



SWW Upstream Thinking Portal – Instruction Manual.

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Argal Reservoir. Photo: Emilie Grand-Clement



What is Upstream Thinking?

The Upstream Thinking Programme (UST) is an award-winning catchment management scheme launched in 2010 by South West Water. The programme, which applies natural landscape-scale solutions to improve water quality and supply, is funded by South West Water and delivered in collaboration with regional environmental and conservation charities (Cornwall and Devon Wildlife Trusts, the Farming & Wildlife Advisory Group SouthWest, Natural England and Westcountry Rivers Trust).

Upstream Thinking aims to ensure potential sources of pollution are prevented from entering surface waters, thus reducing the ongoing level of treatment and associated chemicals and energy required to deliver clean and safe drinking water. The programme supports farm advisers who work closely with landowners to advise on water friendly farming practices. Each farm receives a detailed and individually tailored farm plan, which outlines opportunities for change and the protection of land and water through soil, nutrient and pesticide management. Capital grants are provided to support the delivery of a broad range of interventions to foster change, from watercourse fencing to manure stores, greatly reducing the risk of pollutants entering rivers by directly intercepting the pathways of nutrients or sediment. Good soil husbandry and protection is also fundamental to water quality protection. UST therefore also offers soil testing to understand and plan nutrient applications, detailing steps to reduce the risk of erosion and mobilisation and recognising issues such as compaction¹.

The scheme now works across 18 strategically important drinking water supply river catchments and reservoirs in Devon and Cornwall delivering 16 programmes of water quality improvements and 5 investigation programmes aimed at identifying sources of water quality deterioration in those catchments.

Why it matters?

Ofwat – the economic regulator for the water industry – ensures that the price and service delivered by water companies is fair for customers. To do this, every 5 years the industry goes through a Price Review. This process controls the amount water companies can charge for their services, protecting consumer's interests but also ensuring that the water companies have enough money to finance their functions (water and sewerage services). Ofwat also ensures that other legal obligations of the water companies are met including environmental and social duties.

As part of the process Ofwat requires the Environment Agency (as environmental regulator) and Natural England to write to water companies outlining the obligations and expectations for the water industry during the price review period 2020-2025 (PR19). To understand how best to protect and enhance the natural water environment, they work together to develop a Water Industry National Environment Programme (WINEP). The WINEP represents a set of actions that the water company must complete within the Price Review period. The measures outlined and agreed through the WINEP provide an opportunity for the water company to develop

innovative approaches to meet environmental outcomes and enhance the resilience of these ecosystems, which should benefit the customer, community, the environment, and natural capital.

The need for evidence

Ofwat sets service targets ('performance commitments') for the PR period. This encourages the companies to deliver on the objectives agreed. Most of the water companies' performance commitments have rewards and penalties ('outcome delivery incentives (ODIs)') associated with them. At South West Water the agreed ODI is 50,000 hectares of land actively engaged for water quality or biodiversity enhancement. To measure success, progress towards achieving this target is reported to Ofwat and the Environment Agency and over achievement of this performance delivery target could lead to a business reward.

In addition to reporting to Ofwat and the EA, SWW have monthly and quarterly internal reporting and audit requirements to track progress towards achieving business planning targets and for benchmarking natural capital accounting².

Finally, each of the UST Delivery Partners have developed implementation plans for the catchments that they work in. These plans outline actions and measures that they hope to achieve, and which are selected to ensure delivery of the key investment outcomes, in particular contributions to the cumulative total hectareage of water quality and biodiversity enhancement. To keep track of progress towards these targets appropriate and detailed information must be recorded.

How did SWEEP get involved?

Funded by the Natural Environment Research Council (NERC), the South West Partnership for Environmental and Economic Prosperity (SWEEP) is a collaborative initiative that aims to deliver economic and community benefits to the South West, whilst also protecting and enhancing the area's natural resources. Through partnership working with industry and the community, SWEEP develops bespoke tools and solutions that aid decision-making and support the management of our natural environment.

During the PR planning process, it was identified that in order to provide evidence of achievements and consistency in reporting a new method for recording UST activity was required. The SWEEP Whole Catchment Water Management project worked with UST Delivery Partners and SWW to develop a new online recording portal to log activities and measures delivered and to track progress towards targets.

This SWEEP project was delivered b:

- an academic team from the University of Exeter – Dr Donna Carless, Dr Mandy Robinson, Dr Ben Jackson, Jess Kitch and Prof Richard Brazier.
- Working in collaboration with project partners – South West Water, Cornwall Wildlife Trust, Devon Wildlife Trust, Farming and Wildlife Advisory Group South West, Catchment Sensitive Farming (Natural England), Westcountry Rivers Trust, South West Lakes Trust and South West Peatland Partnership.

Next steps

Under the SWEEP Whole Catchment project, the UST Portal was developed further in collaboration with the UST delivery partners and SWW. In 2022 partners South West Lakes Trust and South West Peatland Partnership were added to the tool.

It will continue to be maintained and supported within the Centre for Resilience in Environment, Water and Waste (CREWW) at the University of Exeter

<https://www.exeter.ac.uk/creww/>.

To find out more please contact – Donna Carless (D.Carless@exeter.ac.uk).

The UST Portal Instruction Manual

This Instruction Manual has been written for the UST Delivery Partners to explain how to use the Upstream Thinking Portal for recording interventions and activities delivered via the Upstream Thinking Programme. The portal was developed by the University of Exeter, SWEEP Whole Catchment Management for Water Quality project (<https://sweep.ac.uk/>), in collaboration with SWW, members of the WRT Evidence Team and the UST Delivery Partners (CWT, DWT, FWAG, NE and WRT). The portal uses the ArcGIS Online platform and is only accessible to SWW and the UST Delivery Partners.

Tab guide and instructions

The UST Portal is divided into tabs. Each tab has a different set of purposes/functions and underlying datasets. These are listed below, with page numbers for each tab:

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Introduction

Aim of the Portal

The overall aim of the portal is to record engagement activities and interventions undertaken as part of Upstream Thinking phase 3 (UST3). Broadly speaking, the portal captures what has happened and where. Data is input by the UST3 Delivery Partners/designated users.

Portal platform

The UST Portal has been developed in ArcGIS Online. GIS means Geographic Information System. GIS is a framework for gathering, storing and analysing spatial (geographic) data. This means that the data contains locational information and can be visualised in maps. GIS data is stored in layers that incorporate geographical features and tabular information (Attribute tables, which are similar to a table in an Excel spreadsheet). The portal captures and stores information in GIS layers.

Users are able to input, view, edit and extract data using the platform built in ArcGIS Online.


Each delivery partner has their own version of the portal, ensuring that they can only see their own data.



Before you enter data into the portal you must ensure that the data subject (the farmer/landowner) has been issued with a copy of the Joint Controller Privacy Notice.

Categories of data captured by the portal

The portal is designed to capture five main categories of data relating to UST3, as follows:

1. Land unit data – information about the land units (often farms) participating in UST3. This includes details such as size, location and type of land unit (e.g. farm, community land, SWW land), and in the case of farms, some information about the farm business, such as type of farm, crops grown, animals kept.
 Names and contact details of farmers or other land managers or owners are NOT collected in the portal.
2. Land unit engagement data – information about the level of engagement as part of UST3, such as number of visits, whether advice has been given by the UST3 Delivery Partner to the land manager etc.
3. Interventions data – information about the specific measures, changes in land management or advice given as part of UST3. Details collected here feed into the SWW monthly reporting items.
4. UST3 active land data – a record of the areas of land (fields) under active management as part of UST3. This refers to land areas/fields that have had physical interventions undertaken on them or have had a change in management practices as a result of the UST3 program. Active areas collected here contribute to the ODI area reporting item.
5. Catchment-scale engagement data – information about UST3 engagements that need to be collected and reported at the catchment scale. Examples include the following indicators, per catchment: number of farms contacted (including unsuccessful contacts that do not result in participation in UST3); number of WTW visits; number of pesticide amnesties; volume (liquid) and mass (solid) of pesticides disposed of in amnesties.



Data Entry: Pop-ups, Survey123 and compulsory questions

As you work through the tabs in this portal there are numerous areas where you will enter data within Survey123 forms or within 'pop-up' windows. Some questions within these data entry functions are compulsory so you will not be able to move on to the next question until data is entered.

Wherever possible, to aid data entry, we have provided drop-down choices for you to select from. At times questions will be restricted to single answers, in other places multiple choice answers can be given. These rules will already be set. If you answer 'Other' to a question you will be provided with a text box to provide additional detail.

When you select an answer to certain questions filters are applied to the questionnaire so that you are asked other relevant questions or, questions that are now irrelevant (based on your previous answer) are not asked.

It is important to follow the instructions as the answers may determine whether a value (a count or an area/length) filters through into the reporting element of the portal.

Whether an item or an area/length contributes to a reporting item may also be determined by the 'Driver' that you allocate. It is therefore essential that when asked, you tick the correct (and at least one) driver (e.g. Biodiversity, NFM, etc) (See Appendix for more information on Drivers).

Finally, where date information is requested it is important that it is provided accurately. Not all activities and interventions require dates but for those that do and where asked 'date land became active' failure to enter an accurate date will result in areas not feeding into reporting or items not appearing in filtered outputs.



Terminology: Land unit

For the purposes of the UST3 Portal, we use the term 'land unit' to refer to an area of land that is managed as a whole by a particular 'land manager' that is being engaged as part of UST3. A land unit does not need to be contiguous, it can be made up of nonadjacent land parcels / land polygons / fields.

A land unit could be a farm, in which case the 'land manager' is the farmer. A 'land unit' is not necessarily the same as a land holding and often won't be. For example, there are large land owners / estates that have multiple separate farmers / farm managers / tenants. Therefore, a single land holding could comprise multiple land units that are each managed by different farmers. When an individual farmer is being engaged in UST3, the area of land that we might expect to influence would be the area that they farm/manage, and hence it is this area of land that we want to identify as a single land unit, regardless of whether this is part of a larger land holding.

Alternatively, a land unit could be a small holding, or it could be an area of land that is managed by a community group. Or it could be a parcel of SWW owned land. In this case, the 'land unit' might be a parcel of land associated with a specific reservoir. The unit of land would certainly not be the whole of SWW's land holdings, just the specific parcel of land that is engaged in UST3.

Sometimes, a land unit engaged in UST3 may be an area of common land.

i Terminology: GIS attribute table and attribute-fields vs farm-fields

The GIS data layers captured through the UST Portal have two key components: a component that defines the geometry of geographic features such as farms or interventions, and tabular information about those features, known as an attribute table.

In ArcGIS, columns in the attribute table are known as fields. To avoid confusion between GIS fields and 'real' fields on farms, we refer to the former as attribute-fields and the latter as farm-fields.

i See Appendix for Glossary of Terms and a full Lists of Drivers and Interventions.

Land Unit Engagement tab

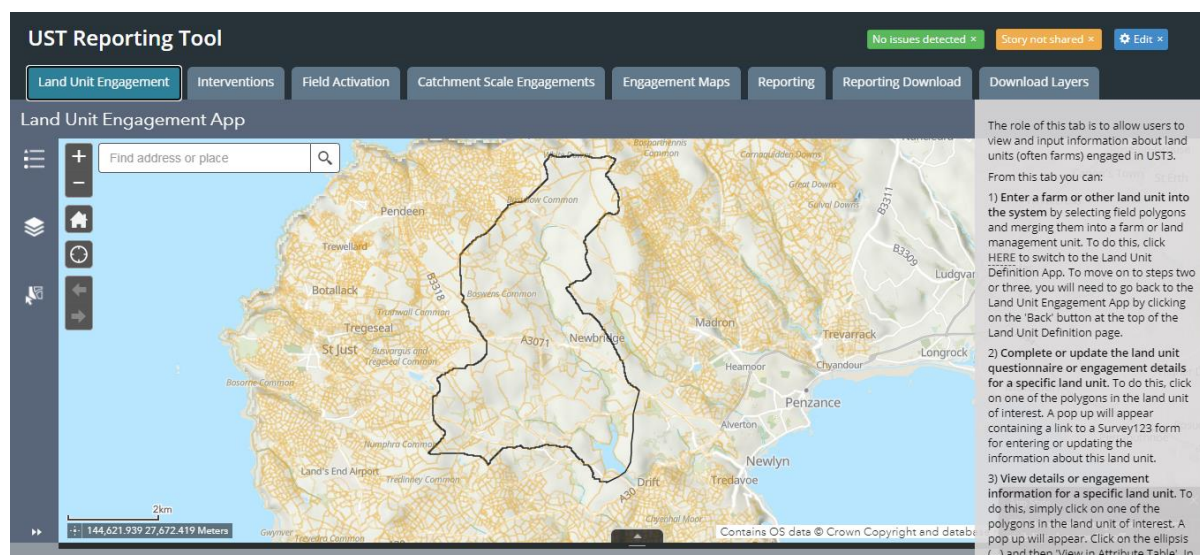


Figure 1: Full screen view of UST Reporting Portal. The Land Unit Engagement tab is active showing the Land Unit Engagement App.

Tab summary

The role of this tab is to allow users to view and input information about land units (often farms) engaged in UST3. The content of the main page of this tab is an embedded web app, called the Land Unit Engagement App (see Figure 1).

From this tab you can:

- 1) Enter a farm or other land unit into the system by selecting field polygons and merging them into a farm or land management unit.
- 2) Complete or update the engagement details or land unit questionnaire for a specific land unit.
- 3) View details or engagement information for a specific land unit.

The land unit engagement details include the following questions/information:

- Was this land unit engaged in UST1?
- Was this land unit engaged in UST2?
- Date first visited by Partner as part of UST3
- Date of most recent visit
- Number of pre-advice visits
- Number of advice-giving or implementation visits
- Number of maintenance or follow-up visits
- Engagement status for UST3 (engaged or not engaged)
- Has a plan/verbal advice been given to the farmer/land manager?
- Date advice/plan given
- Has any of the land in this unit come under active management?
- Date any of the land in this unit first became active

Delivery Partners will therefore need to re-visit this tab as engagement with a Land Unit progresses, leading to a change in any of these details.

The land unit questionnaire also asks for details about the land ownership (e.g. tenancy or freehold), type of land (e.g. farm, community land, SWW land) and other general details such as area of different habitat types and whether any agri-environment schemes are in place on the land unit. Several of the questions are only relevant to farms and so can be skipped (left blank) if not relevant. The land unit questionnaire can be filled in in one go if all the necessary information is available, or it can be completed in stages as additional information becomes available (e.g. resulting from a farm visit).

Tab instructions

From this tab you can:

- 1) **Enter a farm or other land unit into the system by selecting field polygons and merging them into a farm or land management unit.**

What does this actually mean? On the Land Unit Engagement tab, the Land Units GIS layer is visually represented in the map by lots of polygons, the boundaries of which often match up with farm-fields in real life. If a land unit is 'in the system', then all the relevant polygons will be linked to the same land unit record. In other words, all the polygons in a land unit will be represented by a single record (row) in the Land Unit layer's attribute table. Each row/record in the attribute table has a unique, system defined OBJECTID. The multiple polygons that make up a single land unit are all part of the same 'object' and therefore share a single OBJECTID.

How can I tell if my land unit of interest is already in the system? Find your area of interest and then zoom in until you can see the polygons that make up the Land Units layer. Click on one of polygons that you would expect to make up the land unit. If the polygon is already part of a land unit in the system, then the relevant polygons will be outlined/highlighted in blue (see Figure 2).

Tip: If you have selected a land unit and there are several land units close to the point that you clicked, you can use the arrow button on the top right of the pop-up to scroll through the other potential land units and visually check which fields/parcels make up each land

unit. 

- i** This step will not be necessary for delivery partners who have provided their own pre-defined land units / farm boundaries. However, before proceeding to step 2, the user should check that their land unit of interest is as it should be (i.e. comprises the correct farm-fields).

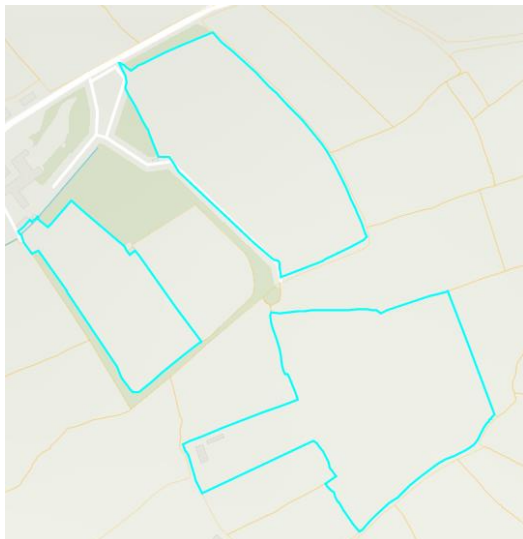


Figure 2. Example of a land unit represented in the Land Unit Engagement tab. Clicking on one polygon in the unit results in all polygons in that unit being outlined in blue.

Step-by-step guide: Enter a farm or other land unit into the system by selecting field polygons and merging them into a farm or land management unit.

In the Land Unit Engagement tab, look to the grey panel on the right (Figure 1) and click where it says ‘...click **HERE** to switch to the Land Unit Definition App’. The Land Unit Definition App opens in a new window. (See Figure 3).

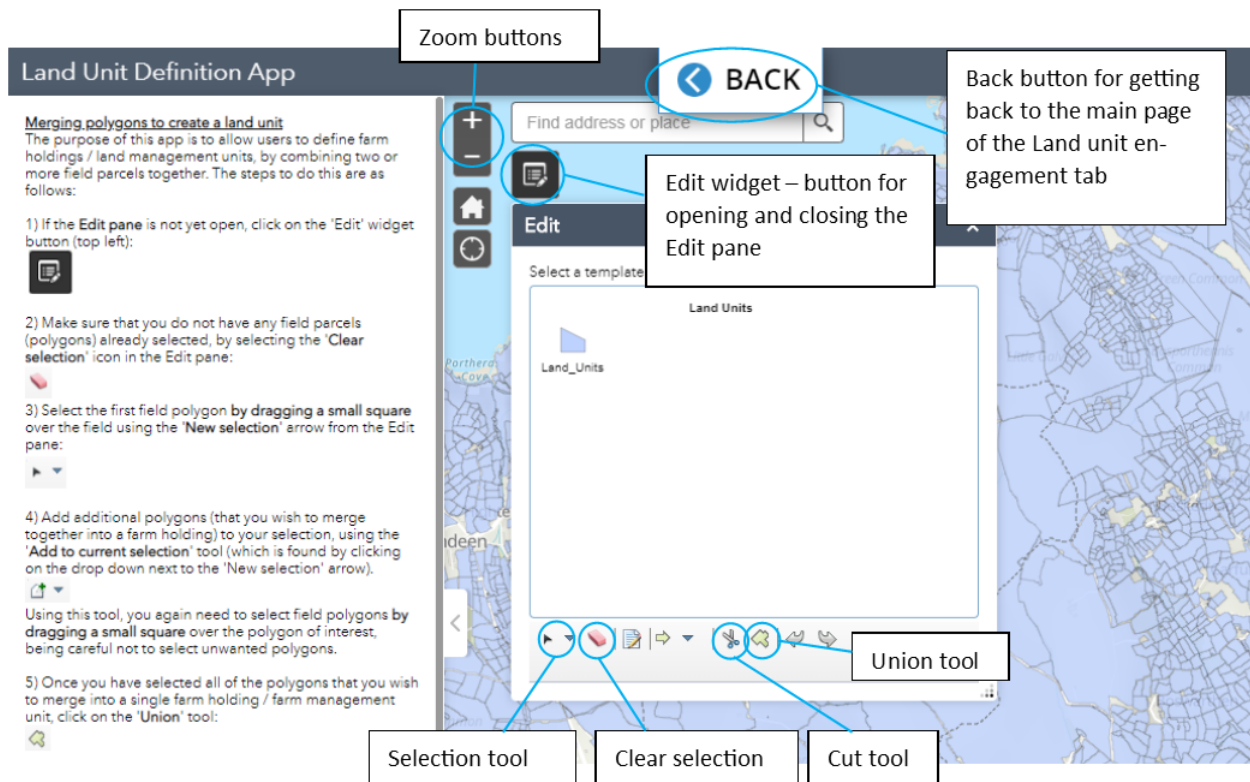


Figure 3. Land Unit Definition App.

From within the Land Unit Definition App, the steps are as follows:

1. If the **Edit pane** is not yet open, click on the 'Edit' widget button (top left):



2. Make sure that you do not have any field parcels (polygons) already selected, by selecting the '**Clear selection**' icon in the Edit pane:



3. Select the first field polygon by dragging a small square over the field using the '**New selection**' arrow from the Edit pane:



4. Add additional polygons (that you wish to merge together into a farm holding) to your selection, using the '**Add to current selection**' tool (which is found by clicking on the drop down next to the 'New selection' arrow).



Using this tool, you again need to select field polygons by dragging a small square over the polygon of interest, being careful not to select unwanted polygons.


5. Once you have selected all of the polygons that you wish to merge into a single farm holding / farm management unit, click on the '**Union**' tool:



- i** If you zoom into an area in order to create a land unit and there is **no polygon in the required location or the existing polygons do not meet your requirements**, you have the following options:

Edit polygons (in preparation for merging)

If there is a polygon in the required location but it is too large or the wrong shape, you can either:

- Use the cut tool  on the Edit pane to split the polygon in two (this is the equivalent of 'split' in ArcGIS desktop). You can also use this tool to cut a smaller polygon within an existing polygon - the two shapes created will be separate objects in the GIS layer.
- Delete the incorrect polygon and create a new one (see below).

Create new polygons (in preparation for merging)

1. If the **Edit pane** is not yet open, click on the 'Edit' widget button (top left):



2. Make sure that you do not have any field parcels (polygons) already selected, by selecting the '**Clear selection**' icon in the Edit pane:



3. Select the **Land Units template** from the Edit pane:



4. Digitise (draw) your polygon in the required location.



Please only create a new polygon if there is a blank space where you need a polygon, do not create overlapping polygons. Once you have created a polygon, it can be merged/unioned with other polygons as required in order to create a land unit.

To move on to steps two or three, you will need to go back to the Land Unit Engagement App by clicking on the 'Back' button at the top of the land unit definition page (see Figure 3).

Actions that can be completed from the Land Unit Engagement App (continued):

2) Complete or update the land unit questionnaire or engagement details for a specific land unit.

To do this, click on one of the polygons that make up the land unit of interest. A pop up will appear containing a link to a Survey123 form for entering or updating the information about this land unit (Figure 4).

(See Appendix for definitions of potentially ambiguous terms that are used in the survey form).



It is important that step 1 – merging of polygons to define a land unit – has been completed before completing the Survey123 Land Unit questionnaire and Engagement details form. This is because, when polygons are merged, the information (attributes) from only one of the polygons are kept – the polygon with the lowest OBJECTID (in a GIS layer, all objects (features) have a system-defined ID number called an OBJECTID). If you have completed the Survey123 form for a polygon or land unit and then merge it with another

object with a lower OBJECTID, then the information you have already submitted via Survey123 will be lost.

3) View details or engagement information for a specific land unit.

To do this, simply click on one of the polygons in the land unit of interest. A pop up will appear (see Figure 4). Click on the ellipsis (...) and then 'View in Attribute Table'. In the Attribute Table, you can scroll to the right to view additional attribute fields. Alternatively, you can view these details within the Survey123 form (see point 2 above).

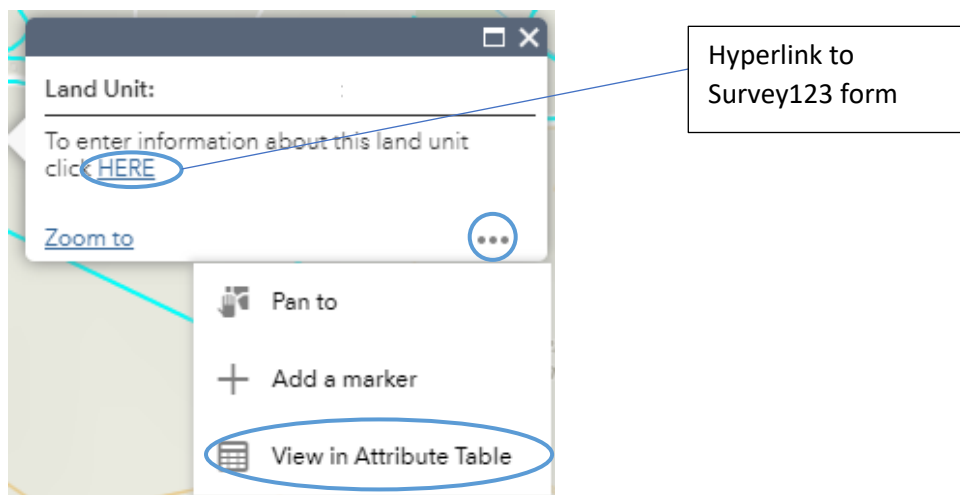


Figure 4. Land Unit Engagement tab – Land unit polygon 'Pop-up' showing link to Survey123 form and link to Attribute table.

Interventions tab

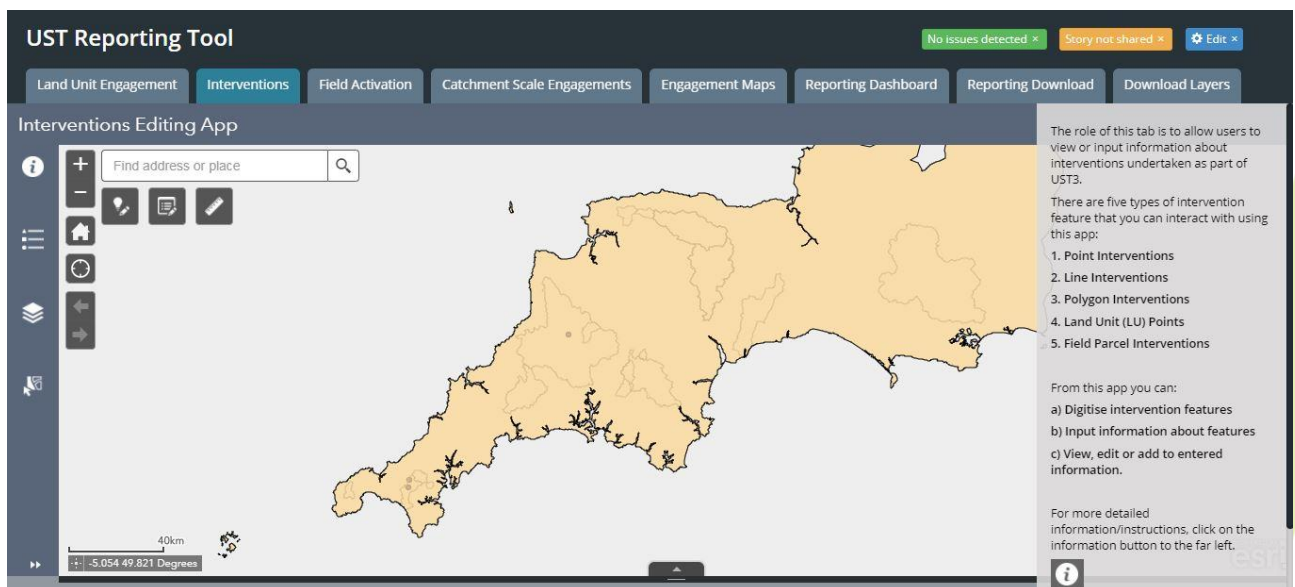


Figure 5. Full screen view of the Interventions tab, showing the embedded Interventions Editing App.

Tab summary

The role of this tab is to allow users to view or input information about interventions undertaken as part of UST3. The content of this tab is an embedded web app, called the Interventions Editing App (see Figure 5 and Figure 6).

There are five types of intervention feature that you can interact with using this app:

1. Point Interventions
2. Line Interventions
3. Polygon Interventions
4. Land Unit (LU) Points
5. Field Parcel Interventions

From this app you can:

- a. Digitise intervention features
- b. Input information about features
- c. View, edit or add to entered information

More details about this tab are provided below.

The five intervention types

An overview of the five intervention types:

(For more information on interventions and their relevant feature types see appendix)

1. **Point Interventions** - discrete interventions whose location can be represented using a single point and whose area or length does not need to be captured for the purpose of UST3 reporting. These include the following interventions:
 - Construct bridges/watercourse crossings for livestock
 - Construct livestock drinkers/feeders with hard bases
 - Gateway relocation from high risk area
 - Installation of: cross drains; livestock drinking troughs (in draining pens for freshly dipped sheep); piped culverts in ditches; secure holding areas to keep dipped sheep away from watercourses; sheep dip drainage aprons and sumps; water gates
 - In-stream NFM measures
 - Provision of alternative drinking water for livestock - e.g. troughs. Includes associated pipework and pumps.
 - Relocation of sheep dips to lower risk locations
 - Resurfacing of gateways
 - Other (for point interventions/features not listed above)
2. **Line Interventions** - linear interventions whose length needs to be captured for the purpose of UST3 reporting. These include the following interventions:
 - Ditch management
 - Establish: in-field grass buffer strips; new hedges; riparian buffer strips
 - Hedgerow management
 - Install: non-watercourse fencing; watercourse fencing
 - Management of livestock and machinery hardcore tracks
 - Stone wall restoration
 - Other (for linear interventions not listed above)
3. **Polygon Interventions** - areal interventions whose location and size are best represented by a polygon feature and whose area needs to be captured for the purpose of UST3 reporting. Examples include:
 - Creation of wet/water holding features
 - Management of in-field wet /water holding features
 - Management of moorland - rewetting (e.g. Grip blocking drainage channels)
 - New roofing (e.g. for slurry and silage stores)

- Yard works and rainwater goods
- Earth banks and soil bunds
- 4. **Land Unit (LU) Point** - a single point for capturing multiple advice measures given to a land manager/land unit. This is for capturing advice that is farm-wide (i.e. might be relevant to multiple farm-fields), rather than associated with a specific point location. Examples include:
 - Adoption of a nutrient management plan
 - Reduce fertiliser application rates
 - Leave residual levels of non-aggressive weeds in crops
- 5. **Field Parcel Interventions** - interventions that take place on specific farm-fields. For the recording of this type of intervention, this app has been pre-populated with a GIS layer of farm-fields. This layer is only visible when zoomed in on an area. Field parcel interventions include the following measures:
 - Arable reversion to grassland with low fertiliser input
 - Create or maintain uncropped cultivated margins
 - Cultivate land for crops in spring rather than autumn
 - Enhanced management of maize crops
 - Establish cover crops in the autumn
 - Establishment of two year sown legume fallow
 - Management of: invasive non-native species (INNS); permanent grassland with very low inputs; rough grazing for birds
 - Nil fertiliser inputs
 - Reducing stocking density and fertiliser inputs on intensive grassland adjacent to a watercourse
 - Soil aeration
 - Undersown spring cereals

Each intervention type has its own GIS feature layer.

Tab instructions

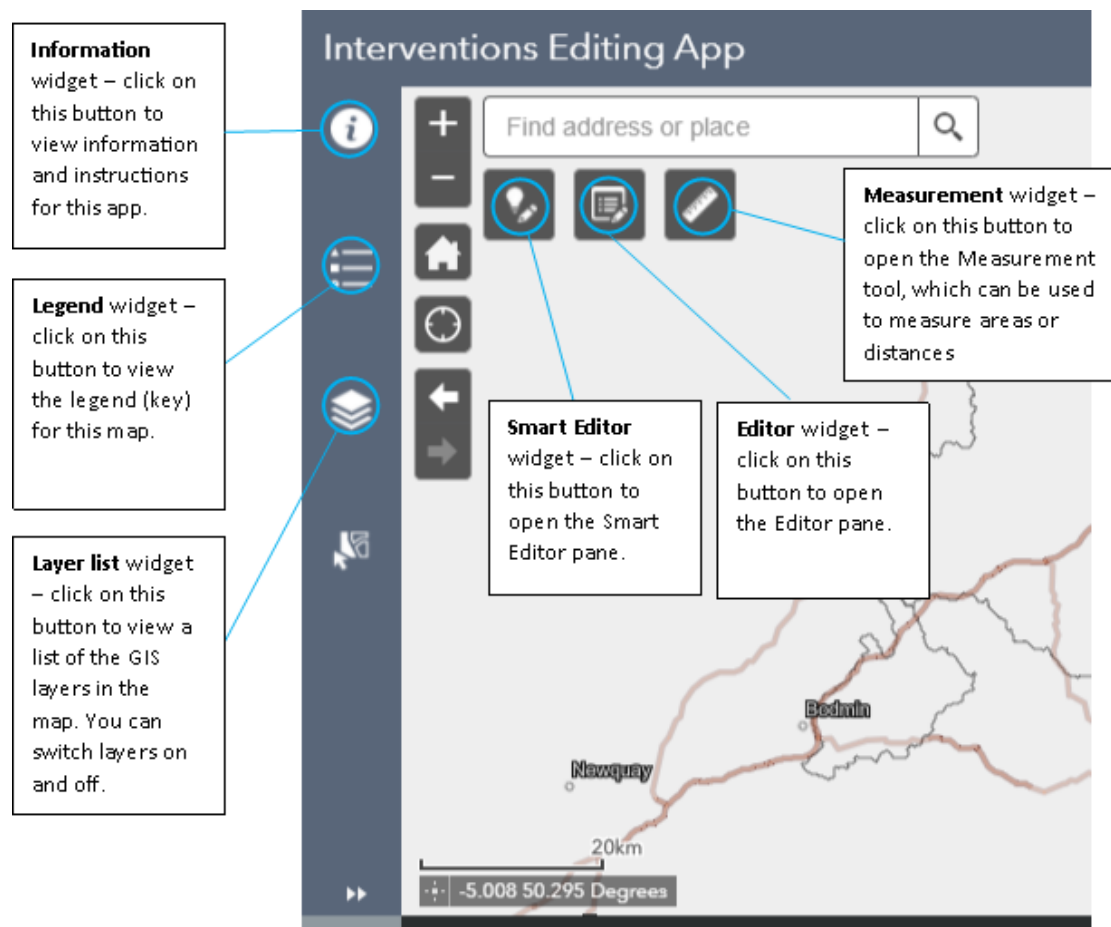


Figure 6. Interventions Editing App.

Step-by-step guide:

From the Interventions Editing App, you can:

a) Digitise intervention features

To digitise an intervention, find or zoom into the location where you want to add a point, line or polygon. Then select the **Smart Editor** widget in the top left hand corner of the map (see Figure 6). From the Smart Editor pane that opens up, select the relevant template (e.g. 'Point interventions') and then insert or draw a feature in the required location (Figure 7).

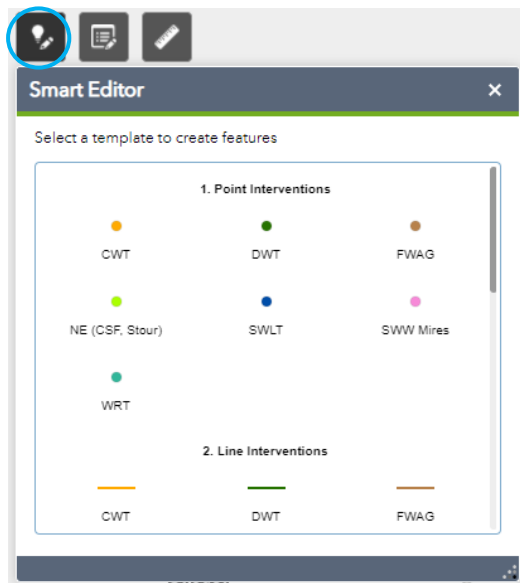


Figure 7. Smart Editor widget showing Intervention templates - 1. Point Interventions, 2. Line Interventions, etc

In the case of Field Parcel interventions the app has been pre-populated with a GIS layer of farm-fields so in most cases you should not need to digitise a polygon. However, if there is no polygon in the required location open the Edit widget (next to the Smart Editor on the top left hand corner) and click on the 'Field parcel interventions' template within the Edit pane that opens up (Figure 8).

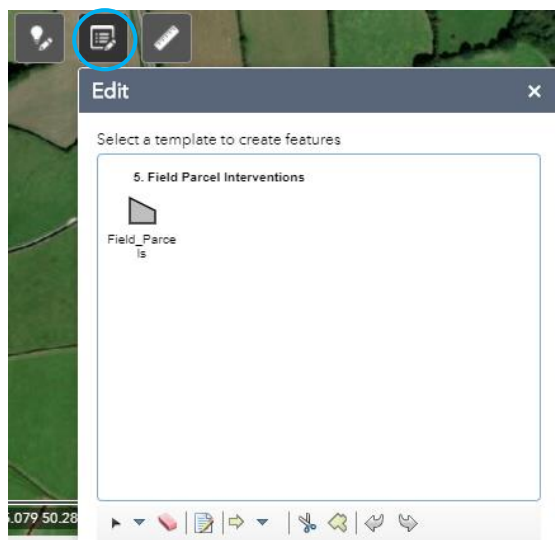



Figure 8. Editor widget from where you can select the Field Parcel template

You can then digitise a new polygon in the required location. If necessary you can also split/cut  Field Parcel polygons using the cut tool in the Edit pane.

Once you have digitised a feature, you need to click **'Save'** in the Smart Editor/Edit pane for your feature to be recorded.

If you have started to create a feature by digitising it but are not happy with it and wish to delete it, click on **'Cancel'** in the Smart Editor pane.

- i** In the case of LU Points, it might be useful to add the point in a key/memorable location, such as the main farm building, or a main car park, as long as this falls within the defined boundaries of the land unit of interest. This might help you to re-locate the point if edits are required.
- i** Furthermore, if you have given advice on separate dates and you want to record this, you will need to digitise/add a separate LU Point for advice given on each separate date. Similarly, if pieces of advice given on the same day have different end dates and you want to record this, you will need to do separate LU Point(s) in order to be able to account for the different end dates in the information you input through Survey123.
- i** Field Parcel Interventions should not generally require digitisation as this app has been pre-populated with a GIS layer of farm-fields.
- i** To aid accurate digitisation of line and polygon features, you can use the Measurement tool (Figure 9) to first draw a line or polygon of the required length or area, respectively, in the correct location. Then, without clearing the newly drawn measurement feature, click on the Smart Editor widget, select the required template and then digitise a line intervention or polygon intervention on top of the measurement feature. Once your intervention has been digitised, you can click on the Measurement widget and then 'Clear' to remove the measurement feature.

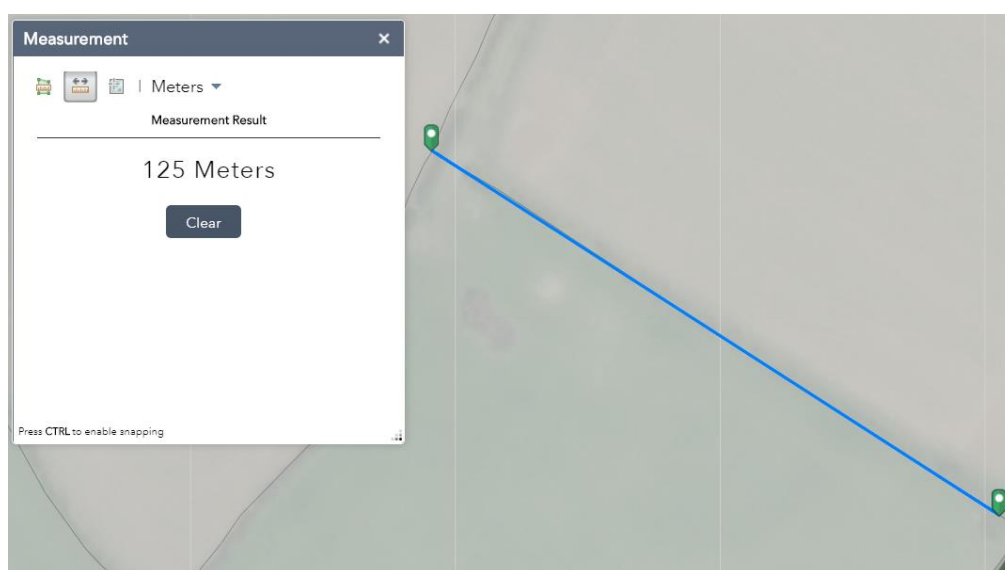


Figure 9. Example of using the line measurement tool to draw a temporary line measuring 125 m.

b) Input information about features

To enter information (e.g. Partner, type of intervention) about a **Point** or **Line Intervention**, keep the Smart Editor pane *open* and then select the feature of interest. You will then be able to enter information about the intervention feature into the Smart Editor pane (Figure 10). If you have just digitised a Point or Line Intervention, this pane will already be open for the feature digitised.

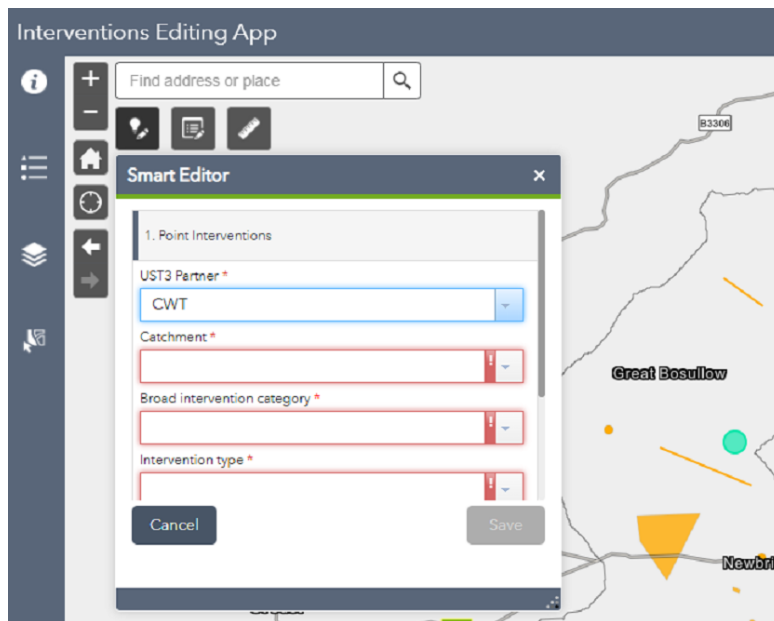


Figure 10. Smart Editor pane open for data entry about a point intervention.

To enter information (e.g. Partner, advice given) about a **Polygon**, **LU point**, or **Field Parcel**, close the Smart Editor pane and then select the feature of interest. A pop-up will appear, from which you can click on a hyperlink to a Survey123 form (Figure 11). The survey123 will open in a new browser.

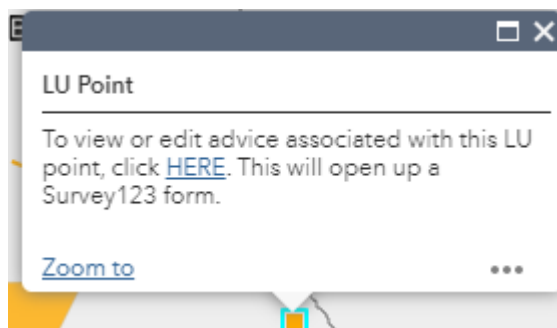


Figure 11. Land unit intervention - pop-up containing link to survey123 form for data entry.

All interventions recorded though the Smart Editor or Survey123 form will require a 'Start date' to be provided and where relevant an end date.

For point, lines and polygons – more physically 'built' interventions, please provide the date at which they were constructed or implemented.

Land unit points – please provide the date of implementation or behaviour change. One LU point can have multiple items selected and if these multiple items/advice were given and implemented all at the same time, they can have a single start date (and if relevant a single end date). If that isn't appropriate you will need to add a new point for every individual item and give each a single start and end date.

For Field Parcel interventions, again please provide the date of implementation or behaviour change. For each option that is selected from the multiple choice list, a 'Start date' and 'End

date' question will become available (below the list). This means that every intervention that is being applied to this field parcel will be captured and a start and end date given for each item.

Some interventions may occur only once or at one specific time e.g. soil aeration so an end date will not be relevant.

Tip: If you have selected an intervention feature and there are several close to the point that you clicked, you can use the arrow button on the top right of the pop-up to scroll through the pop-up of the other nearby features.




c) View, edit or add to entered information.

To **view** entered information about a Point or Line Intervention, simply select the feature of interest and a pop-up will appear. The Smart Editor pane can be open or closed when you do this but if a template (e.g. 1. Point Intervention) is already selected within the Smart Editor pane you will need to 'de-select' it first by clicking on the selected symbol in the Smart Editor pane. To **edit** the information however, the Smart Editor pane must be open.






To **view** entered information about a Polygon or Field Parcel from within this app, ensure that the Smart Editor pane is *open* and then select the feature of interest. As above, if a template (e.g. 3. Polygon Intervention) is already selected within the Smart Editor pane you will need to 'de-select' it first by clicking on the selected symbol in the Smart Editor pane.

To **edit** Polygon or Field Parcel information, ensure that the Smart Editor pane is *closed* and then select the feature of interest. A pop-up will appear, from which you can click on a hyperlink to a Survey123 form.

To **view** or **edit** entered information about an LU Point, ensure that the Edit pane is *closed* and then select the feature of interest. A pop-up will appear, from which you can click on a hyperlink to a Survey123 form.

You can view the intervention layers' attribute tables by clicking on the arrow tab at the bottom of the page. 

Tips for this tab:

-  The 'Field Parcel Interventions' layer is only visible when zoomed in to a local, 'neighbourhood' scale.
-  You can toggle layers off and on using the Layers widget . It might sometimes be useful to turn the Field Parcel Interventions layer off in order to see the satellite imagery underneath.
-  You can view the intervention layers' attribute tables by clicking on the arrow tab at the bottom of the page .

See Table 1 for a Summary of data input and viewing options according to intervention feature type. See Table 2 for a summary of intervention driver requirements by feature type. See Appendices 3 and 4 for information on intervention drivers and a list of interventions by feature type.

Table 1. Summary of data input and viewing options according to intervention feature type.



Intervention type / Layer name	Feature digitisation required?	How to input details about a specific intervention of this type	Options for viewing entered information. The option necessary for editing information is highlighted in bold.
Point Interventions	Yes – point required to represent location of the intervention.	Using the Smart Editor. With the Smart Editor pane <i>open</i> , select the feature of interest. An editable pop-up will appear.	Smart Editor Pane (click on feature whilst Smart Editor open). Map pop-up (click on feature whilst Smart Editor closed). Attribute table. Two options: 1) Whilst Smart Editor closed, click on feature of interest, click on ellipsis (...), 'View in Attribute Table'. 2) Click on arrow tab at the bottom of the page to view attribute tables. 
Line Interventions	Yes – a line needs to be digitised. Length of the digitised line is important for reporting.		
Polygon Interventions	Yes – a polygon needs to be digitised. Area of the polygon is important for reporting.	Via Survey123 form. With the Smart Editor pane closed, select the feature of interest. A pop-up will appear, from which you can click on a hyperlink to a Survey123 form.	Re-open the Survey123 form. With the Smart Editor pane closed, select the feature of interest and on the pop-up, click on the hyperlink to the Survey123 form.
LU Points	Yes – but only one LU Point per land unit. A single LU Point can be associated with multiple advice measures.		
Field Parcel Interventions	In most cases – no. Field Parcel Interventions should not require digitisation as this app has been pre-populated with a GIS layer of farm-fields. If, however, a field parcel is not already present in the required location, a field polygon can be digitised.		Attribute table. Two options: 1) Whilst Smart Editor closed, click on feature of interest, click on ellipsis (...), 'View in Attribute Table'. 2) Click on arrow tab at the bottom of the page to view attribute tables. 

Table 2. Summary of intervention driver requirements by feature type.

Intervention type / Layer name	Intervention driver requirement information
Point Interventions	No drivers required - point interventions aren't assigned drivers
Line Interventions	Up to three drivers can be assigned. At least one driver must be assigned. The intervention drivers do not influence which monthly reporting item(s) an intervention feeds into. However, relevant drivers should still be set, to aid additional categorisation, analysis and reporting of interventions.
Polygon Interventions	Up to three drivers can be assigned. At least one driver must be assigned. Some drivers cause an intervention to feed into a particular monthly reporting item (e.g. 'Area of new habitat') – see appendices 3 and 4.
LU Points	No drivers required - LU point interventions aren't assigned drivers
Field Parcel Interventions	Multiple drivers can be assigned. Some drivers cause the field parcel area to feed into a particular monthly reporting item – see appendices 3 and 4.

Field Activation tab



Completion of this tab is important as the areas turned 'Active' contribute to the cumulative total of **Total area of farms/land units under 'Active management'** for the reporting of the UST3 ODI to SWW.

All areas turned active feed into the reporting so you must ensure that the correct areas are selected. Please also ensure that the date land became active is filled in with the appropriate date.

What constitutes 'Active'?

If there have been new actions/measures on a farm/land unit/field parcel since April 2020. This includes new:

- advice that is being implemented across the whole farm/land unit and/or behaviour changes (i.e. items that are recorded through the Land Unit point intervention feature),
- physical interventions that are recorded using points, lines and/or polygon intervention features, or
- measures reported through the Field-parcel intervention feature.

There must be a minimum of one of the above interventions recorded within the farm/land unit/field parcel before it can to be classed as 'Active'. For a whole land unit (i.e. a farm) to be classed as active, there should an expectation of changes in behaviour/management across the majority of the land unit (i.e. farm).

The interventions must also relate to new engagement since April 2020 or follow-on agreements to replace or update AMP6 work.

If you are recording only a maintenance visit or your visit has been to check on pre-AMP7 works that are continuing but not new, you cannot record these areas as Active or count them towards AMP7 reporting.

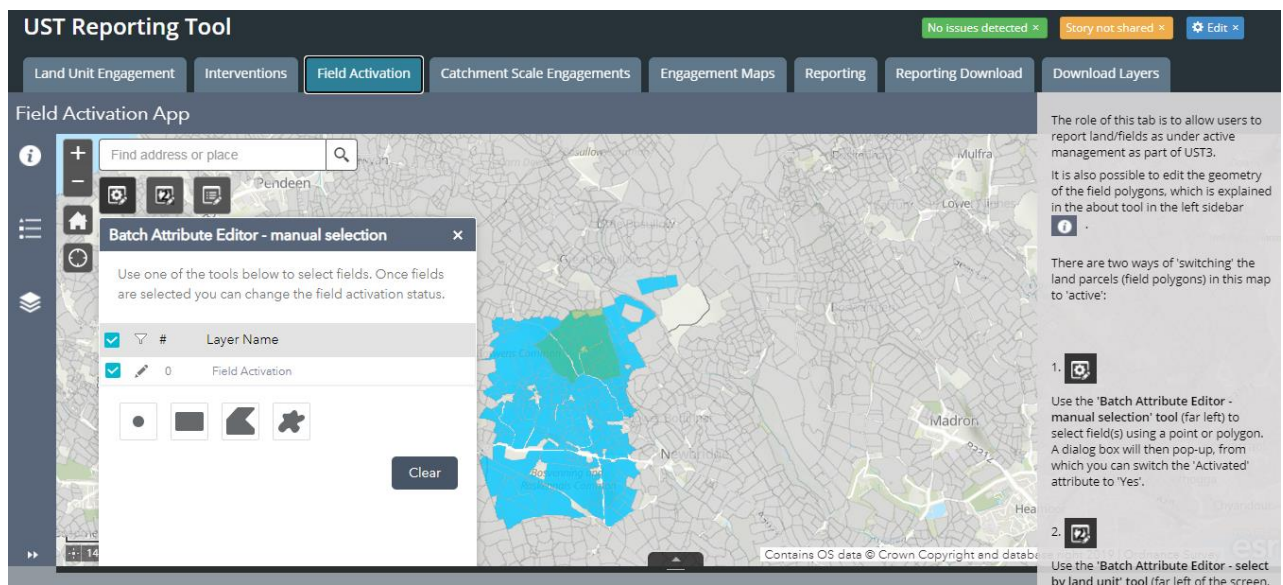


Figure 12. Full screen view of Field Activation tab showing Field Activation App.

Tab summary

The role of this tab is to allow users to report land/fields as being under active management as part of UST3. The content of this tab is an embedded web app, called the Field Activation App (Figure 12).

The map in this tab contains a GIS polygon feature layer called 'Field activation'. This layer contains field polygons derived from a number of potential sources, depending on the area of interest /delivery partner. Registering a land area / field parcel as 'active' is achieved by switching an attribute called 'Activated' to 'Yes'.

Tab instructions

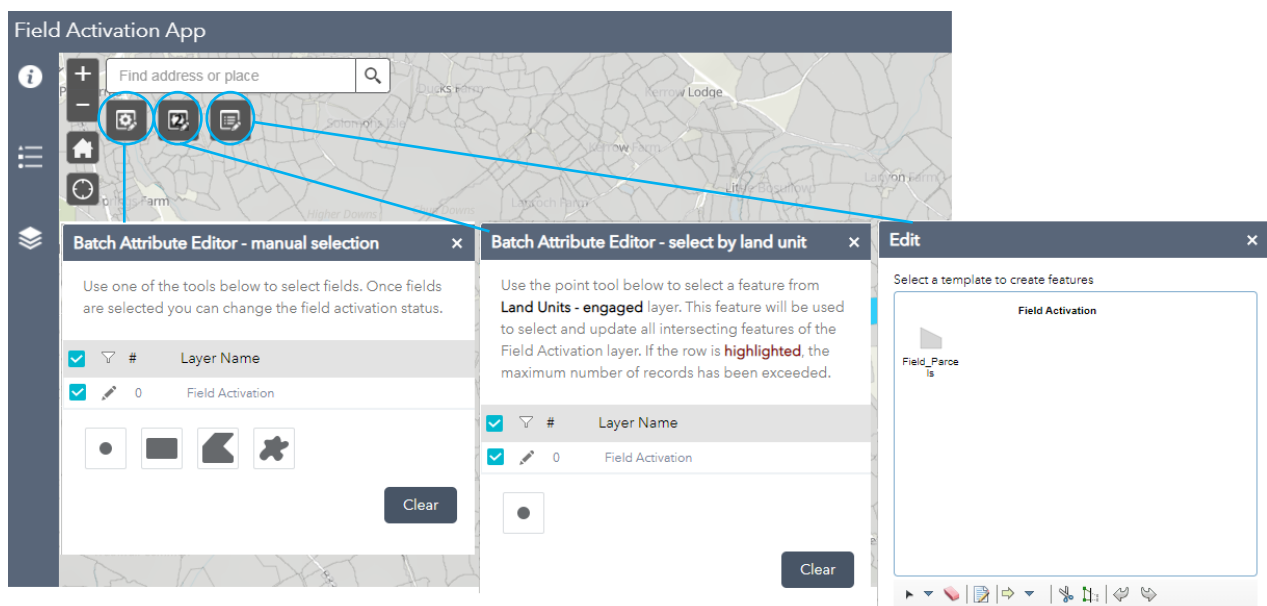
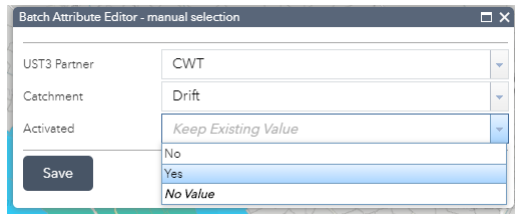



Figure 13. Field Activation App and associated widgets [NB. All widgets open at the same time for illustration only. In the portal only one widget (e.g. Edit) can be open at a time].


There are two ways of 'switching' the land parcels (field polygons) in this map to 'active':

1. Use the 'Batch Attribute Editor - manual selection' tool (far left) to select field(s) using a point or polygon. A dialog box will then pop-up, from which you can switch the 'Activated' attribute to 'Yes'.



2. Use the 'Batch Attribute Editor - select by land unit' tool (top left of the screen, to the right of the manual selection tool). Use a point to click on and select a land unit (note - only engaged land units are shown). All the fields that intersect (correspond to) this land unit will then be selected automatically. A dialog box will then pop-up, from which you can switch the 'Activated' attribute to 'Yes'.

 Before editing the dialog box, ensure that only the correct fields have been selected. If more fields than required are highlighted, then you will need to either: a) use the manual selection method instead or b) turn all the selected/highlighted fields active and then use the manual selection method to switch the required fields back to inactive.

Tip - you can turn the 'Land units - engaged' layer off using the Layers widget. 

Catchment Scale Engagements tab

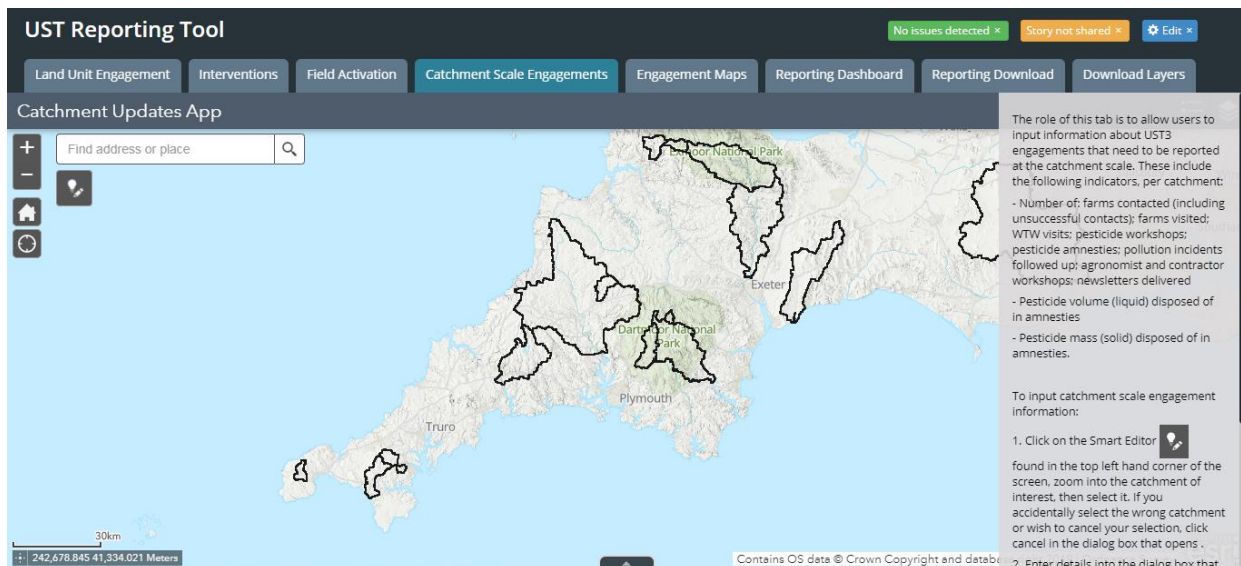


Figure 14. Full screen view of Catchment Scale Engagement tab showing Catchment Updates App.

Tab Summary

The role of this tab is to allow users to input information about UST3 engagements that need to be reported at the catchment scale. These include the following indicators, per catchment:

- Number of:
 - farms contacted (including unsuccessful contacts – those that do not lead to active management under UST3);
 - farms visited (including– those that do not undertake interventions or changes in management under UST3);
 - WTW visits;
 - pesticide workshops;
 - pesticide amnesties;
 - pollution incidents followed up;
 - agronomist and contractor workshops;
 - newsletters delivered
 - Volunteer/community events
- Pesticide volume (liquid) disposed of in amnesties
- Pesticide mass (solid) disposed of in amnesties

The content of this tab is an embedded web app, called the 'Catchment Updates App' (Figure 15).

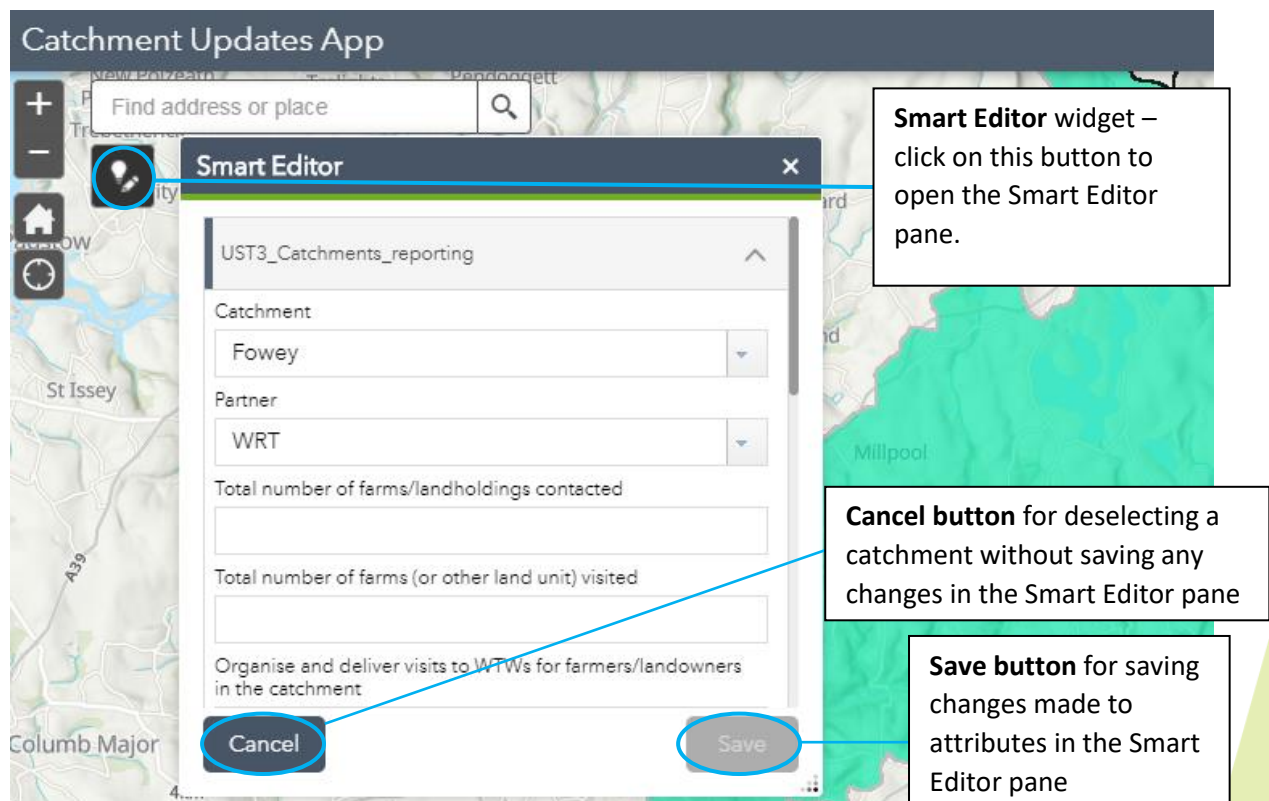




Figure 15. Catchment Updates App with Smart Editor pane open and an example catchment (Fowey) selected.

Tab instructions

To input catchment scale engagement information:

1. Click on the Smart Editor widget  found in the top left hand corner of the screen, zoom into the catchment of interest, then click within the black polygon outline to select the desired catchment. If you accidentally select the wrong catchment or wish to cancel your selection, click cancel in the dialog box that opens (see Figure 15).

2. Enter details into the dialog box that opens in the Smart Editor pane, then click Save (see Figure 15).

To **view catchment-scale engagement information**, you can either click on the catchment of interest, or view the catchment layers' attribute table by clicking on the arrow tab at the bottom of the page. 

Engagement Maps tab

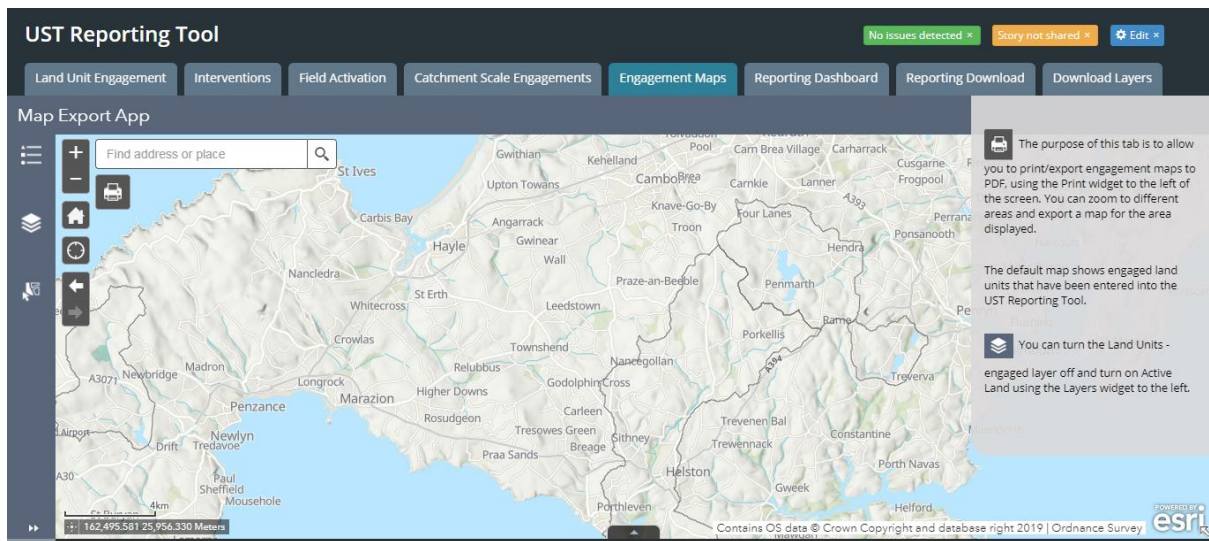


Figure 16. Engagement Maps tab showing Map Export App.

The purpose of this tab is to allow you to print/export engagement maps to PDF, using the Print widget to the left of the screen. In the pop-up window you can set the Title and format then click Print. A link to the new map PDF is then added to the pop-up (see Figure 17). Click on Map PDF for it to open in a new window from where you can download and save.

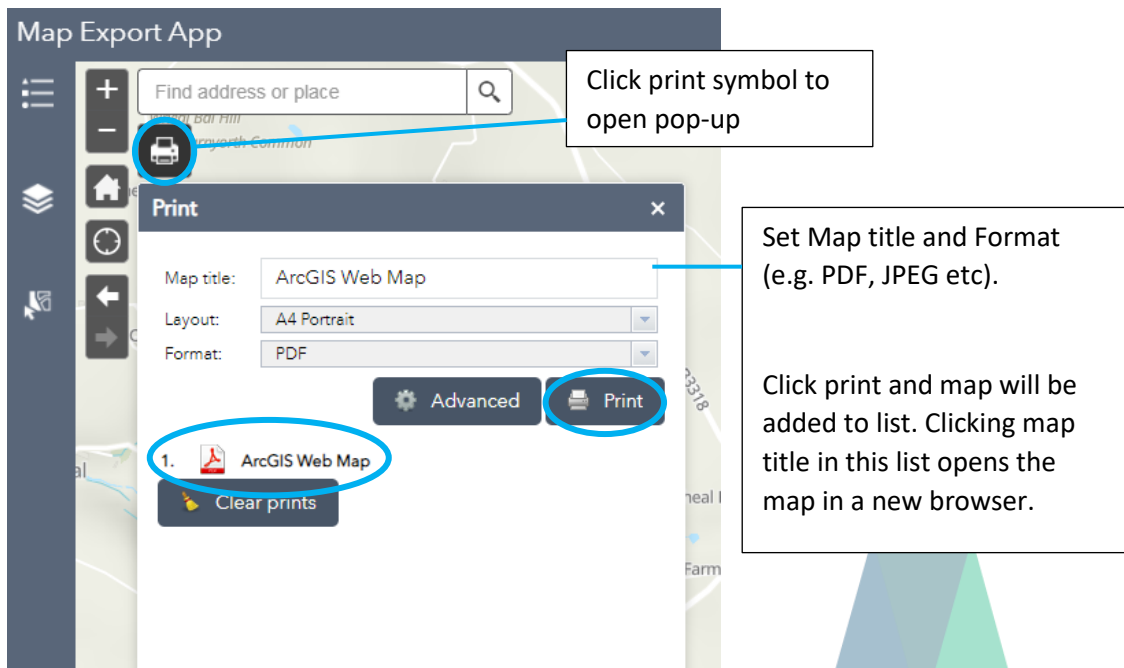


Figure 17. Engagement Map tab pop-up

The default map shows engaged land units that have been entered into the UST Reporting Portal. You can zoom to different areas and export a map for the area displayed.

Tip: You can turn the Land Units - engaged layer off and turn on Active Land using the Layers widget to the left.



Reporting Dashboard tab

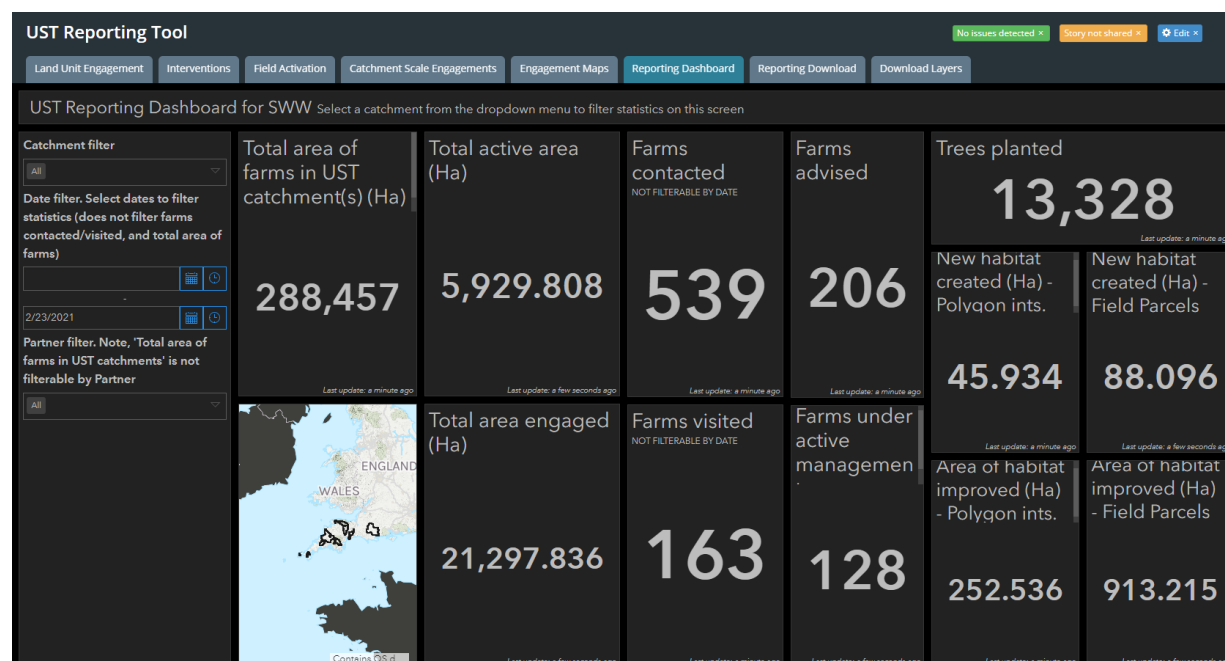


Figure 18. UST Reporting Dashboard (with dummy data)

The reporting Dashboard provides a visual summary of key performance indicators.

Each of the key reporting features in this dashboard will contain a live count (e.g. Number of Farms Contacted, Trees planted) or a cumulative total (e.g. Area of new habitat created) of areas intervened on for your catchment.

Use the drop down on the left of the window to select the catchment of interest or move around the map to filter the results (Figure 18).

This tab is just for visualisation and reviewing summary data. See information on the next tab for reporting and extracting data.

Reporting Download tab

UST Reporting Tool

Land Unit Engagement Interventions Field Activation Catchment Scale Engagements Engagement Maps Reporting Dashboard Reporting Download Download Layers

Reporting

File Edit View Insert Cell Kernel Help Python 3

In [1]:

```
def csv_download_link(df, csv_file_name, delete_prompt=True):
    """Display a download link to load a data frame as csv from within a Jupyter notebook"""
    df.to_csv(csv_file_name, index=True)
    from IPython.display import FileLink
    display(FileLink(csv_file_name))

from arcgis.features import FeatureLayer
from arcgis.gis import GIS
# Import warnings
#warnings.simplefilter(action='ignore', category=FutureWarning)
import pandas as pd
gis = GIS("home")
# Clear output()
import numpy as np

##### ALL PARTNERS#####
#####
# Item Added From Toolbar
# Title: UST3 Catchments Reporting
Catches = gis.content.get("42d790c691e14ed38cc06cd22a54177a")

# Item Added From Toolbar
# Title: Land units
LU = gis.content.get("9fc105cb961b455f912d00ecb831a979")

# Item Added From Toolbar
# Title: Field Parcels Reporting
Field = gis.content.get("70a364e5c573468ea0a3aef2502d51ff")

Layer_catch = Catches.layers #Accesses the Layers within a Feature service
Layer_catch = Layer_catch[0].query() #Selects the first (and only) Layer from the feature service
Layer_catch = Layer_catch.sdf

#print("Layer_catch sdf")
Dummy = pd.DataFrame()
Dummy['Catchment'] = Layer_catch['Catchment']
```

Reporting spreadsheet download

Compatibility:

This download facility has been known to have some problems with browser compatibility. If an error message is shown on clicking this tab, please try a different browser.

WARNING:

DO NOT EDIT THE CODE ON THE SCREEN. If you accidentally do so, refresh the screen to reset the page.

Instructions: To download the spreadsheet:

- 1) Click "Run"
- 2) Filtering by date: A question will display at the bottom of the screen. If you want to filter by date then type "yes" otherwise type "no".
- 3) If you type "yes" then additional questions will display: asking for dates to filter data by, asking for a start date (in which all interventions occur after this date), and then an end date. Type these in the format of YYYY-MM and YY (e.g. 2015 for year, 09 for month and 11 for day).

Please note that the date filtering capabilities will not filter all of the data. When the data is downloaded it will provide the complete, cumulative reporting figures, but also reporting totals filtered by date, which excludes the items that cannot be filtered by date.

4) Click on the blue link. This will start the

Figure 19. Full screen view of Reporting Download tab

This tab is for downloading the reporting spreadsheet with all the required data for UST reporting, in the correct format. The tab contains a 'notebook' containing script which pulls together all the information inputted so far into relevant reporting items to populate a spreadsheet. **It is also possible to filter (relevant data) by date.**

It may look intimidating but there is only one button you need to press. See below for step by step instructions.



WARNING:

DO NOT EDIT THE CODE ON THE SCREEN, if you accidentally do so, refresh the screen to reset the page, and do not save changes.

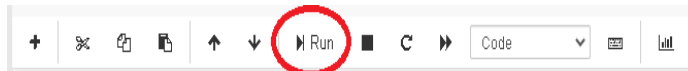


Compatibility:

This download facility has been known to have some problems with browser compatibility. If an error message is shown when you click this tab, please try a different browser. There is no internet browser in particular that works more often than others, so please try any other internet browser you have available, and if that doesn't work, try another. Usually, this works first try though.

Instructions: To download the spreadsheet:

1) Click "Run" located in the tool bar across the top of the reporting window.



2) The following question will display at the bottom of the screen. If you want to filter by date then type "yes" otherwise type "no".

Do you want to filter results by date? Does not filter anything in the catchment reporting polygon (see manual). (Yes/No):

3) If you type "yes" then additional questions will display: asking for dates to filter the data by.

- Start of reporting period: Enter the start date 'year' (YYYY) - this is the year in which all the interventions you want to report occur after this date. E.g. 2017.
- Enter a month (MM). E.g. 04 (for April)
- Enter a day (DD). E.g. 01
- Then enter the end date of the reporting period you are interested in.
In the same format of YYYY MM and DD (e.g. 2019 for year, 03 for month and 31 for day).

```
Start of reporting period. First enter a year(YYYY): 2011
Enter a month (MM): 11
Enter a day(DD): 01
End of reporting period. First enter a year(YYYY): 2020
Enter a month (MM): 11
Enter a day(DD): 01
```

Please note that the date filtering capabilities will not filter all of the data as not all input data collects date information.

4) Click on the blue link This will start the download after a few seconds. Clicking the link may open a new window/tab.

[Reporting_spreadsheet.csv](#)

Click "Reporting_spreadsheet.csv" link above

When the data is downloaded the spreadsheet produced will provide the complete, cumulative reporting figures, but also reporting totals filtered by date (excluding the items that cannot be filtered by date).

All reporting items (cumulative totals)

1		Drift	Upper Col	College ar	Stithians	Lower Cober
2	All reporting items (cumulative totals for UST)					
3	Total area of farms/landholdings in catchment (Ha)	0	0	0	0	0
4	Total number of farms/landholdings contacted	0	0	0	0	0
5	Total number of farms (or other land unit) visited	0	0	0	0	0
6	Total number of farms/land units receiving advice from UST farm advisors	0	0	0	0	0
7	Total number of farms/land units under 'Active Management'	0	0	0	0	0
8	Total area of farms/land units under 'Active management (Ha)'	0	0	0	0	0
9	Linear riparian measures contributing to river improvement/protection (km)	0	0	0	0	0
10	Riparian buffers created (km)	0	0	0	0	0
11	Riverside hedgerows (km)	0	0	0	0	0

Subset of reporting items filtered by date.

1	Reporting items that are filtered by date	0	0	0	0	0
2	Total number of farms/land units receiving advice from UST farm advisors	0	0	0	0	0
3	Total number of farms/land units under 'Active Management'	0	0	0	0	0
4	Total area of farms/land units under 'Active management (Ha)'	0	0	0	0	0
5	Linear riparian measures contributing to river improvement/protection (km)	0	0	0	0	0
6	Riparian buffers created (km)	0	0	0	0	0
7	Riparian hedgerows (km)	0	0	0	0	0
8	Riverside Fencing (km)	0	0	0	0	0
9	Ditch management (km)	0	0	0	0	0
10	In-field grass buffer strips (km)	0	0	0	0	0
11	Areal Biodiversity (Ha)	0	0	0	0	0
12	Area of new habitat (Ha)	0	0	0	0	0
13	Area of improved habitat (Ha)	0	0	0	0	0

Download layers tab

The screenshot shows the 'UST Reporting Tool' interface. The top navigation bar includes tabs for 'Land Unit Engagement', 'Interventions', 'Field Activation', 'Catchment Scale Engagements', 'Engagement Maps', 'Reporting Dashboard', 'Reporting Download', and 'Download Layers'. The 'Download Layers' tab is selected, displaying a list of layers for 'Land Units'. The 'Export Data' button is highlighted with a red circle. A callout box points to the 'Export Data' button with the text: 'Click links in this list to access item pages for different datasets.'

Figure 20. Full screen view of the Download Layers tab

The purpose of this tab is to provide you with options for exporting or downloading the data that you have entered through the various Apps as shapefiles, for use in your own GIS projects or as CSV files.

The default view of this tab shows the ArcGIS Online item page for the Land Units GIS layer. From here you can click on 'Export Data' (in the list on the right hand side) to export to a shapefile or CSV and then download the file created (see Figure 20).

In the grey box on the right hands side of this screen you have options to click hyperlinks which will take you to other item pages (see Figure 20).

Here you can access the item pages for the following layers:

- Field Parcels (contains both field parcel intervention and field activation data)
- Point Interventions
- Line Interventions
- Polygon Interventions
- LU Point (Land Unit advice)
- UST3 Catchments (including catchment scale engagements reporting data)

If you navigate away from the Land Units download page you will have an option to click a 'Back' button, at the top of the tab to return to it.




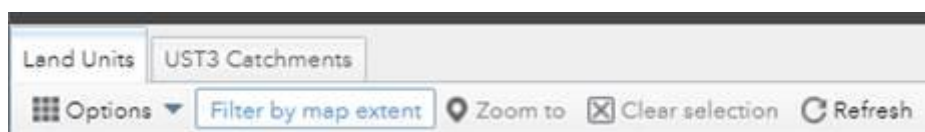
Hints and Tips

How to apply a temporary filter to a layer

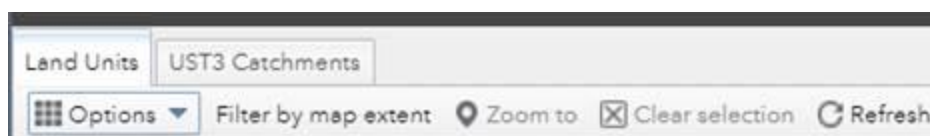
In the UST Reporting Portal, you can filter a layer by its attributes, so that only some of the objects (point, lines or polygons) are displayed, and only these records are shown in the attribute table. For example, on the Land Unit Engagement tab – Land Unit Engagement App, you could filter the Land Units layer to only show land units where the UST3 Partner is set to your organisation.

To do this, you would need to:

1. Open up the Land Units attribute table (by click on the arrow  at the bottom of the page). Then click on the Land Units attribute table tab (if it isn't already selected):



2. If you want to see all records in the layer and apply the filter to the whole layer, not just the part of the layer currently visible in the map, then turn off 'Filter by map extent':



3. Then click on 'Options' (far left, see above screenshot) and then 'Filter'. You can then set a filter expression such as UST3 Partner is [Your organisation name]:



Once the filter has been applied, you will only see the applicable land units. You can remove the filter again when you want to see all land units by deleting the expression (clicking on the cross on the far right in the above screenshot).

You can apply more than one expression to filter by. For example, on the 'Intervention' tab, you could apply a filter to the point interventions layer to only see selected intervention types:

Filter ✕

+ Add expression
+ Add set

Display features in the layer that match any of the following expressions ▾

Intervention type (S) ▾ is ▾ Construct bridges / watercourse crossings fo ⚙ ✕

☐ Case sensitive

Intervention type (S) ▾ is ▾ Construct livestock drinkers/feeders with han ⚙ ✕

☐ Case sensitive

Intervention type (S) ▾ is ▾ Installation of water gates ⚙ ✕

☐ Case sensitive

Note that for the above to work correctly, the top option must be set to 'Display features in the layer that match **any** of the following expressions'. It is also possible to have expressions where you want to 'Display features in the layer that match **all** of the following expressions'. For example, you may want to apply a filter to display only land units that are farms in a specified catchment:

Filter ✕

+ Add expression
+ Add set

Display features in the layer that match all of the following expressions ▾

Catchment (String) ▾ is ▾ Fowey ⚙ ✕

☐ Case sensitive

Land type (String) ▾ is ▾ Farm ⚙ ✕

☐ Case sensitive

OK
Cancel

Appendix

Appendix 1: Glossary of common GIS terms:

Attribute Table:

A database or tabular file containing information about a set of geographic features, usually arranged so that each row represents a feature and each column represents one feature attribute.

Digitizing:

This is the process of creating new data (points, lines or polygons) or converting geographic data either from a hardcopy or a scanned image into vector data by drawing or tracing the features. It is the process by which coordinates from a map, image, or other sources of data are converted into a digital format in the GIS.

Feature:

A representation of a real-world object on a map.

Layer:

The visual representation of a geographic dataset in any digital map environment. Conceptually, a layer is a slice or stratum of the geographic reality in a particular area, and is more or less equivalent to a legend item on a paper map. On a road map, for example, roads, national parks, political boundaries, and rivers might be considered different layers.

Shapefile:

A shapefile is a digital vector storage format for storing geometric location and associated attribute information. Shapefiles spatially describe geometries: points, polylines, and polygons.

Web app and web maps:

A web map is created and stored in ArcGIS Online. It is a way of displaying information on a web hosted map. The map usually contains a basemap, a set of data layers, navigation/extent tools and simple tools for interacting with the map data.

Web maps are used/embedded within the web apps which may offer additional functionality for interacting with the map. Web apps are a suite of configurable templates which can combine maps, text or other content to build tools such as the UST Reporting Portal for data collection and visualisation.

These applications are accessed through the internet and do not need to be downloaded.

Widget

An interactive graphic component of a user interface (such as a button, scroll bar, or menu bar), its controlling program, or the combination of both the component and program. The widget supports user interaction with the map or data. For example, a zoom widget allows users to interact with the level of detail shown on a map or scene; a legend widget displays information about the data layers.

Appendix 2: Definitions of potentially ambiguous terms:

Pre-advice visits – visits to a land unit or land unit manager (e.g. farmer) undertaken as part of UST3, prior to providing any advice or management plans and before any interventions have been undertaken on that land unit. No advice is given on these visits. In some cases, advice might be given on the first visit, in which case the count for that land unit would always remain zero; this is fine.

Advice-giving or implementation visits – visits undertaken for the purposes of giving UST3 advice (including management plans) and/or undertaking (or advising/helping in the undertaking) of a UST3 intervention. e.g. Where a delivery partner goes to a site in order to participate or advise on tree planting or habitat management that is taking place on the day of the visit. *Note: for the purposes of UST3 reporting the counts for ‘advice-giving or implementation visits’ and ‘maintenance or follow-up visits’ are mutually exclusive – a visit should not be input to both categories as this would cause double-counting.*

Maintenance or follow-up visits – UST3 visits to a land unit or land unit manager (e.g. farmer) undertaken where:

- i) advice or new management plans have previously been given, or intervention(s) have been implemented or are ongoing; and
- ii) no completely new advice is given; and
- iii) the purpose of the visit is not to implement an intervention

Note: for the purposes of UST3 reporting the counts for ‘advice-giving or implementation visits’ and ‘maintenance or follow-up visits’ are mutually exclusive – a visit should not be input to both categories as this would cause double-counting. If a visit occurs where an intervention or new management practice is ongoing and additional advice is provided about this, then the visit should be counted as a ‘maintenance or follow-up visits’. If, however, an intervention or new management practice is ongoing but completely new advice is given (i.e. that relates to a different type of intervention not previously advised on that land unit) then the visit should count as an ‘advice-giving or implementation visit’.

Engaged/Engagement – A farm/land unit should be considered engaged in UST when:

- i) positive contact has been made with the farmer/landowner
- ii) a physical visit has taken place and
- iii) there is an expectation that there will be further participation in UST (additional visits, farm plan etc)

At this point GDPR should be completed and the Joint data controller Privacy Notice issued to the farmer/landowner, allowing their details to be entered into the portal.

Appendix 3: Drivers and interventions information

Driver	Explanation	Does this driver have a related monthly reporting item? Will use of this driver feed the intervention into one of the monthly reporting items?
Creation of new permanent habitat*	Actions to create new permanent habitat with the intention that it becomes semi-natural over time. Includes new hedgerows, heathland restoration, turning agricultural improved grasslands into species rich ones, etc. For woodland include new plantings of broadleaves, but not commercial conifers or Willow planted for regular harvesting.	Yes, in the case of Polygon Interventions and Field Parcel Interventions. The "Area of new habitat" reporting item is the total area of polygons in the Polygon Interventions layer and Field Parcel Interventions layer with an intervention driver attribute-field set to "Creation of new permanent habitat". If a Line Intervention driver is given this driver, it cannot contribute to "Area of new habitat" as line interventions are not given an area. However, it is still important to assign this driver if appropriate, to aid categorisation and analysis of interventions. If a Line Intervention (e.g. 'Install non-watercourse fencing') is undertaken as part of creation of new habitat, then the area of habitat created should be captured separately as a Polygon or Field Parcel Intervention.
Restoration of semi-natural habitat*	Actions to improve the ecological function of permanent semi-natural habitat areas. This would include ditch blocking, scrub clearance and introduction of new grazing, etc. But it would not include an annual hay meadow cut, which is part of the annual maintenance cycle. For hedges it would include a restoration project such as laying a neglected hedge but not a bi-annual cut.	Yes, in the case of Polygon Interventions and Field Parcel Interventions. The "Area of habitat restored" reporting item is the total area of polygons in the Polygon Interventions layer and Field Parcel Interventions layer with an intervention driver attribute-field set to "Restoration of semi-natural habitat". If a Line Intervention is given this driver, it cannot contribute to "Area of habitat restored" as line interventions are not given an area. However, it is still important to assign this driver if appropriate, to aid categorisation and analysis of interventions. If a Line Intervention (e.g. 'Install non-watercourse fencing') is undertaken as part of habitat restoration work, then the area of habitat restored should be captured separately as a Polygon or Field Parcel Intervention.

New non-permanent management in the farmed landscape which improves biodiversity*	Includes planting herbal leys, field margins and buffers, actions to encourage arable weeds, fallow periods, etc. All are transient changes as part of the agricultural rotation and not likely to remain as permanent changes in the landscape. Include buffer strip on field edges, don't include fenced off riparian margins, these are new permanent habitat features.	Yes, in the case of Polygon Interventions and Field Parcel Interventions. The "New non-permanent management in the farmed landscape which improves biodiversity" reporting item is the total area of polygons in the Polygon Interventions layer and Field Parcel Interventions layer with an intervention driver attribute-field set to "Restoration of semi-natural habitat". If a Line Intervention is given this driver, it cannot contribute to the area of "New non-permanent management in the farmed landscape which improves biodiversity" as line interventions are not given an area. However, it is still important to assign this driver if appropriate, to aid categorisation and analysis of interventions. If a Line Intervention (e.g. 'Install non-watercourse fencing') is undertaken as part of new management in the farmed landscape which improved biodiversity, then the area of land managed/improved should be captured separately as a Polygon or Field Parcel Intervention.
NFM	Natural Flood Management. Measures aimed at delaying water, reducing surface run-off, and increasing infiltration.	Yes, in the case of Polygon Interventions and Field Parcel Interventions. The "Area of landscape managed for NFM" reporting item is the total area of polygons in the Polygon Interventions layer and Field Parcel Interventions layer with an intervention driver attribute-field set to "NFM". If a Line Intervention is given this driver, it cannot contribute to the "Area of landscape managed for NFM" as Line Interventions are not given an area. However, it is still important to assign this driver if appropriate, to aid categorisation and analysis of interventions.
GHG emissions	Reduce GHG (greenhouse gas) emissions.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
Nitrogen	Reduce N pollution through reducing inputs (source), reducing nutrient loss (mobilisation), or capturing nutrients in transport.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.

Phosphorus	Reduce P pollution through reducing inputs (source), reducing nutrient loss (mobilisation), or capturing nutrients in transport.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
Pesticides	Reduce pesticide pollution or the potential harm of pesticides (e.g. pesticide swapping).	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
Dirty water	Reduce volumes of dirty water produced from farmyards and manure heaps and ensure safe storage.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
Soil/sediment	Reduce sediment pollution by reducing losses (mobilisation) or capturing sediment in transport.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
Pathogens/FIOs	Reduce FIO/pathogen pollution through reducing inputs (source), reducing nutrient loss (mobilisation), or capturing nutrients in transport.	No, there is not a specific monthly reporting item related to this driver. However, it is still important to assign this driver where appropriate, to aid categorisation and analysis of interventions.
<p>*</p> <p>Please note that these three drivers ('Creation of new permanent habitat', 'Restoration of semi-natural habitat' and 'New non-permanent management in the farmed landscape which improves biodiversity') are mutually exclusive. Each of these three drivers will correspond to a separate reporting item in the Reporting Download spreadsheet. So if a Polygon or Field Parcel intervention is assigned one of these drivers, its area will contribute to the corresponding reporting item (e.g. a polygon with the 'Creation of new permanent habitat' driver will contribute to the 'Area of new habitat' reporting item). A single intervention should not be assigned more than one of these drivers as this would lead to double-counting in the 'Areal Biodiversity' reporting items.</p>		

Appendix 4: Intervention Feature Types and drivers for reporting

Point Intervention Features

Intervention	Description/Explanation	GIS Layer (layer name on the Interventions tab)	Driver (to ensure feeds through into reporting) / Reporting item information where relevant
Construct bridges/watercourse crossings for livestock	<p>This intervention provides a dedicated bridge or crossing point for livestock and machinery. This reduces disturbance to the watercourse, preventing faecal contamination and sedimentation.</p> <p>Relevant CS code: RP3</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Installation of cross drains	<p>This item will provide a drain to intercept and conduct surface runoff away from farm tracks and yards. The drain will help reduce channelling of surface runoff and the risk of sediment and other pollution entering a watercourse.</p> <p>Relevant CS code: RP5</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Installation of piped culverts in ditches	<p>This watercourse crossing will provide access for farm machinery or livestock. This will reduce the disturbance to the watercourse which will help reduce sedimentation and bacterial levels in the water.</p> <p>If successful there will be:</p> <p>an adequate flow of water; runoff of expected flows diverted under a track so farm machinery and livestock can cross; farm machinery or livestock crossing tracks safely</p> <p>Relevant CS code: RP6</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers

Installation of livestock drinking troughs (in draining pens for freshly dipped sheep)	<p>This item will install new livestock drinking troughs in relocated sheep dip facilities. Pollution from sheep dips can cause damage to people and aquatic wildlife. Relocating sheep dips and pens can help reduce risk of diffuse water pollution.</p> <p>Relevant CS code: RP23</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Gateway relocation from high risk area	<p>This option is to move the gateway to a suitable location where it will not act as a pathway for water runoff. This will prevent polluted surface water from leaving fields through gateways and help to reduce risk of soil erosion and diffuse pollution.</p> <p>Relevant CS code: RP2</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Construct livestock drinkers/feeders with hard bases	<p>This item will provide hard bases where livestock can stand when drinking. This will reduce the risk of runoff and water pollution from mobilised sediments and organic manures.</p> <p>CS Code: LV3</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Installation of secure holding areas to keep dipped sheep away from watercourses	<p>This ensures freshly dipped sheep can be kept in secure areas or fields with no access to a watercourse to reduce risk of watercourses becoming polluted.</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers
Provision of alternative drinking water for livestock - e.g. troughs. Includes associated pipework and pumps.	<p>When cattle have been excluded from watercourses, this is the alternative drinking provided.</p> <p>This item will provide livestock with an alternative to drinking from watercourses and ponds. It will reduce bank erosion, sediment pollution and the faecal contamination of watercourses. It is not for replacing existing troughs.</p> <p>CS code: LV7</p>	Point Interventions	No drivers required - point interventions aren't assigned drivers

Installation of water gates	This item will prevent livestock from entering watercourse channels. It will also stop livestock from trampling waterside banks and will leave bankside vegetation lush and unbroken by livestock paths. FG15	Point Interventions	No drivers required - point interventions aren't assigned drivers
Installation of sheep dip drainage aprons and sumps	It will install a new sheep dip drainage apron and sump in new locations. Pollution from sheep dips can cause damage to people and aquatic wildlife. Relocating sheep dips and pens can help reduce risk of diffuse water pollution Relevant cs code: RP22	Point Interventions	No drivers required - point interventions aren't assigned drivers
Relocation of sheep dips to lower risk locations	CS code: RP20 This item will install replacement sheep dips in new locations. Pollution from sheep dips can cause damage to people and aquatic wildlife. Relocating sheep dips can help reduce the risk of diffuse water pollution.	Point Interventions	No drivers required - point interventions aren't assigned drivers
Resurfacing of gateways	This item will provide a strengthened surface at the field gateway. This will reduce ponding on either side of the gateways caused by soil compaction. If successful there will be reduced surface runoff, soil erosion and risk of diffuse water pollution. Relevant CS code: RP1	Point Interventions	No drivers required - point interventions aren't assigned drivers
In-stream NFM measures	Various features that aim to slow the movement of water in small natural streams and ditches. These features slow surface water, allowing sediment (and other pollutants) to settle out, improving water quality are reducing downstream flood risk. They can also help push lows onto the floodplain. e.g. Check dams, large and small leaky woody dams CS codes: RP12, RP32, RP33	Point Interventions	Point interventions aren't assigned drivers. However, this item automatically feeds into the 'Number of in-stream NFM measures delivered' reporting item.
Other - Custom intervention	Add in an explanation of the intervention delivered.		No drivers required - point interventions aren't assigned drivers

Line Intervention Features

Intervention	Description/Explanation	GIS Layer (layer name on the Interventions tab)	Driver (to ensure feeds through into reporting) / Reporting item information where relevant*
Ditch management	<p>This item is intended for ditch management that has benefits to biodiversity, water quality and/or flood management.</p> <p>This includes management of ditches that are managed as wet farmland features, permanently or seasonally flooded and which support a range of farmland wildlife, including plants, invertebrates, amphibians, reptiles, birds and mammals.</p> <p>Also applies to management of ditches essential for the management of habitats such as wet grassland, fen, reedbed and lowland raised bog.</p> <p>Relevant CS code: WT3.</p>	Line Interventions	This item feeds into the 'Ditch management' reporting item, regardless of which drivers are set.
Hedgerow management - non-riparian	<p>This item is for management of non-riparian hedgerows. It covers various management options including gapping up and laying. Management should increase the availability of blossom for invertebrates. By allowing fruit and berries to ripen it provides food for overwintering birds. It also improves the structure and longevity of hedgerows by promoting vigorous regrowth and a continuous length.</p> <p>If successful there will be: taller and wider hedges, with gaps forming less than 10% of the hedge length.</p> <p>Includes Stone-faced bank repair.</p> <p>Relevant CS codes: BE3, BN7, BN5, BN1, BN2.</p>	Line Interventions	This item feeds into the 'Length of hedgerows (riparian and non riparian)' reporting item, regardless of which drivers are set.

* For Line Interventions, the intervention drivers do not influence which reporting item(s) an intervention feeds into. However, relevant drivers should still be set.

Hedgerow management - riparian	<p>This item is for management of riparian hedgerows. It covers various management options including gapping up and laying. Management should increase the availability of blossom for invertebrates. By allowing fruit and berries to ripen it provides food for overwintering birds. It also improves the structure and longevity of hedgerows by promoting vigorous regrowth and a continuous length.</p> <p>If successful there will be: taller and wider hedges, with gaps forming less than 10% of the hedge length.</p> <p>Relevant CS codes: BE3, BN7, BN5</p>	Line Interventions	This item feeds into the 'Riparian hedgerows' and 'Length of hedgerows (riparian and non riparian)' reporting items, regardless of which drivers are set.
Establish new hedges - non-riparian	<p>This item is for establishing new non-riparian hedgerows. There will be new lengths of hedgerow planted with locally occurring native species. Can be used to replace former hedges, extend or link existing lengths of hedgerow or where creation will help reduce soil erosion and runoff.</p> <p>Relevant CS Code: BN11</p>	Line Interventions	This item feeds into the 'Length of hedgerows (riparian and non riparian)' reporting item, regardless of which drivers are set.
Establish new hedges - riparian	<p>This item is for establishing new riparian hedgerows. There will be new lengths of hedgerow planted with locally occurring native species. Can be used to replace former hedges, extend or link existing lengths of hedgerow or where creation will help reduce soil erosion and runoff.</p> <p>Relevant CS Code: BN12</p>	Line Interventions	This item feeds into the 'Riparian hedgerows' and 'Length of hedgerows (riparian and non riparian)' reporting items, regardless of which drivers are set.
Management of livestock and machinery hardcore tracks	<p>Relocating or resurfacing farm tracks can reduce soil compaction and erosion caused by livestock and machinery. They also help reduce channelling of surface runoff and the risk of sediment and other pollutants entering a watercourse.</p> <p>Relevant CS Code: RP4</p>	Line Interventions	This item feeds into the 'Farm tracks' reporting item, regardless of which drivers are set.

Install watercourse fencing	Trampling by livestock can erode river/stream banks and increase sediment inputs to watercourses. Preventing access eliminates this source of pollution. Keeping stock out of watercourses and off banks adjacent to watercourses also avoids direct contamination of water with soil and faeces.	Line Interventions	This item feeds into the 'Riverside Fencing' reporting item, regardless of which drivers are set.
Install non-watercourse fencing	Fencing to control livestock and protect environmental features or habitat. For example, post and wire, sheep netting, electric fencing etc. Relevant CS Codes: FG1, FG2, FG3	Line Interventions	Please select relevant drivers. However, this intervention will not feed into a monthly reporting item.
Stone wall restoration	There will be a rebuilt stone wall which will help to control livestock and conserve traditional landscapes. Relevant CS code: BN12	Line Interventions	Please select relevant drivers. However, this intervention will not feed into a monthly reporting item.
Establish in-field grass buffer strips	<p>Grass areas or strips will help to reduce the quantity of sediment, nutrients and pesticides transported through surface runoff water, both within fields and from field to field.</p> <p>A grass buffer strip may provide new habitat, protect existing landscape features, and improve water quality.</p> <p>Next to existing features, it will provide habitat for wildlife, and form links or corridors between other habitats.</p> <p>Relevant cs codes: SW1, SW3</p>	Line Interventions	This item feeds into the 'In-field grass buffer strips' reporting item, regardless of which drivers are set.
Establish riparian buffer strips	<p>It establishes a grass buffer to help reduce the risk of potential pollutants, such as sediment, pesticides and nutrients (mainly phosphate), being transported to watercourses in surface water runoff. It may also provide habitat for wildlife, and form links between other habitats.</p> <p>Relevant cs code: SW4</p>	Line Interventions	This item feeds into the 'Riparian buffers created' reporting item, regardless of which drivers are set.
Other - Custom intervention	Add in an explanation of the intervention delivered.		Please select relevant drivers.

Polygon Intervention Features

Intervention	Description/Explanation	GIS Layer (layer name on the Interventions tab)	Reporting Driver (to ensure feeds through into reporting)* / Reporting item information where relevant
Creation of beetle bank	There has been creation of a raised grass bank to provide nesting and foraging for insects, small mammals and birds. Relevant CS code: AB3	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Creation of wet/water holding features	This option includes various features designed to permanently or seasonally hold water for the benefit of invertebrates and/or wading birds (e.g. scrapes and gutters, foot-drains, ponds/pools) and/or managing run-off, sediment or water pollution (e.g. swales, sediment traps and ponds). Relevant CS codes (list may not be exhaustive): WN2, RP7, RP11	Polygon Interventions	Creation of new permanent habitat and/or NFM (could be appropriate depending on the intervention)
Management of in-field wet /water holding features	This option includes various features designed to seasonally hold water for the benefit of invertebrates and/or wading birds (e.g. scrapes and gutters, foot-drains, ponds/pools) and/or managing sediment or water pollution (e.g. swales, sediment traps and ponds). Relevant CS codes (list may not be exhaustive): WN5, WN6, WT4, WT5, WN7	Polygon Interventions	Restoration of semi-natural habitat and/or NFM (could be appropriate depending on the intervention)

* Only drivers that directly feed into monthly reporting items are listed. However, it is important that other drivers are also selected where relevant, to aid additional categorisation, analysis and reporting of interventions.

There are three habitat/biodiversity drivers that, in the case of Polygon and Field Parcel Interventions, feed into monthly reporting items:

If the "**Creation of new permanent habitat**" driver is set, the area of a Polygon or Field Parcel Intervention will feed into the "Area of new habitat" monthly reporting item.

If the "**Restoration of semi-natural habitat**" driver is set, the area of a Polygon or Field Parcel Intervention will feed into the "Area of habitat restored" reporting item.

If the "**New non-permanent management in the farmed landscape which improves biodiversity**" driver is set, then the area of a Polygon or Field Parcel Intervention will feed into the "New non-permanent management in the farmed landscape which improves biodiversity" reporting item.

There is one additional driver that, in the case of Polygon and Field Parcel Interventions, will feed into a monthly reporting item:

If the "**NFM**" driver is set, then the area of a Polygon or Field Parcel Intervention will feed into the "Area of landscape managed for NFM" monthly reporting item.

Creation of successional areas and scrub	<p>This option regenerates a succession of scrub. This enhances habitats for specific target species and improves the quality of the woodland edge.</p> <p>Relevant CS code: WD8</p>	Polygon Interventions	<p>Creation of new permanent habitat or</p> <p>New non-permanent management in the farmed landscape which improves biodiversity</p>
Management of successional areas and scrub	<p>This option provides enhanced habitat for a wide range of wildlife and improves the quality of the woodland edge. It also helps prevent soil erosion and holds back water to reduce downstream flood risks.</p> <p>Relevant CS code: WD7.</p>	Polygon Interventions	<p>Restoration of semi-natural habitat or</p> <p>New non-permanent management in the farmed landscape which improves biodiversity</p>
Establishment of legume and herb-rich swards	<p>This is creation of a vigorous, mixed sward with abundant grasses, legumes, herbs and wildflowers, suitable for productive cattle and sheep, which will also provide habitat and food for invertebrates, including crop pollinators, and improve soil structure and water infiltration.</p> <p>Relevant CS code: GS4</p>	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Management of moorland – re-wetting (e.g. ditch blocking drainage channels)	<p>This includes activities to maintain and restore moorland habitats and ecosystem function. Including actions to re-wet.</p> <p>Relevant CS code: UP3 (and UP5, Moorland rewetting)</p>	Polygon Interventions	Restoration of semi-natural habitat. NFM driver could be relevant.
Management of moorland vegetation	<p>This option is for when an appropriate programme of vegetation management has been implemented to contribute to restoration and improvement in the functionality of priority habitats such as dry heath, wet heath and blanket bog where significant changes to current management are required.</p> <p>Relevant CS code: UP3, UP4</p>	Polygon Interventions	Restoration of semi-natural habitat

Creation of fallow plots for lapwing and/or stone-curlew nesting	This option aims to provide sparsely vegetated/fallow plots as nesting sites for lapwing and other ground-nesting birds in large arable fields. Relevant CS code: AB5	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Plant areas of farm with wild bird seed / nectar flower mixtures	This option provides areas of flowering plants to boost essential food sources for beneficial pollinators and farmland birds, especially in autumn and winter. Relevant CS Codes: AB1, AB8, AB9	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Protection of in-field trees	This option aims to protect trees (including roots) from agricultural operations. Fallen trees will be left to provide habitats for invertebrates. Relevant CS Code: BE1	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Creation of new BAP habitat	This option is where there is an opportunity for habitat creation (or re-creation) of a specific priority habitat. Details of before and after habitat should be recorded.	Polygon Interventions	Creation of new permanent habitat
Creation of new habitat (non-BAP)	This option is where there is an opportunity for habitat creation (or re-creation) of a non-BAP habitat. Details of before and after habitat should be recorded.	Polygon Interventions	Creation of new permanent habitat
Enhancement of BAP habitat	This option is where there is an opportunity for enhancement of a BAP habitat. Habitat type should be recorded.	Polygon Interventions	Restoration of semi-natural habitat or New non-permanent management in the farmed landscape which improves biodiversity (for Field Margins only)
Enhancement of habitat (non-BAP)	This option is where there is an opportunity for enhancement of a non-BAP habitat. Habitat type should be recorded.	Polygon Interventions	Restoration of semi-natural habitat or New non-permanent management in the farmed landscape which improves biodiversity
Creation of new skylark plots	This option creates Skylark plots - bare patches in winter cereal fields designed to help skylarks to forage. Relevant CS code: AB4	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity

Tree planting	This option is for capital spend on individual tree planting, or restocking after tree health issues. (Woodland planting should be recorded as Creation of new habitat). Relevant CS code TE4.	Polygon Interventions	No biodiversity driver might be appropriate (e.g. just planting a couple of trees) or Restoration of semi-natural habitat N.B. 'Creation of new permanent habitat' driver not appropriate because woodland creation should be entered under a creation of new habitat intervention
Take field corners and small areas out of management	Field corners and other small areas can be taken out of management/production (on both arable and livestock farms) by either not managing or planting with grass which will create year round habitat and food for a range of wildlife. Relevant CS Code: GS1	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Create or maintain unharvested cereal headlands	This intervention creates conservation headlands/headlands of cereal crops which are sprayed selectively to allow populations of broad-leaved weeds and their insects to develop. Management involves avoiding the use of broad-leaved herbicides in the crop, and avoiding the use of insecticides. It will provide an important food source for farmland birds throughout the year and insects in the summer, and provides both grain and seeding arable plants in winter. Relevant CS code: AB10	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity

Seasonal exclusion of livestock from upland sites	<p>This intervention excludes livestock from upland sites (for at least 4 months) in order to improve habitat and feature conditions. This intervention should allow: increased rates of heather regeneration; improved rates of flowering of rare species such as spring gentian; a regeneration of scrub such as juniper;</p> <p>improved downstream water quality and improvements in the condition and visibility of archaeological sites and other historic features.</p> <p>Relevant CS code UP6</p>	Polygon Interventions	New non-permanent management in the farmed landscape which improves biodiversity
Establish tree shelter belts around livestock housing and/or slurry storage facilities	<p>For the purpose of recapture of ammonia emissions from animal housing units or slurry stores. Tree shelter belt will disrupt air flows around the building or slurry storage facility, reducing NH3 emission rates and will also directly re-capture a proportion of the emitted NH3.</p> <p>New or increased wooded habitat created (both broadleaved and conifers) would increase biodiversity.</p>	Polygon Interventions	Could potentially be assigned 'Creation of new permanent habitat'
New roofing	<p>This item will provide new roofing to reduce water pollution by preventing rainfall from getting into:</p> <p>sprayer washdown areas</p> <p>manure storage areas</p> <p>livestock gathering areas</p> <p>slurry and silage stores</p>	Polygon Interventions	This item feeds into the 'New roofs and concrete yards' reporting item, regardless of which drivers are set.

	Relevant CS code: RP28		
Yard works and rainwater goods	<p>These measures aim to improve or upgrades existing outdoor (uncovered) yards and yard drainage to reduce foul drainage volumes (by collection of water and keeping clean and dirty water separate), reduce runoff and risk of water pollution.</p> <p>Actions include: concrete yard renewal, yard inspection pits, rainwater goods, rainwater storage tanks, pipework/separation of clean and dirty water from farm yards and roofs/ inspection pit/chamber.</p> <p>Relevant CS codes: RP13, RP14, RP15, RP16, RP17, RP18, RP19</p>	Polygon Interventions	This item feeds into the 'New roofs and concrete yards' reporting item, regardless of which drivers are set.
Site solid manure heaps on concrete/impermeable base and collect the effluent	<p>If stored directly on the soil surface, leachate from solid manure heaps will seep into the soil and/or flow over the soil surface in response to rainfall events. Storing manure on an impermeable base prevents the seepage and accumulation of nutrients in the soil below the heap, which may subsequently be lost in surface runoff/drain flow or leaching to ground water. Also, storage on an impermeable (e.g. a concrete base) reduces soil compaction caused by farm machinery, during the forming and subsequent spreading of field heaps. The leachate collected can be spread at a later date when soil conditions are suitable and the nutrients can be utilised by crops, or the leachate may be added back to the heap or into a slurry store.</p>	Polygon Interventions	This item feeds into the 'New roofs and concrete yards' reporting item, regardless of which drivers are set.

Earth banks and soil bunds	<p>An earth bank or soil bund can be used to:</p> <ul style="list-style-type: none"> - slow the movement of water, protecting streams and rivers from pollutants - slow flows during high rainfall and reduce downstream flooding - control water levels to aid raised water levels for habitat creation and restoration <p>CS code: RP9</p>	Polygon Interventions	NFM
Making space for water	<p>This measure will help water flow in a winding course across floodplains, flooding temporarily to restore river and wetland habitats. This will also reduce the risk of high energy flows and soil erosion, and allow water to drain freely back into the river channel.</p> <p>If successful there will be:</p> <ul style="list-style-type: none"> - new areas of river and wetland habitats appearing, such as new channels, temporary ponds in old channels and wet grassland - gradual erosion and movement of the river bed and river banks - deposits of gravel, sand and silt appearing in the river channel and on the floodplain after a flood <p>CS code: SW12</p>	Polygon Interventions	NFM
Other - Custom intervention	Add in an explanation of the intervention delivered.		Please select relevant drivers.

Land Unit Point Intervention features

Intervention	Description/Explanation	GIS Layer (layer name on the Interventions tab)	Driver (to ensure feeds through into reporting)
Ensure irrigation/water supply equipment is maintained and leaks repaired	This advice measure aims to improve water use efficiency.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use efficient irrigation techniques (boom trickle, self-closing nozzles)	This advice aims to promote use of efficient and accurate irrigation techniques for water use efficiency.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Adoption of a nutrient management plan	This option is aimed at improving nutrient management planning to develop effective nutrient management ensuring application timings are appropriate and inputs are matched to crop demand thereby minimising use potentially saving costs to the farm and protecting the environment.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Analyse soil nutrient value	<p>This option advises regular soils analysis.</p> <p>Knowledge of soil properties is essential for setting site objectives, and provides a valuable baseline against which trends can be judged and problems diagnosed.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Avoid liming or fertilising marginal land	CSF recommendation to avoid liming or fertilising marginal land.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Avoid spreading manufactured fertiliser to fields at high-risk times (e.g. when risk of run-off is high)	<p>Fertiliser timing affects the mobilisation of nutrients released from land to water.</p> <p>Avoiding spreading to fields at high-risk times reduces the availability of nitrate for loss through leaching and of P for loss in surface run-off or rapid preferential flow.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Do not apply manufactured fertiliser to high-risk areas (e.g. high risk of run-off)	This recommendation advises consideration of high risk areas and suggests fertilisers are not applied if there is a high risk of run-off, taking account of the slope of the land, land drains, ground cover, proximity to surface water, weather conditions and soil type.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Do not apply P fertilisers to high P index soils	The amount of P lost via soil erosion or leaching depends on the soil P status. Losses in solution increase rapidly once soil P reserves reach elevated levels (e.g. ADAS Soil P index 4 or above). Losses can be minimised by maintaining soil P levels at Index 2 or by allowing the P content of high P index soils to run-down overtime.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Fertiliser spreader calibration (includes re-calibrate after testing)	Inaccurate fertiliser spreading (i.e. poor spread patterns) results in the under-application of fertiliser on some areas and over-application on other areas. Under-application of N fertiliser results in reduced yields and over-application can also result in reduced yields (through lodging) and increased NO3 leaching losses.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Incorporate a urease inhibitor into urea fertiliser	Urea and urea-based fertilisers are associated with much higher ammonia emissions than other types of nitrogen fertiliser. Urease inhibitors delay the conversion of urea to ammonium carbonate; this delay allows urea fertiliser to be solubilised and 'washed' into the soil and also reduces the pH rise around the urea fertiliser.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Integrate fertiliser and manure nutrient supply	Recommendation systems should be used to provide a robust estimate of the amount of nutrients supplied by organic manure applications. This information can then be used to determine the amount and timing of additional manufactured fertilisers needed by the crop. Fertiliser use statistics suggest that, in many cases, this will result in a reduction in fertiliser inputs (particularly on arable and maize crops) compared with current practice and a concomitant reduction in diffuse nutrient pollution.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Monitor grain nitrogen content and adapt nitrogen applications	To adapt N applications to specific requirements of the crops.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Reduce fertiliser application rates	Better planning and calculation of requirements can allow reductions in application rates.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Replace urea fertiliser with another nitrogen form (e.g. ammonium nitrate)	Urea and urea-based fertilisers are associated with higher NH ₃ emissions (typically around 20% of total N applied for urea and 10% for UAN) than other forms of manufactured fertiliser N.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use (manufactured) fertiliser placement technologies	<p>Placement of nutrients close to plant seeds and roots increases nutrient uptake efficiency.</p> <p>Fertiliser placement can be particularly useful in low P status soils to increase uptake efficiency and can also enable reductions in fertiliser application rates through improved nutrient recovery (without any impact on yield). Placement also reduces exposure of fertiliser at the soil surface, thereby reducing the potential for incidental losses in surface runoff from sloping ground.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use clover in place of fertiliser nitrogen	By using clover in a grass sward the need for additional manufactured N fertiliser is reduced.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use clover in place of grass	By using clover in a grass sward the need for additional manufactured N fertiliser is reduced.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Use nitrification inhibitors	This measure promotes the addition of nitrification inhibitors (NIs) to applied manufactured N fertilisers, organic manures and grazed pastures for the purpose of slowing the rate of conversion of NH ₄ to NO ₃ , so that NO ₃ is formed at a rate that is in better 'synchrony' with crop demand (i.e. slow release) and will thereby increase N use efficiency and reduce N ₂ O emissions and NO ₃ leaching.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use plants with improved nitrogen use efficiency	This measure aims to develop new plant varieties with improved genetic traits for the capture of soil N. Improving N use efficiency of plants could potentially: <ul style="list-style-type: none"> • Reduce fertiliser N additions to agriculture • Improve nutritional characteristics of new forage plant varieties (e.g. improved amino acid profile, reduced rumen protein degradation, improve fibre digestibility) • Improve N efficiency in agriculture 	LU Point	No drivers required - LU point interventions aren't assigned drivers
Very low nitrogen inputs to groundwaters	This will be used to reduce nutrient input to grassland in highly targeted locations to help slow or reverse nutrient levels in groundwater. This will be targeted to help specific designated sites and Water Framework Directive Protected Areas. CS code: SW13	LU Point	No drivers required - LU point interventions aren't assigned drivers
Adopt phase feeding of livestock	This measure aims to: <ul style="list-style-type: none"> • Manage livestock in smaller groups, divided on the basis of their individual feed requirements. • Feed groups separately with rations matched to the optimum N and P requirements of the animals within each group. This allows more precise matching of the ration to the individual animal's nutritional requirements. Nutrients are utilised more efficiently and less dietary N and P is excreted, thereby reducing the N and P content of manures, which reduces the amount of N and P at risk of loss.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Locate out-wintered stock away from watercourses	This will limit livestock poaching and damage to areas along watercourses and associated pollution.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Move feed and water troughs at regular intervals or install onto permanent hard standing	To avoid poaching of soils where animals gather to feed.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Outwintering of cattle on woodchip stand-off pads	For cattle, as an alternative to winter housing in a building, construct purpose-built woodchip pads (including an impermeable liner and drainage collection system), with a feeding area. NH ₃ emissions from urine deposition on to a woodchip stand-off pad are likely to be lower than from a concrete yard or a cattle house, because of rapid infiltration into the woodchip matrix.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Reduce dietary N and P intakes if too much being given now (includes; Dairy, Pigs, Poultry)	Avoiding excess N and P in the diet and/or making dietary N and P more available allows nutrient concentrations in the diet to be reduced, without adversely affecting animal performance. These methodologies reduce the amount of N and P excreted, either directly to fields or via handled manures, and thereby minimise additions as sources of diffuse pollution.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Reduce field stocking rates when soils are wet	Soils are most easily poached/compacted when they are 'wet'. Reducing livestock numbers or the duration of grazing when soils are 'wet' reduces poaching damage and the potential for mobilisation and transport of pollutants to watercourses.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Reduce overall stocking rates on livestock farms	Reducing the stocking rate reduces the amount of nutrients and FIOs in field deposited excreta and in handled manures at an individual farm level. Associated manufactured fertiliser inputs and poaching risks would also be reduced.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Reduce the length of the grazing day/grazing season	<p>Reduce the length of time livestock graze in the fields, either by keeping stock inside during the night or by shortening the length of the grazing season.</p> <p>Urine patches are a major source of NO₃ leaching and N₂O emissions to air. Reducing the time animals spend at grazing reduces the amount of urine deposited in fields.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Reduce upland grazing to sustainable levels to prevent erosion	Reducing stocking levels or changing timing can reduce impact on upland vegetation and reduce soil erosion. Especially where soils are already bare (due to fire, bracken control or forestry activities).	LU Point	No drivers required - LU point interventions aren't assigned drivers
Seasonal livestock removal (e.g. on grassland in SDAs next to streams, rivers and lakes)	<p>Livestock will be removed at particular times of the year from fields adjacent to a watercourse that are prone to waterlogging, compaction or poaching. This will help improve soil structure, reduce surface runoff and risk of diffuse pollution to the watercourse. Reducing surface runoff may help to reduce the risk of flooding.</p> <p>Relevant cs code: SW9</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use high sugar grasses	<p>In addition to dietary benefits, HSG's have been found to provide environmental benefits in the form of reduced environmental N losses.</p> <p>Improving protein utilisation in the rumen reduces nitrogen (N) losses in the urine. This in turn, reduces environmental impacts through the decrease in nitrous oxide emissions from converted volatile ammonia in urine.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Additional targeted straw bedding for cattle housing	Increasing targeted straw bedding use (in areas where most excreta is deposited) enhances the physical and microbiological emissions reduction properties of FYM.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Adopt batch storage of slurry (pathogen reduction)	FIOs die-off during storage. However, adding fresh slurry results in re-inoculation with viable microorganisms, so for effective reduction in FIO loads, slurry needs to be batch stored without fresh additions. As there are few microorganisms on the batch stored slurry (after 90 days), the risk of FIOs entering water bodies via surface runoff or drain flow losses (after slurry application) is greatly reduced.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Adopt batch storage of solid manure	FIOs die-off during storage; as a result there will be fewer microbial pathogens in the spread manure and lower loss risks in runoff. Also, the readily available N content of stored farmyard manure (FYM) is lower than in 'fresh' FYM, due to losses during storage, which will lessen the risk of NO ₃ leaching losses and NH ₃ emissions.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Allow cattle slurry stores to develop a natural crust	Retain a surface crust on stores, composed of fibre and bedding material present in cattle slurry, for as long as possible. In most cattle systems, it is possible to retain an intact crust for the majority of the year. The surface crust acts as a physical barrier between the NH ₄ -N in slurry and the free air above the crust, and thereby reduces NH ₃ emissions.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Analyse slurry and manure for nutrient content	<p>Livestock manure and slurry contain valuable nutrients. Good nutrient management makes the most of these resources, minimises application of mineral fertilisers and reduces nutrient losses. By realising the nutrient content of the manures and slurry on your farm, you can benefit from:</p> <ul style="list-style-type: none"> - cost savings due to decreased inputs of mineral fertilisers - improved crop yields and quality - reduced risk of watercourse pollution - improved soil fertility and structure - improved habitat and fishery quality. 	LU Point	No drivers required - LU point interventions aren't assigned drivers
Assess amount of dirty water returned to land, its nutrition value and volume	<p>Dirty water is a low dry matter effluent made up from water contaminated by manure, urine, effluent, milk, dairy washings or cleaning materials. Assessing volumes and nutrient value will avoid risk of such things as pollution caused by run-off and over will ensure applications are in line with crop requirements and avoid application of N and P.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Change from slurry to a solid manure handling system	<p>Change from a system where the manure from housed animals is collected as a liquid (i.e. slurry) to one where animals are kept on bedding (e.g. straw) to produce solid manure.</p> <p>Solid manures are more easily stored than slurries and present less risk of pollutant loss during and following land spreading. Straw use also encourages bacterial immobilisation of readily available nitrogen, resulting in a lower potential for NH₃ emissions during housing, storage and following land spreading</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Change from solid manure to slurry handling system	<p>Change from a system where the manure from housed animals is collected as a solid to one where animals are kept on a liquid (i.e. slurry) based system.</p> <p>Slurry-based systems have a greater risk of pollutant losses during and following land spreading. However, solid manures contain both aerobic (and anaerobic) micro-sites where $\text{NH}_4\text{-N}$ can be nitrified to $\text{NO}_3\text{-N}$, providing a source of NO_3 for N_2O emission (by denitrification). This can occur as the bedding material builds up in the animal house, and particularly once the bedding has been removed from the building for storage prior to land spreading. Slurry, on the other hand, is anaerobic (until the time it is spread onto land) and there is little or no N_2O emission from slurry-based buildings/stores.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Compost solid manure	The aim is to facilitate naturally occurring microflora to degrade cellulose and other carbon compounds in the manure to produce a friable, stable and spreadable material, with reduced volume. As part of the composting process, the manure is 'sanitised' and the readily available N content is reduced, thereby lowering the risks of FIO and NO_3 losses when the composted manure is spread to land.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Do not apply manure to high-risk areas (e.g. high risk of run-off)	<p>Do not apply manure to field areas where there is a high-risk of direct loss to watercourses. For example, directly adjacent to a watercourse.</p> <p>These areas have a high-risk of rapid transport of manure-borne pollutants to watercourses, so manure applications (particularly of slurry) should be avoided wherever possible.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Do not spread, farmyard manure, slurry or poultry manure to fields at high-risk times (e.g. when risk of run-off is high)	Slurries and poultry manures have 'high' readily available N contents (>30% of total N). Avoiding the application of these materials at times when surface runoff or rapid preferential flow to field drains is likely to occur reduces water pollution risks. Also, avoiding application in autumn/early winter will help to reduce over-winter NO ₃ leaching losses.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Frequent removal of slurry from beneath-slat storage in pig housing	NH ₃ emissions from slatted-floor pig housing occur from both manure deposited on slat surfaces and also slurry in the below slatted-floor storage area. Frequent removal of beneath-slat slurry will reduce NH ₃ emissions from pig housing.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Incorporate manure into the soil as soon as possible	The rapid soil incorporation of manure can reduce pollutant losses in runoff and also reduce the exposed surface area of manure from which NH ₃ emissions can occur.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Increase scraping frequency in dairy cow cubicle housing	More frequent removal of urine and faeces from the cubicle passage floor reduces the amount of time that NH ₃ emissions (from a given quantity of excreta) will occur, thereby reducing the overall potential for emissions.	LU Point	No drivers required - LU point interventions aren't assigned drivers
In-house poultry manure drying	Drying will inhibit the hydrolysis of uric acid N in the manure, slowing the formation of NH ₄ -N and thereby reducing NH ₃ emissions	LU Point	No drivers required - LU point interventions aren't assigned drivers
Install air-scrubbers or bio trickling filters in mechanically ventilated pig housing	This method removes NH ₃ from the exhaust air-stream, thereby reducing emissions to the wider environment.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Manure spreader calibration (includes re-calibrate after testing)	<p>The even application of manure ensures that all parts of the field receive similar amounts of total and crop available nutrients.</p> <p>The uneven spreading of manure can result in a variable supply of nutrients to the crop that is difficult to take into account as part of the farm nutrient management plan; so farmers tend to fertilise to meet crop nutrient needs on under-applied areas. Over application of N results in higher post-harvest soil mineral N levels and greater potential for NO₃ leaching losses over-winter. Runoff risks would also be reduced.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
More frequent manure removal from laying hen housing e.g. with manure belt systems	The method relies on the rapid removal of manure from the house prior to the peak rate of NH ₃ emission.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Ensure adequate capacity of farm slurry (manure) stores to improve timing of applications	The collection and storage of manure and slurry provides increased flexibility in land application timing. There will be fewer occasions when a lack of storage capacity forces application to occur when there is a high-risk of surface runoff and losses to water i.e. when soils are 'wet'.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Site solid manure heaps away from watercourses and field drains	An adequate separation distance between field heaps and watercourses reduces the risk that any leachate from a heap might run over the soil surface directly into a watercourse. Similarly, siting solid manure heaps away from field drains reduces the risk of preferential flow of leachate through the soil that could transport nutrients, FIOs and oxygen depleting pollution to watercourses. There can be an increased risk of surface runoff from the area immediately surrounding a field heap, because of damage to soil structure caused by farm machinery when loading/unloading manure.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Transport manure to neighbouring farms	Nutrients are removed and exported to neighbouring farmland. This reduces the nutrient load on the farm and thereby reduces the risk of diffuse pollution from that farm. The export of manure should also enable the remaining manure to be managed in a more integrated way i.e. there will be less pressure to spread manures during high-risk periods and to better time applications in relation to crop demand.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use anaerobic digestion of livestock manures	CH ₄ generated from livestock manures during (mesophilic) anaerobic digestion can be used to produce heat and power, and to replace fossil fuel use. Also, CH ₄ emissions during subsequent manure storage prior to land spreading will be reduced	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use dry-cleaning techniques to remove solid waste from yards prior to cleaning	Dry-cleaning techniques, such as scrapers, squeegees and brushes, can be used to remove solid waste from yards and pens before they are cleaned with water. This will reduce the amount of water used, as well as the quantity of dirty water requiring treatment, storage and disposal.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use liquid/solid manure separation techniques	Separating the suspended solids from slurry means that the two manure streams can be handled separately. The solid fraction can be stored on a concrete pad or in a field heap, while the liquid fraction can be stored and transported/pumped to fields for land application. Separation enables greater flexibility in manure management and application timing.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use manure additives (e.g. alum)	Use of additives in manure for environmental benefit (e.g. to reduce emission of gases such as ammonia).	LU Point	No drivers required - LU point interventions aren't assigned drivers

Use poultry litter additives	Poultry litter contains 'high' concentrations of P and readily available (uric-acid and ammonium) N. Research has shown that P concentrations in surface runoff are closely related to the soluble P content of the manure. Alum additions to poultry litter precipitate P into a form that is not water-soluble. Also, Alum additions reduce NH ₃ emissions from poultry litter which can result in heavier birds, better feed conversion efficiency and lower mortality.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use slurry band spreading application techniques	NH ₃ volatilisation occurs from the surface of the applied slurry. Reducing the overall surface area of slurry, by application in narrow bands, will lead to a reduction in NH ₃ emissions (provided that slurry infiltration into the soil is not delayed by the increased hydraulic loading rate on the slurry bands compared with broadcast spreading). In addition, if slurry is placed beneath the crop canopy, the canopy will also provide a physical barrier to reduce the rate of NH ₃ loss.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use slurry injection application techniques	NH ₃ volatilisation occurs from the surface of applied slurry. Reducing (for open slot shallow injection) or eliminating (for closed slot deep injection) the surface area of applied slurry reduces NH ₃ emissions.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Washing down of dairy cow collecting yards	Urine deposited on collecting yard surfaces is a major source of NH ₃ emissions. Reducing the quantity of urine on the yard surface and the time it remains there will reduce NH ₃ emissions.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Adopt and follow a comprehensive integrated pest management plan (IPM).	IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Employ methods to ensure no pesticide spills	Methods for avoiding any pesticide spill (concentrate or tank mix) - including tank overfilling. Use portable bund or drip tray to place underneath hopper to catch spillages. Do not wash any spill into drains - Use absorbent spill kits/provide bucket of sand for use	LU Point	No drivers required - LU point interventions aren't assigned drivers
Avoid plunge dipping of sheep - use only 'pour-ons' and 'injectables' for external sheep parasites.	Consider alternative treatment methods such as pour-on or injectable products instead of lunge dips as it is easier to minimise exposure of people and protect the environment.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Avoid PPP application at high risk timings (e.g. immediately prior to significant rain, windy and frosty conditions)	Avoiding the application of these materials at times when surface runoff or rapid preferential flow to field drains is likely to occur reduces water pollution risks.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Effective treatment of PPP washings through disposal, activated carbon or biobeds / biofilters (or other technology)	Pesticide contaminated water produced during sprayer cleaning can cause pollution problems. Bioremediation options such as biobeds/biofilters provide controlled areas for these liquids to enter a biomix where any pesticides within the waste liquid can lock onto organic matter. Bacteria within the biomix then slowly work to break down the pesticide residues.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Ensure safe and appropriate on-farm storage and disposal of pesticide products	Preventing accidents/ leaks/ fire (HSE AIS 16).	LU Point	No drivers required - LU point interventions aren't assigned drivers

In-field preparation and calibration of applicator/sprayer	<p>PPPs can enter surface water bodies through different routes. Most important are the losses of PPPs from point sources (originating from the farmyard) and diffuse sources (originating from treated fields, e.g. surface runoff/soil erosion, drainage and spray drift).</p> <p>Filling and cleaning in the field to be treated can reduce the risk of spills in the yard, or whilst travelling to the field and avoids contaminated mud being carried out of fields on to roads. However locations should be alternated and keep a distance of at least 10m from a watercourse.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Leave residual levels of non-aggressive weeds in crops	Residual weed populations in crops provide food for farmland birds, mammals and invertebrates. This also reduces levels of pesticide and herbicide use.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Spray headland last to avoid driving on treated area.	Spraying headlands last helps to avoid driving over sprayed areas and picking up mud and pesticides on tyres, reducing the risk of pollution.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Store sprayers and pellet applicators under cover to prevent wash off losses with rain.	Storing sprayers and applicators under cover whilst not in use will reduce any risk of wash off by rain and protect watercourses.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Substitution of one pesticide for an alternative(s) with beneficial properties (e.g. lower use rate/ no detections in water/ easier drinking water removal).	Use of alternative pesticides (e.g. ones whose physio-chemical properties make it less mobile in soil) is a useful method of mitigating risk of pesticides to surface waters.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use high quality best practice 'in field' sprayer/pellet operations. E.g. avoid all watercourses	Follow best practice for applications including consideration of application variables such as height and speed of sprayer, sprayer calibration, filling and timing off application and keep away from water courses.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Provide high quality training for spray operators.	<p>Pesticides are hazardous and must be handled responsibly and with care. Operators should be aiming to maximise the benefit whilst minimising the risk to themselves, bystanders and the environment. To make sure this happens, pesticide legislation in the UK regulates not just the products themselves but also the people who handle and use them.</p> <p>All pesticide users must be adequately trained, no matter what their age. The training should give them the same skills needed to obtain a Certificate of Competence.</p> <p>All contractors who apply professional pesticides must hold a certificate of competence.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use improved PPP application technology	<p>The adoption of new methods and application technologies can have many benefits. Such improvements as more accurate and consistent application of chemicals (using variable rate sprayers or spot spraying for example) makes application of PPP more targeted and reduces the risk of over-/under-dosing over blanket spraying methods and reduces overlaps. This provides cost efficiencies and a reduction in pesticide use - getting the same affect with less pesticide.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use professional spray contractors	<p>Use professional spray contractors registered with an appropriate trade body to apply pesticides using best or ideal practice (e.g. NROSO). Specify a contractor who recognises and acts on pesticides in water advice.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Adopt soil management plan	<p>Managing soils according to a carefully considered and updated plan can help to reduce the risk of compaction and erosion, optimise the yields and quality of crops and pasture, as well as reducing the risk of damaging the environment.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Adopt reduced cultivation systems where soils are suitable	Reduced/no-till cultivations (rather than ploughing) can retain soil surface organic matter and preserve good soil structure, with the resulting soil conditions improving water infiltration rates and thereby reducing soil erosion risks and associated loss risks of particulate P and sediment.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Allow field drainage systems to deteriorate where being allowed to cease drainage	Drainage systems can accelerate the delivery of pollutants from land to a watercourse, by acting as a preferential (by-pass) flow route. Allowing drainage systems to deteriorate therefore reduces hydrological connectivity and the potential transfer of pollutants to watercourses, although surface runoff would be increased.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Avoid high risk crops on fields at high risk of erosion	This is primarily to manage soil erosion. For example, switching from late sown autumn to spring sown crops on higher risk sites, the likelihood of erosion can be reduced significantly.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Check for and deal with capping and sub-surface compaction	This will identify problems and allow them to be dealt with and chose appropriate actions for future use. Good soil structure is important as it affects such things as run-off and erosion and nutrient loss.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Cultivate and drill across the slope (where it is safe to do so)	On fields with simple slope patterns, cultivating and drilling across the slope will reduce the risk of surface runoff being initiated and increase re-deposition rates where surface runoff does occur. The ridges created across the slope increase down-slope surface roughness and provide a barrier to surface runoff. As a result, particulate P and associated sediment losses will be reduced.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Ensure properly managed heather/grass burns (cf: Defra code of good practice) to prevent damage to soil	Follow guidance and consider avoiding sensitive areas such as woodland edges, peatlands, areas where the soil is very thin or there is already soil erosion, steep hillsides and areas near watercourses. Aim to conduct "quick, cool burns" as these pose less risk of damage to the moss or litter layer and exposure of base soil.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Purchase of equipment to disrupt tramlines in arable areas	<p>This option is for the purchase of equipment that can loosen soil that has compacted in wheeled tramlines. E.g. Spiked or rotary harrow or tine device.</p> <p>CS: RP31</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Harvest high risk fields (or medium risk fields with high risk crops) early in autumn and introduce cover crop	<p>Earlier harvesting of crops, especially those that are traditionally harvested late, would enable harvesting to be undertaken when soil conditions were drier, reducing (severe) compaction and soil structural damage risks, and associated sediment and nutrient losses in surface runoff.</p> <p>Introducing a cover crop would enable the crop to take up (some) N before the onset of over-winter drainage and provide good vegetation cover over the winter months to protect the soil from rainfall induced surface runoff and associated erosion.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Introduce grass leys into arable rotations	<p>A herbal ley is a diverse sward that includes different grasses and species, with varying rooting depths, properties and drought tolerances.</p> <p>They have a positive effect on soil health, structure and drainage and usually include nitrogen-fixing legumes, which are high in protein and tannins, and have huge potential for carbon sequestration.</p> <p>Herbal leys also provide a very rich mineral feed for livestock</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Leave autumn seedbeds rough	<p>Leaving the autumn seedbed rough encourages surface water infiltration and reduces the risk of surface runoff, thereby reducing particulate P and associated sediment loss risks.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Maintain and enhance soil organic matter	Maintaining and enhancing soil organic matter levels helps to reduce the risks of surface runoff and erosion, enables improved water retention and the efficient use of soil and added nutrients. The long-term benefits of improved soil structure etc. should be effective in reducing particulate P and associated sediment losses.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Manage (avoid if possible) tramlines over winter. If run-off occurs break up any compaction.	Tramlines are generally established in autumn sown combinable crops at the time of drilling; they can result in the channelling of surface water and the development of rills and gullies on sloping erosion susceptible soils. Tramline management to improve water infiltration rates can help to reduce accelerated runoff and the loss of particulate P/sediment.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Monitor and amend soil pH status for grassland	The ideal soil pH for grass and clover is pH 6.0-6.5. pH levels above or below this cause expensive production losses. They affect nutrient availability which can lead to nutrients reaching the watercourse, affecting water quality and causing environmental damage. Liming is considered expensive and so rarely done. Instead, more nitrogen and other nutrients are applied to achieve the same output. This creates an inefficient system where too much fertiliser is applied and the vast majority is lost.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Plan bracken management to avoid soil erosion	Consider methods of bracken control that are appropriate for the location e.g. slope of site and pick those that will not risk erosion, especially if surface will be left exposed.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Plough in crop residues/green manure as a soil conditioner	This method can have many benefits including short- and long-term benefits for nitrogen management, prevention of nitrogen leaching, improving soil structure and increasing soil organic matter.	LU Point	No drivers required - LU point interventions aren't assigned drivers

Retain (and enhance) over-winter stubble	<p>It provides a winter food source for seed-eating birds, which feed on spilt grain and the seeds of broad-leaved weeds. It also provides spring and summer foraging and nesting habitat for other farmland birds and undisturbed habitat for other farmland wildlife including many pollinators and brown hare.</p> <p>If successful there will be:</p> <ul style="list-style-type: none"> - naturally occurring arable plants providing seed and forage over the winter, spring and summer - farmland birds and brown hare foraging on the seed shed during harvest - farmland birds and pollinating insects using the winter stubble and spring fallow area - only low populations of blackgrass plants in the late spring that need targeted spraying <p>Relevant cs codes: AB2, AB6</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers
Use correctly-inflated low ground pressure tyres on machinery to minimise compaction	<p>Traffic from farm machinery is one of the main causes of compaction, which occurs whenever the ground pressure on the soil is greater than its ability to resist.</p> <p>Using correctly inflated, low ground pressure tyres will avoid compressing soil particles together too tightly which reduces the space between them, restricting the movement of water, nutrients, roots and earthworms as well as excluding the air vital for healthy soil micro-flora and fauna.</p> <p>Reducing the pressure works by extending the tyre contact patch and the number of lugs in contact with the ground, it reduces the depth to which pressure extends, improves traction and reduces both fuel consumption and working time.</p>	LU Point	No drivers required - LU point interventions aren't assigned drivers

Avoid irrigating at high risk times	Irrigating at high risk times can increase risk of run-off and erosion and associated loss of soil and nutrients.	LU Point	No drivers required - LU point interventions aren't assigned drivers
Other - Custom intervention	Add in an explanation of the intervention delivered.		No drivers required - LU point interventions aren't assigned drivers

Field Parcel Intervention Features

Intervention	Description/Explanation	GIS Layer (layer name on the Interventions tab)	Reporting Driver (to ensure feeds through into reporting) *	Code used to represent this intervention in attribute table on AGOL - automatically populated by completing Survey123 Field Parcels Intervention form
Management of rough grazing for birds	This option is specifically for restoring or maintaining upland bird populations. The option brings about water level management and provides the appropriate grassland habitat and sward structure for feeding and nesting. Relevant CS code: UP2	Field Parcel Interventions	New non-permanent management in the farmed landscape or Restoration of semi-natural habitat	Mng_Rgrazing_birds
Management of permanent grassland with very low inputs	This option is where permanent grassland is managed with very low fertiliser inputs to provide higher value areas for wildlife. Relevant CS codes: GS2, GS5	Field Parcel Interventions	New non-permanent management in the farmed landscape or Restoration of semi-natural habitat	Mng_Pgrass_Vlow
Establishment of two year sown legume fallow	Established by the sowing of a seed mixture to provide pollen for insects and habitat for a wide range of farmland wildlife. Relevant CS code AB15	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	2yr_SL_fallow

* Only drivers that directly feed into monthly reporting items are listed. However, it is important that other drivers are also selected where relevant, to aid additional categorisation, analysis and reporting of interventions.

There are three habitat/biodiversity drivers that, in the case of Polygon and Field Parcel Interventions, feed into monthly reporting items:

If the "**Creation of new permanent habitat**" driver is set, the area of a Polygon or Field Parcel Intervention will feed into the "Area of new habitat" monthly reporting item.

If the "**Restoration of semi-natural habitat**" driver is set, the area of a Polygon or Field Parcel Intervention will feed into the "Area of habitat restored" reporting item.

If the "**New non-permanent management in the farmed landscape which improves biodiversity**" driver is set, then the area of a Polygon or Field Parcel Intervention will feed into the "New non-permanent management in the farmed landscape which improves biodiversity" reporting item.

There is one additional driver that, in the case of Polygon and Field Parcel Interventions, will feed into a monthly reporting item:

If the "**NFM**" driver is set, then the area of a Polygon or Field Parcel Intervention will feed into the "Area of landscape managed for NFM" monthly reporting item.

Create or maintain uncropped cultivated margins	This intervention creates areas rich in annual plants which provide habitat for ground-nesting birds and insects and foraging sites for mammals within plots or strips that are cultivated but left undrilled/uncropped. Relevant CS code: AB11	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	Uncrp_margins
Undersown spring cereals	This interventions provides the addition of a low growing grass/legume mix as an understorey to the cereal crop which will help to suppress weeds and build soil fertility and therefore reduce the need for agrochemical inputs. This intervention will also increase the diversity of habitat provided in the field and benefit farm wildlife. Relevant CS code: OP5	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	Undersown_SprC
Nil fertiliser inputs	Implementation of this advice helps to reduce the risk of nitrate loss to ground and surface water by reducing nutrient inputs to zero. Relevant CS Code: SW14	Field Parcel Interventions	Could potentially be assigned 'New non-permanent management in the farmed landscape which improves biodiversity'	Nil_fert_inputs
Arable reversion to grassland with low fertiliser input	A dense grass sward in arable fields at risk of soil erosion or surface runoff will stabilise the soil, reduce nutrient losses, and buffer sensitive habitats, such as designated aquatic habitats. It will also reduce surface runoff, which may help to reduce the risk of flooding. Relevant cs code: SW7	Field Parcel Interventions	Creation of new permanent habitat or New non-permanent management in the farmed landscape which improves biodiversity	Arable_reversn
Cultivate land for crops in spring rather than autumn	Autumn cultivation of land stimulates the mineralisation of N from organic matter reserves at a time when there is little N uptake by the crop, which will increase the potential for over-winter NO3 leaching losses. By cultivating in spring, there will be less opportunity for mineralised N to be leached and the N will be available for uptake by the established spring crops, and there will be less risk of particulate P losses in surface runoff.	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	Spring_crops

Enhanced management of maize crops	It reduces the risk of soil erosion and surface runoff in fields where maize is grown. It will slow runoff water before it builds to a damaging flow, and remove sediment, organic material, nutrients and chemicals carried in the water. CS code: SW5	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	Enh_mng_maize
Establish cover crops in the autumn	Without a cover crop, NO ₃ can be lost through over-winter leaching and particulate P can be lost through sediment transport in surface runoff. To be effective in reducing NO ₃ leaching, the crop needs to take up N before the onset of winter drainage, but thereafter the date of destruction is less critical. To be effective in reducing particulate P and sediment losses the crop does not have to be alive (i.e. straw and crop residues can be effective), but the soil must be protected throughout the period when surface runoff can occur.	Field Parcel Interventions	New non-permanent management in the farmed landscape which improves biodiversity	Aut_cover_crops
Soil aeration	Soil aeration increases the porosity and permeability of a soil to allow more air to reach roots, improving root development and alleviating soil compaction. With this method infiltration and drainage will be improved, reducing surface run off volumes and slurry and fertilizer runoff.	Field Parcel Interventions	NFM	Soil_aeration
Reducing stocking density and fertiliser inputs on intensive grassland adjacent to a watercourse	Reducing stocking density and fertiliser inputs on improved grassland will help reduce soil compaction, surface run-off and risk of diffuse pollution to the watercourse. Reducing surface runoff may help to reduce the risk of flooding. The option may also reduce the risk of nitrate loss to ground and surface water if it is used with SW14 - Nil fertiliser supplement. Relevant CS code: SW8	Field Parcel Interventions	Please select relevant drivers.	IntGrass_watercrse

Management of invasive non-native species (INNS)	<p>Active management and eradication of invasive non-native species such as:</p> <ul style="list-style-type: none"> - Himalayan balsam - Japanese knotweed - Floating pennywort and other invasive aquatic plants <p>Active management will maintain or restore wildlife value or protect archaeological features. If successful there should be a reduction in cover and density of non-native invasive species. Native plants and animals will re-establish the area cleared, returning a more natural balance to the habitat.</p>	Field Parcel Interventions	Restoration of semi-natural habitat	Mng_INNS
Other - Custom intervention	Add in an explanation of the intervention delivered.		Please select relevant drivers.	Other