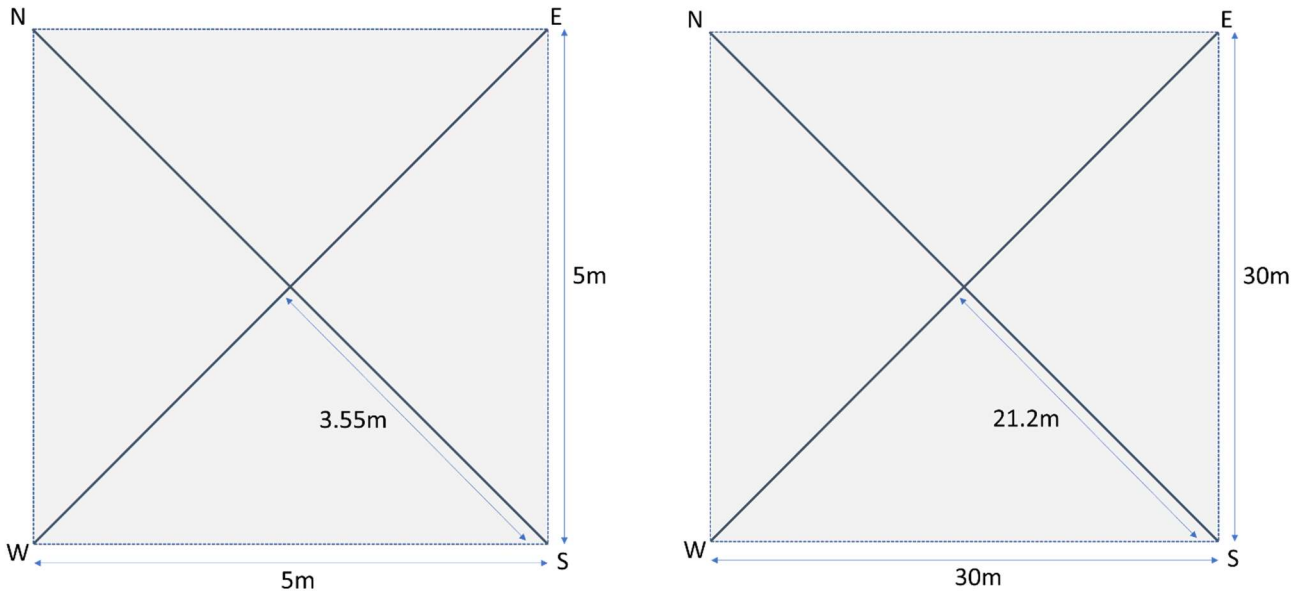



**Figure 3: X-plot dimensions for CD in Open Habitats (left) & Woodlands (right)**

5.13 Identify up to 10 of the most dominant species with the highest % cover across the area covered by the X-plot; each of these should have equal to or >10% cover. Remember that when surveying woodlands, you should ideally record the dominant canopy species.

5.14 The species listed in the Field Maps app are primarily those defined as positive or negative indicator species, or otherwise listed as typical species for each habitat within NPMS or BEHTA. Whilst this is not an exhaustive list of all species you might encounter; it is likely to incorporate the majority you will need to record. If, in the process of recording your point, you encounter any species that are not on the list within the Field Maps app please let the LE/CD Team know and record in the free text notes section. The list also incorporates abiotic options such as 'bare soil' and 'water', along with some generic vegetative groups such as 'scrub', which may be used when a specific species isn't present on the list.

5.15 Continue to record the following in Field Maps (see Section 4.6 for details):

5.15.1 **Average vegetation height (cm)**. Estimate and record the average height of the vegetation in the plot in cm.

5.15.2 **Species 1**. Record the most dominant species present with the highest percentage cover first.

5.15.3 **Species 1 - % cover**. Estimate and record the percentage cover of the individual key species within the X-plot located within the segment/sub-segment (>10% cover). Note that due to the different layers or levels of vegetation, total cover for all species may exceed 100%.

5.15.4 **Species 2-10**. Repeat the step above (5.6.7) identifying the species with the next highest percentage cover. Continue to repeat until you have either recorded the top 10 species (by percentage cover) present, or until only species with percentage cover <10% remain.

5.15.5 **Species 2-10 - % cover**. Estimate and record the percentage cover of each of the species identified.

## Additional Information: Living England & Change Detection

5.16 Whether you are focusing on core LE ground data points, or recording additional detailed CD data, the following information should be recorded:

5.16.1 **Time taken to survey segment (min).** The time taken in minutes to locate and survey the segment and record the point.

5.16.2 **Notes.** Any short supporting text to help explain your responses above or provide useful context and additional information (e.g. whether tree/shrub canopies are touching, or evidence of current management)

5.16.3 **Take 2 photos** using the app button to access the camera. One focussing in on the vegetation at your feet or immediately around you, and the other with a wider view of the habitat patch you are in, which should be the primary (most abundant) LE class present in the segment.

5.17 The Field Maps app will automatically capture your AGOL account ID, the date and time of capture of the record, and the location of the point.

5.18 Remember to synchronise your app when you are next connected to a network. If you do not do this, your data will not be used. Details of how to do this are shown in Section 4.8.

5.19 Hypothetical examples of segments, habitats, and how to record points are provided in Annex 1.

## SSSI visits

5.20 Note that this section will only be visible when you are present on a SSSI, although the app requires a good location accuracy before it can calculate this.

5.21 When conducting surveys on SSSIs, all contracted NE partners should now complete this short section for **each unit of the SSSI** they visit (see Annex 4 for details). The SSSI layer is provided within the Field Maps app to assist with identifying the boundaries of SSSI units in the field.

5.22 Record the following in Field Maps, alongside the LE/CD data point entry you have completed for the segment within the SSSI unit (see Section 4.6 for details):

5.22.1 **Reason for visit**. Select from the list of survey types. This will typically be “LE Survey”.

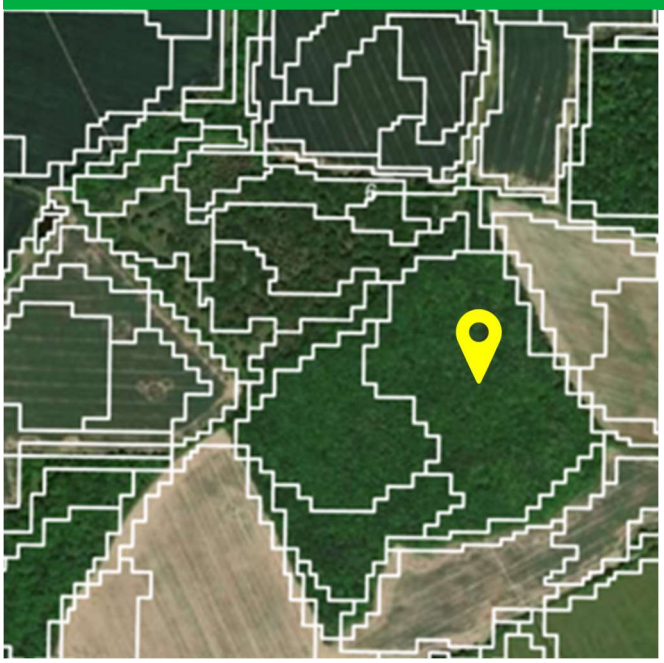
5.22.2 **Comments**. Please record if there are any major disturbances to the site that may need raising with the NE Protected Sites team.

5.23 The SSSI name and unit number are automatically populated, although the app requires a good location accuracy before it can calculate these.

# Annex 1

The following examples (Table 4Table , Table 5Table , Table 6Table ) illustrate scenarios you may encounter when in the field. They are illustrative only, and the habitats on the ground may differ from those shown below. Yellow location icons represent suitable locations for recording a point within the segment.

**Table 4: Example 1 – LE segment containing only woodland.**

| Habitat imagery and segment outline | LE ground data capture v5 fields | Data entry |
|---|---|---|
|  | **Living England** | |
| | Primary LE Habitat | Broadleaved mixed and yew woodland (16) |
| | Primary LE Habitat % Cover | 100% |
| | Primary Sub-class (inc. UKBAP Priority Habitat – PH) | LE Sub-class: PH-Lowland mixed deciduous woodland \| Annex 1: Dry oak-dominated woodland |
| | Secondary LE Habitat | [Empty] |
| | Secondary LE Habitat % Cover | [Empty] |
| | Secondary Sub-class (inc. UKBAP Priority Habitat – PH) | [Empty] |
| | % Cover Notes | [Empty] |
| | **Habitat Change** | |
| | Record Habitat Change? | No |
| | **SSSI** | |
| | Are you on a SSSI? | No |
| | **Additional Information** | |
| | Time Taken to Survey Segment (min) | 4 |
| | Notes | [Empty] |

*Background source: Esri et al. (2023a).*

**Table 5: Example 2 – LE segment containing mixture of woodland and grassland with notable change observed within the segment.**

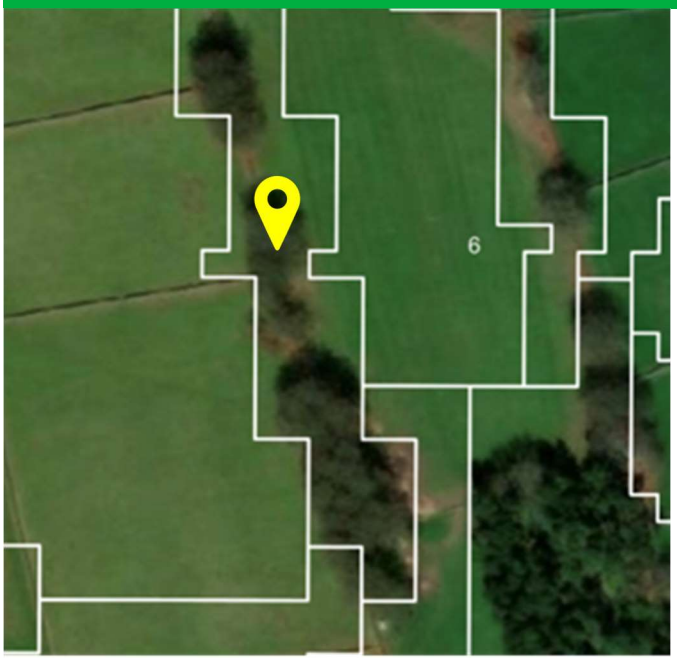
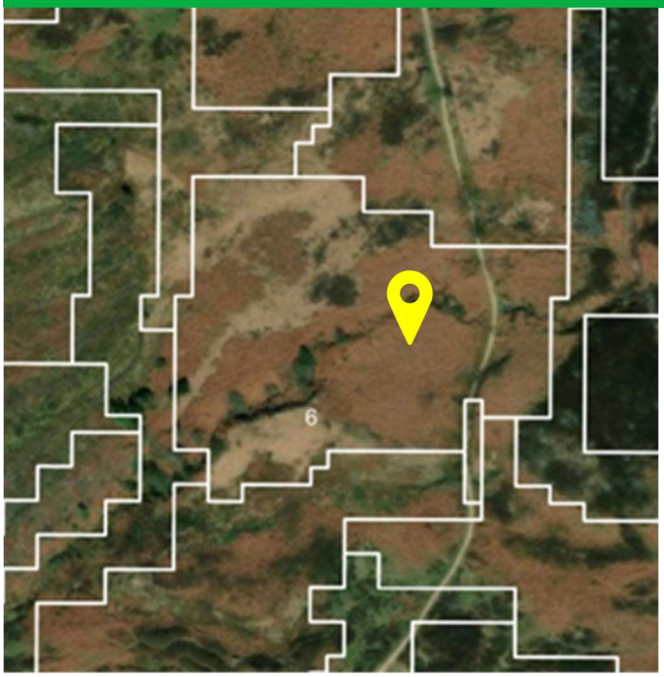
| Habitat imagery and segment outline | LE ground data capture v5 fields | Data entry |
|---|---|---|
|  *Background source: Esri et al. (2023a).* | **Living England** | |
| | Primary LE Habitat | Broadleaved mixed & yew woodland (16) |
| | Primary LE Habitat % Cover | 40% - 60% |
| | Primary Sub-class (inc. UKBAP Priority Habitat – PH) | LE Sub-class: PH-Lowland mixed deciduous woodland \| Annex 1: Dry oak-dominated woodland |
| | Secondary LE Habitat | Unimproved grassland (9) |
| | Secondary LE Habitat % Cover | 20% - 40% |
| | Secondary Sub-class (inc. UKBAP Priority Habitat – PH) | LE: Unimproved grassland \| UKBAP PH: Lowland dry acid grassland |
| | **Habitat Change** | |
| | Record Habitat Change? | Yes |
| | Cause of Change | Managed - Felling |
| | Key Habitat Link | Unimproved grassland (9) |
| | Is this a known BNG designated site? | No |
| | **Further Habitat Change** | |
| | Record habitat change details and species? | Yes |
| | Average Vegetation Height (cm) | 250 |
| | Species 1 | Quercus Robur |
| | Species 1 % Cover | 20 – 40 % |
| | … | … |
| | Species 10 | Rumex Acetosella |
| | 10 % Cover | 10 - 20 % |
| | **SSSI** | |
| | Are you on a SSSI? | No |
| | **Additional Information** | |
| | Time Taken to Survey Segment (min) | 15 |
| | Notes | [Empty] |

**Table 6: Example 3 – LE segment containing multiple habitats within a SSSI. This is a large upland segment containing Dwarf Shrub Heath, Bracken, and Unimproved Grassland, each covering >10% of the segment.**

| Habitat imagery and segment outline | LE ground data capture v5 fields | Data entry |
|---|---|---|
|  *Background source: Esri et al. (2023a).* | **Living England** | |
| | Primary LE Habitat | MULTIPLE (999) |
| | Primary LE Habitat % Cover | [Empty] |
| | Primary Sub-class (inc. UKBAP Priority Habitat – PH) | [Empty] |
| | Secondary LE Habitat | [Empty] |
| | Secondary LE Habitat % Cover | [Empty] |
| | Secondary Sub-class (inc. UKBAP Priority Habitat – PH) | [Empty] |
| | % Cover Notes | Contains: Dwarf Shrub Heath (40%), Bracken (40%), Unimproved Grassland (20%). |
| | **Habitat Change** | |
| | Record Habitat Change? | No |
| | **SSSI** | |
| | Are you on a SSSI? | Yes |
| | Reason for Visit | LE survey |
| | Comments | [Empty] |
| | **Additional Information** | |
| | Time Taken to Survey Segment (min) | 10 |
| | Notes | [Empty] |

# Annex 2

The published Living England Habitat Probability Map is displayed in the **Living England Ground Data Dashboard** as well as being available to view on AGOL.

This is a modelled probability map which predicts the most likely habitat present within a segment (A_pred) or Primary habitat prediction) as well as stating the modelled probability (A_prob or Primary habitat probability). The map also provides a secondary prediction (B_pred or Secondary habitat prediction) and associated modelled probability. This information is visible when you click on a segment in the probability map.

The **Living England Ground Data Dashboard** displays the predicted habitats, along with the up-to-date status of LE and CD field surveys (i.e. where ground data points have already been collected). The dashboard updates automatically as new points are collected (or synced from offline areas) and can be access through AGOL via the link below. It can help to indicate the possible location and extent of those habitats with fewer ground data points collected.

https://defra.maps.arcgis.com/apps/dashboards/63bda08c773f45f2a1585c13f7cb51a0

For the LE project, all ground data points collected are combined with existing datasets from previous surveys before undertaking a quality assurance process such that only 1 point is used per segment and to remove points that produce spectral outliers. This is to ensure that only high-quality data is used in the modelling process to produce as reliable output as possible.

The dashboard offers a wide range of functionality to help in planning and monitoring surveys through the “Configure Dashboard Options” on the left sidebar which will filter the data shown on the dashboard and map (examples of these are shown below in **Error! Reference source not found.** - **Error! Reference source not found.**):

- **Biogeographic Zone**. Finding which habitats require targeting in each BGZ for the current collection phase (2-year cycle between each LE publication). When a BGZ is selected, the tracking wheels on the right appear for each habitat in that zone. These are colour coded in relation to their progress towards their respective targets: red = below target, yellow = target hit for 1 year, green = target hit for 2 years.
- **Date Range**. Checking data points collected within a specific date range.
- **Survey Type**. Finding LE specific or CD specific points.
- **LE Primary Habitat**. Assessing the spatial distribution of points for each habitat – it is best to avoid clustering of data within each BGZ to give a better representation of that habitat across the BGZ.
- **Surveyor**. Checking that the points you have collected have synced properly or finding all the points collected by a group of surveyors. Selecting a point in the **Recently Collected Points** list will also zoom the map to that location and open the point details.
- **Protected Sites Check**. Finding points with within SSSI’s where surveyors have noted their presence.

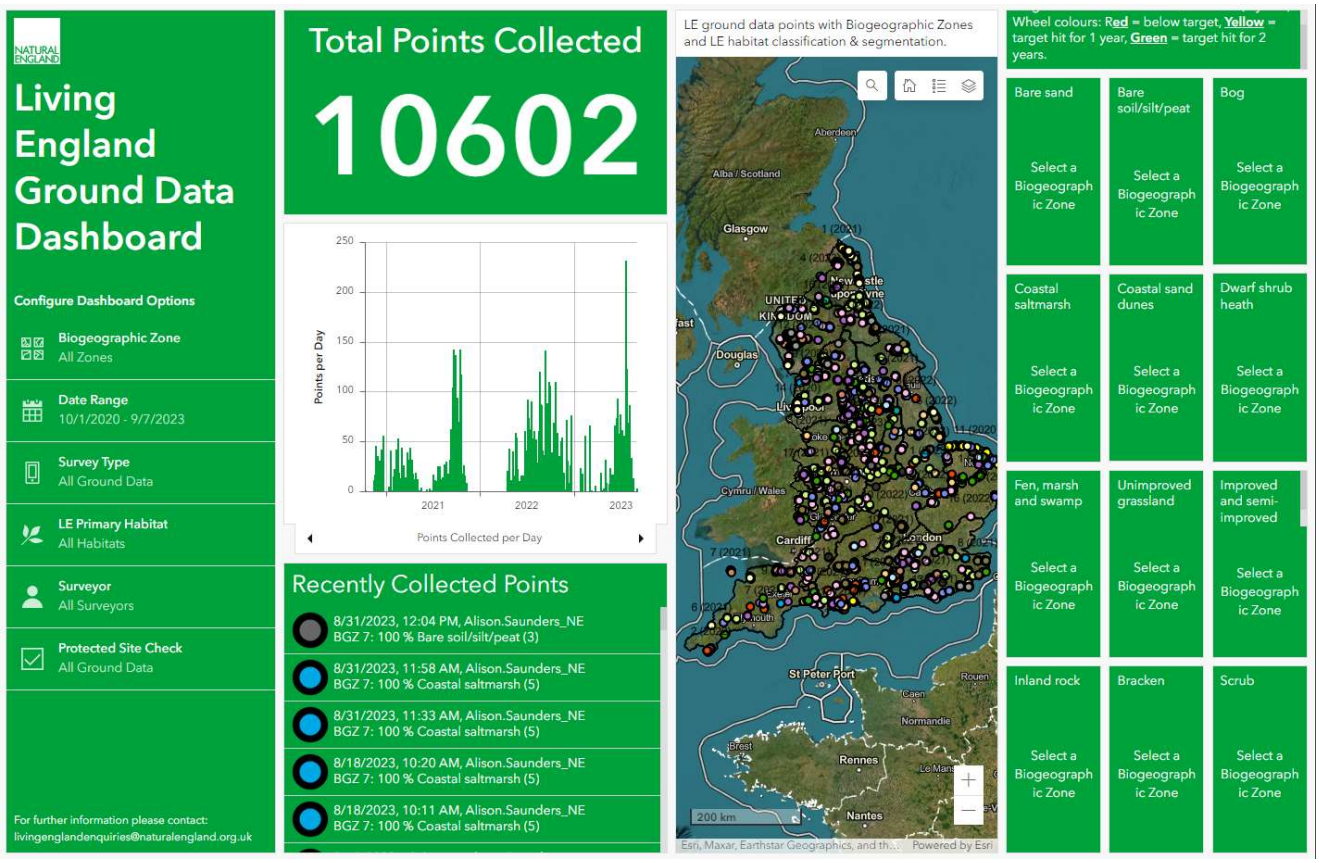



**Figure 4: LE ground data dashboard (as of 31/08/2023). Default display. Background source: Esri et al. (2023a, 2023b).**


**Figure 5: LE ground data dashboard (as of 31/08/2023). Showing the option to scroll through graphs/pie charts to display different information. Background source: Esri et al. (2023a, 2023b).**

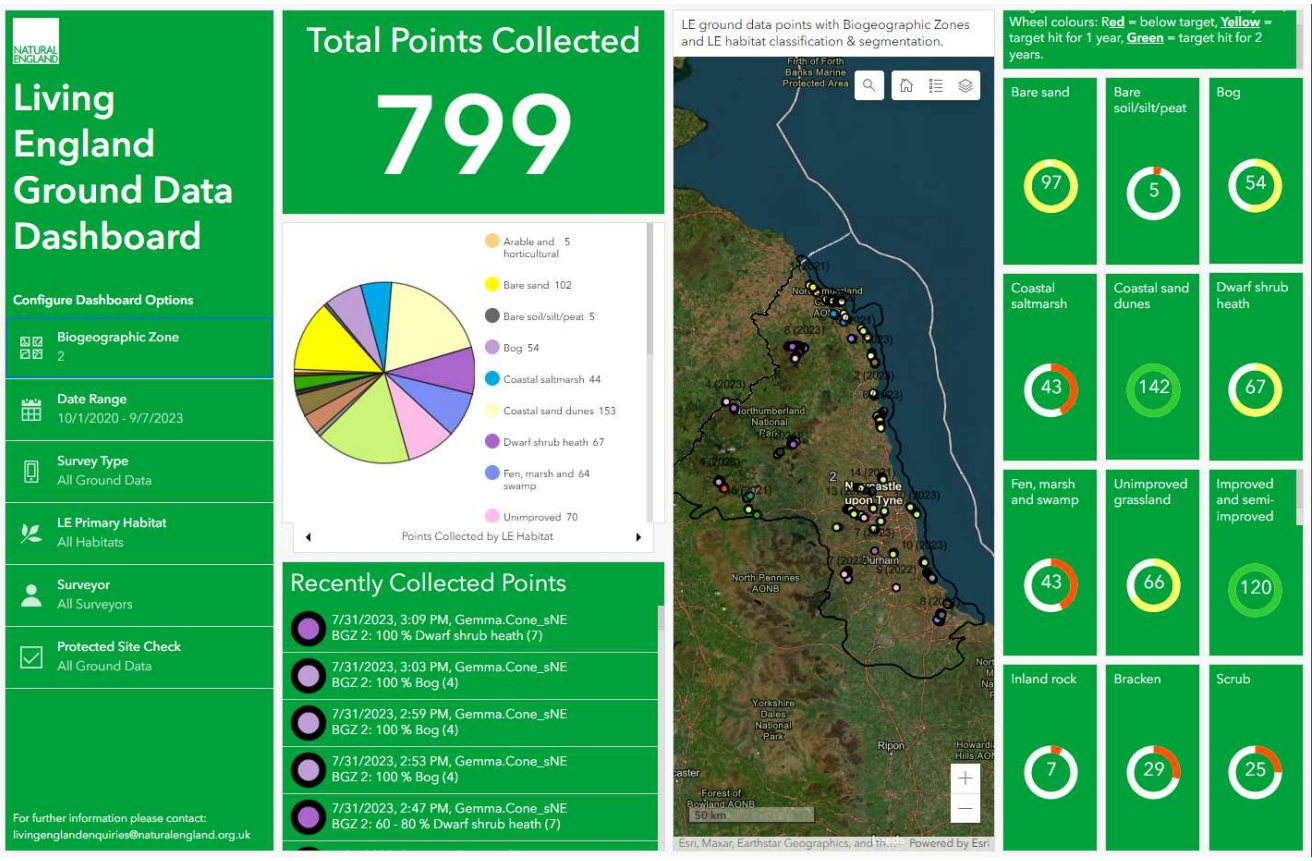



**Figure 6: LE ground data dashboard (as of 31/08/2023). Showing how the tracking wheels appear once a BGZ (2 shown here) is selected. Background source: Esri et al. (2023a, 2023b).**

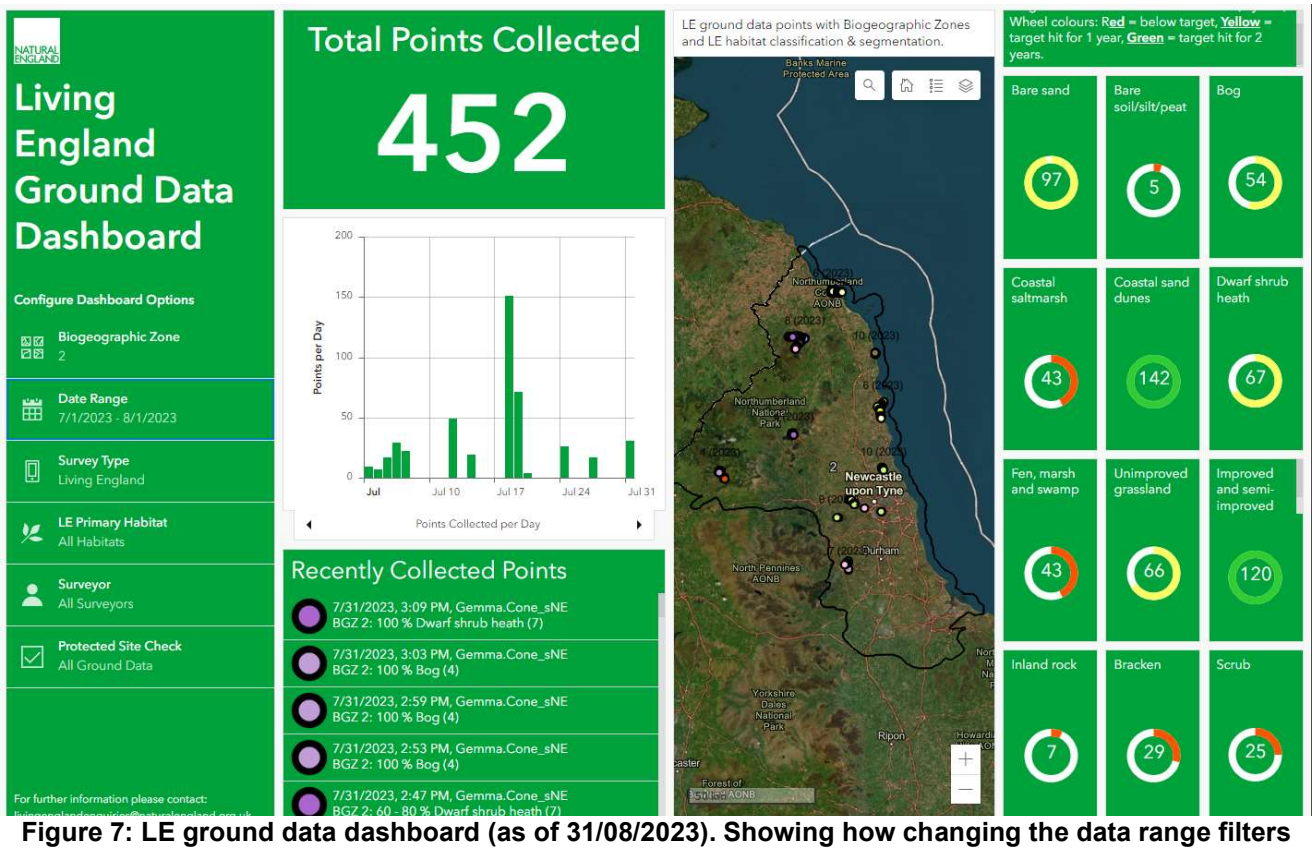



**Figure 7: LE ground data dashboard (as of 31/08/2023). Showing how changing the data range filters the data displayed. Background source: Esri et al. (2023a, 2023b).**

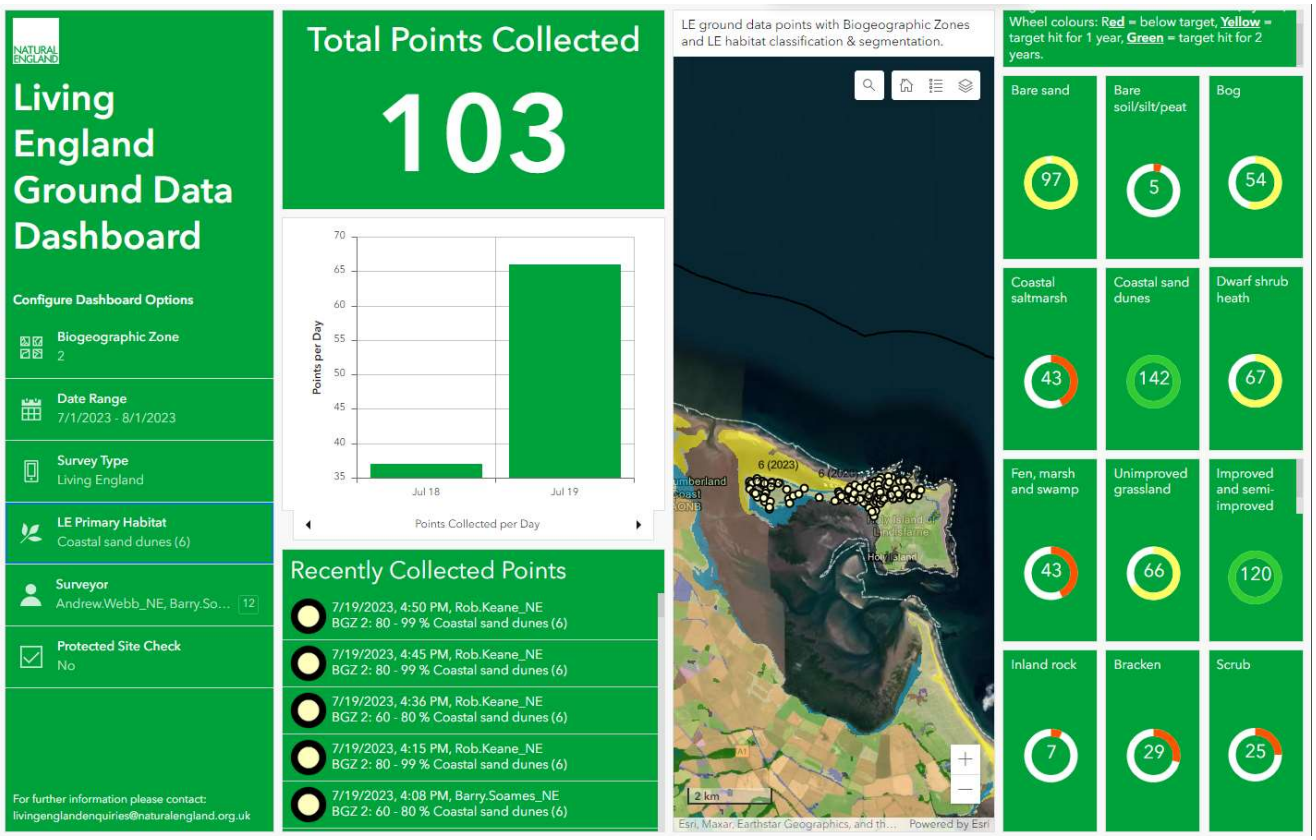



**Figure 9: LE ground data dashboard (as of 31/08/2023). Showing how changing the LE habitat and surveyors filters the data displayed. Background source: Esri et al. (2023a, 2023b).**

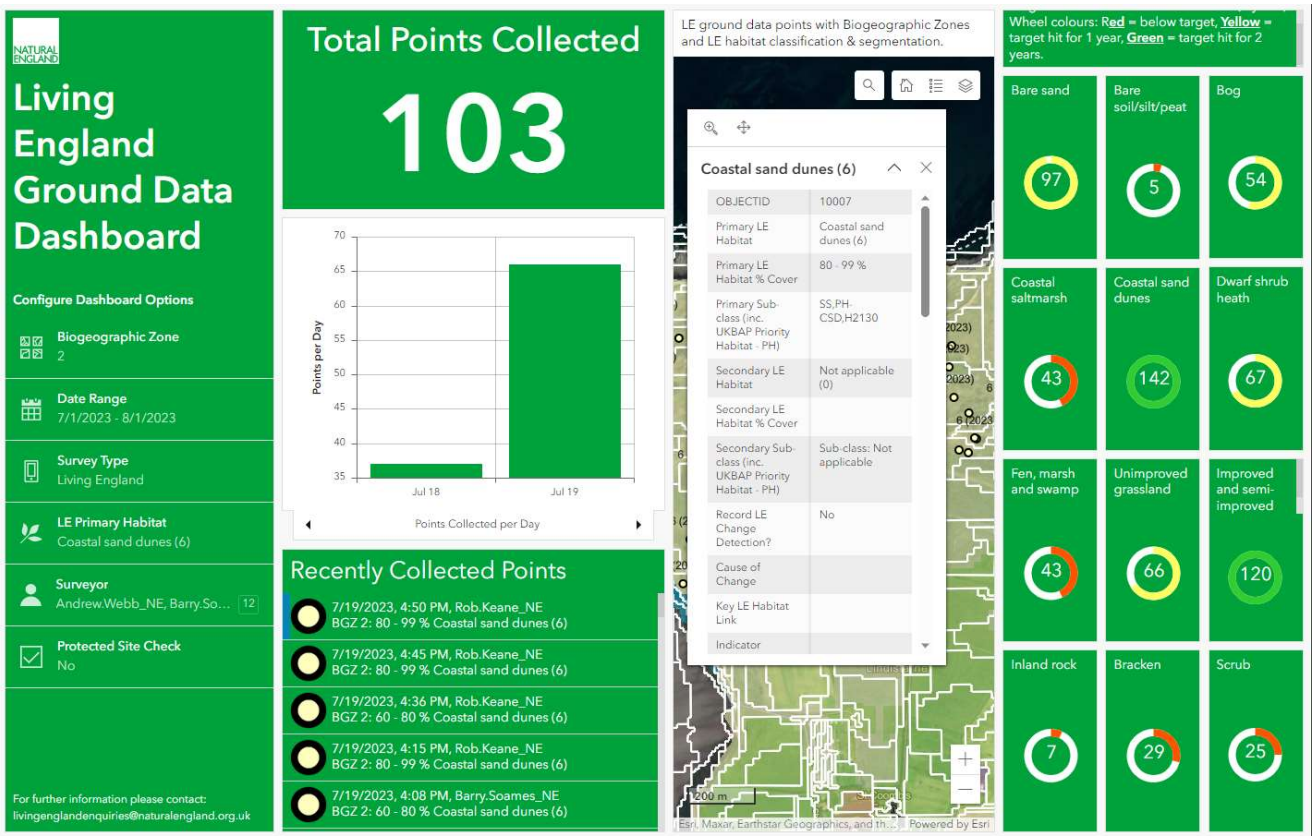



**Figure 8: LE ground data dashboard (as of 31/08/2023). Showing how selecting a point from the Recently Collected Points list displays the pop-up. Background source: Esri et al. (2023a, 2023b).**

# Annex 3

Details about specific habitat types and how they fit into the LE UKBAP classification framework (UKBAP priority habitat (PH) (JNCC, 2011) and EU Habitats Directive Annex 1 (EU, 2013) habitat level) are shown in Table 7. Where several habitats could be applied the options are indicted as: [*First habitat /Second habitat*].

**Table 7 (continued next page): Details of how to record specific habitats within the LE UKBAP classification framework.**

| Habitat type | What to record for LE | Description |
|---|---|---|
| **Bogs which are dominated by dwarf shrub heath** | LE: Dwarf shrub heath \| LE Sub-class: [*Upland/Lowland*] heathland (dominating bog) | Although the habitat is bog, record the LE broad habitat class as dwarf shrub heath (as that is what is visible with satellite imagery) and use the LE Sub-class level to record that it is dwarf shrub heath dominating on bog. |
| **Bogs which are dominated by purple moor grass** | LE: Bog \| LE Sub-class: [*Lowland raised/Blanket*] bog (purple moor grass dominated) | Where bogs are dominated by purple moor grass, there is an LE Sub-class to record this. |
| **Fens, Marshes & Swamps which meet the priority habitat criteria for purple moor grass and rush pasture** | LE: Fen, marsh and swamp \| LE Sub-class: PH-Purple moor grass and rush pastures | Use LE Sub-class for purple moor grass and rush pasture. |
| **Fens, Marshes & Swamps which are dominated by purple moor grass** | LE: Fen, marsh and swamp \| LE Sub-class: [*Upland flushes, fens and swamps/PH-Lowland fens*] \| Annex 1: Purple moor-grass meadows | Use the Annex 1 code for purple moor grass meadows (H6410) to record fen, marsh and swamp segments dominated by purple moor grass. |
| **Acid Grasslands which are dominated by purple moor grass** | LE: Unimproved grassland \| LE Sub-class: [*Upland acid grassland/grassland moorland and rough grazing/PH-Lowland dry acid grassland]* \| Annex 1: Purple moor-grass meadows | Use the Annex 1 code for purple moor grass meadows (H6410) to record upland or lowland acid grassland segments dominated by purple moor grass. |
| **Coastal Vegetated Shingle when heavily vegetated** | LE: Inland rock \| LE Sub-class: Coastal vegetated shingle (heavily vegetated but <60% cover) | Record under inland rock, but with the option to select when it is heavily vegetated at LE Sub-class level as may appear very different to bare shingle. Note that heavily vegetated Coastal Vegetated Shingle with >60% vegetation cover across a segment should be recorded under 'Unimproved Grassland'. |
| **Maritime Cliffs & Slopes when heavily vegetated** | LE: Inland rock \| LE Sub-class: Maritime cliffs and slopes (heavily vegetated but <60% cover) | Record under inland rock, but with the option to select when it is heavily vegetated at LE Sub-class level as may appear very different to bare cliffs/slopes. Note that heavily vegetated Maritime Cliffs and Slopes with >60% vegetation cover across a segment should be recorded under 'Unimproved grassland'. |

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| **Coastal Sand Dunes covered with sea-buckthorn scrub** | LE: Scrub \| LE Sub-class: Sea buckthorn scrub \| Annex 1: Dunes with sea-buckthorn | Record scrub covered sand dunes using scrub as the LE broad habitat class as that is what is visible with satellite imagery. |
| **Areas of scrub with more than 1 species** | LE Scrub \| LE Sub-class: Mixed Scrub | Add in the notes what species are present if it is more than 1 scrub species. |
| **Orchards** | LE: Broadleaved, mixed and yew woodland \| LE Sub-class: PH-Traditional orchards | Previously orchards were recorded under Arable & Horticultural, but to accord with UKBAP we record them using Broadleaved, Mixed and Yew woodland. |
| **Semi-improved grassland** | LE: Improved and semi-improved grassland \| LE Sub-class: [*Species-rich/Species-poor*] Semi-improved grassland | Record using the Improved and Semi-improved Grassland LE broad habitat class with species-rich & species-poor semi-improved grasslands defined at LE Sub-class level. For semi-improved grassland that does not fit either category, there is an alternative LE Sub-class simply named 'Semi-improved grassland'. |
| **Montane Heath** | LE: Dwarf shrub heath \| LE Sub-class: PH-Mountain heaths and Willow Scrub | Record areas of Montane Heath at LE Sub-class level within the Dwarf Shrub Heath LE broad habitat class. |
| **Coastal and floodplain grazing marsh** | LE: Improved grassland and semi-improved \| LE Sub-class: PH-Coastal and floodplain grazing marsh | Record under the Improved and Semi-improved Grassland LE broad habitat class at LE Sub-class level. |
| **Various habitats dominated by rush pasture** | LE: [*Bog/Fen, marsh and swamp/Unimproved grassland/Improved and semi-improved grassland*] \| LE Sub-class: [*Various*] (rush dominated) | Areas dominated by rush pasture should be recorded using the dedicated LE Sub-class level category. |
| **Calcareous grassland dominated by Brachypodium Pinnatum** | LE: Unimproved grassland \| LE Sub-class: [*Upland/Lowland*] calcareous grassland (brachypodium pinnatum dominated) | Areas of calcareous grassland dominated by heath false brome or tor-grass should be recorded using the dedicated LE Sub-class level category. |
| **Open mosaic habitats on previously developed land** | LE: Built-up areas and gardens \| LE Sub-class: PH-Open mosaic habitats on previously developed land | Updated in August 2023. Previously open mosaic habitats were recorded under Inland Rock, but to accord with UKBAP we record them under Built-up areas and gardens. |

# Annex 4

Site checks are a simple record of a visit by any NE staff member (or contractor) with the purpose of identifying issues on a protected site (SSSI) that needs further attention, or that NE should be aware of to undertake their statutory duties. You are not required to collect specific SSSI monitoring data, if you are visiting a SSSI for a Living England survey then you will still record your visit. This means no SSSI monitoring experience is required although preferable.

A site check is in fact very basic and only includes the following five variables:

1. Date of site check

2. Assessor

3. Area Checked

4. Reason for Visit

5. Comments

The overall purpose to provide an understanding of who is visiting protected sites, when and why. There is an option to provide comments, but the detail of the comments will depend on your ecological knowledge, awareness of the site and the purpose of the visit. One thing you should look for is clear signs of disturbance to the features of interest (these can be habitats or species). Please record any signs of disturbance in the comments box. If you see anything that has seriously damaged the SSSI, that will require urgent contact with the SSSI Protected Site (PS) Lead, you can find their details on Designated Sites View (DSV) or contact integrated.monitoring@naturalengland.org.uk (please copy in livingenglandenquiries@naturalengland.org.uk as well). The Area Team will then proceed with another visit and a potential enforcement case. Likewise, if you see something particularly positive, please record this in your comments and inform the PS lead.

Examples of comments are “evidence of recent wildfires recorded within the heathland west of Unit 2” or “burst water pipe recorded in Unit 1, causing flooding of grassland”. There may be nothing to comment on due to a lack of site knowledge, but it is an opportunity to highlight or flag potential issues that could be otherwise go unseen for years, and impact on a site condition status.

You should record this information in the LE Field Maps app. The LE team will then handle uploading the information into CMSi (the main system used for storing SSSI data, which is directly linked to the public facing DSV).

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