Farmplan gatekeeper

Nutrient management planning

Using the nutrient management centre in Gatekeeper – Scotland

Proagrica

v.4.15 (CB4.02)

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Nutrient management in Gatekeeper

Before you begin…

Please ensure before proceeding to create a nutrient management plan that you are happy to accept the following statement:

At all times, the responsibility to ensure a nutrient management plan is calculated correctly lies with the user. Whilst every effort has been made to ensure the nutrient management module is accurate and current, Farmplan does not guarantee this will be the case. Nutrient management plans should always be reviewed by a suitably qualified person before being utilised.

Principles of nutrient management planning

The nutrient management centre has been designed to enable Gatekeeper users to create nutrient management plans in accordance with the appropriate guidelines for their location.
In order to calculate the figures required, the nutrient management centre refers to information that has been entered about a field, including:

- Holding details – used to store yield region and rainfall settings.
- Product details – used to store the nutritional content of products.
- Cropping details – used for previous cropping information.
- Field details – used to set NVZ regions and soil types.
- Cropping record detail – used to enter additional information needed.

It then uses the ruleset specified by the user to create the nutrient management plan figures.

Rulesets available

There are multiple rulesets available within the program for calculating nutrient management plan figures with. However, only one ruleset is suitable for calculating nutrient management plans for Scottish farms.

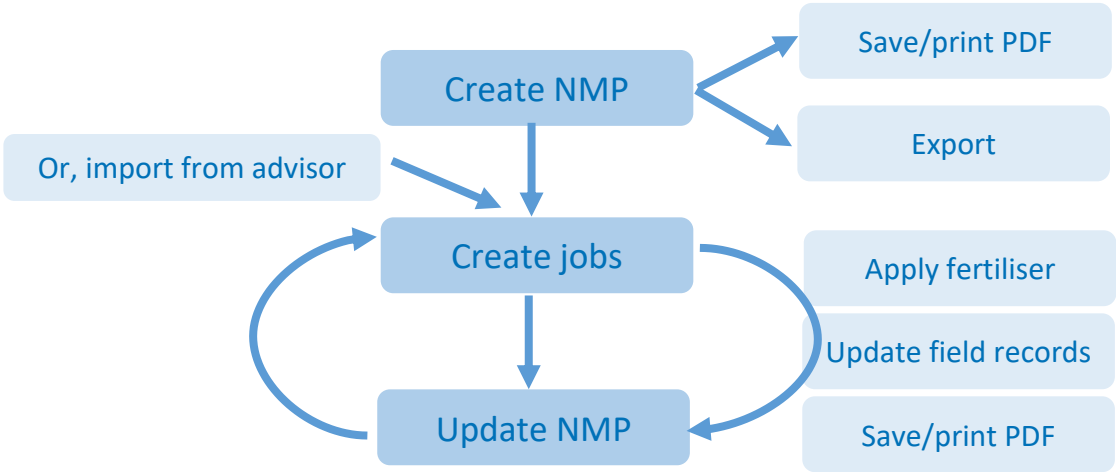
Selecting the appropriate ruleset is essential to ensure the calculations provided are suitable to your requirements, so please ensure you select the option 'RB209 (v8) Scotland Rules' at any point in the program where you are given the opportunity to select a ruleset.

The process of creating a nutrient management plan

The nutrient management centre is built on the expectation that the standard way of using the module would be as follows:

1. Create a nutrient management plan (NMP)
   This is done at the beginning of year, before any applications are made. Nutrient requirements are calculated for each field individually.
2. Create an application plan
   With the nutrient requirements identified, it is possible to create a plan of applications.
3. Update the NMP
   During the year, the NMP is updated with applications made, checking total nutrients applied against the calculated requirements. With updated totals, the next set of applications can be planned and carried out.

The process isn't entirely linear though, and it is expected that during a season a user might need to return to the nutrient management centre a number of times:



In order to create an NMP, a certain amount of field information must be available in Gatekeeper. Therefore, this guide will first look at ensuring all this information is correctly entered, before proceeding to creating the NMP itself.

Once an NMP has been created, it can be used to plan applications and create application jobs quickly and efficiently. This is a benefit for users as it enables the effort put in to create an NMP to be utilised in creating jobs more quickly.

After field applications have been confirmed, the NMP can be updated to show remaining nutrient requirements.

If your agronomist also uses Gatekeeper, it is possible to import an NMP from them into your Gatekeeper – see Publishing nutrient management plans.

Entering essential information

Because the nutrient management centre references field and operations records, there are certain sets of information which must be entered correctly for the NMP to be calculated successfully.

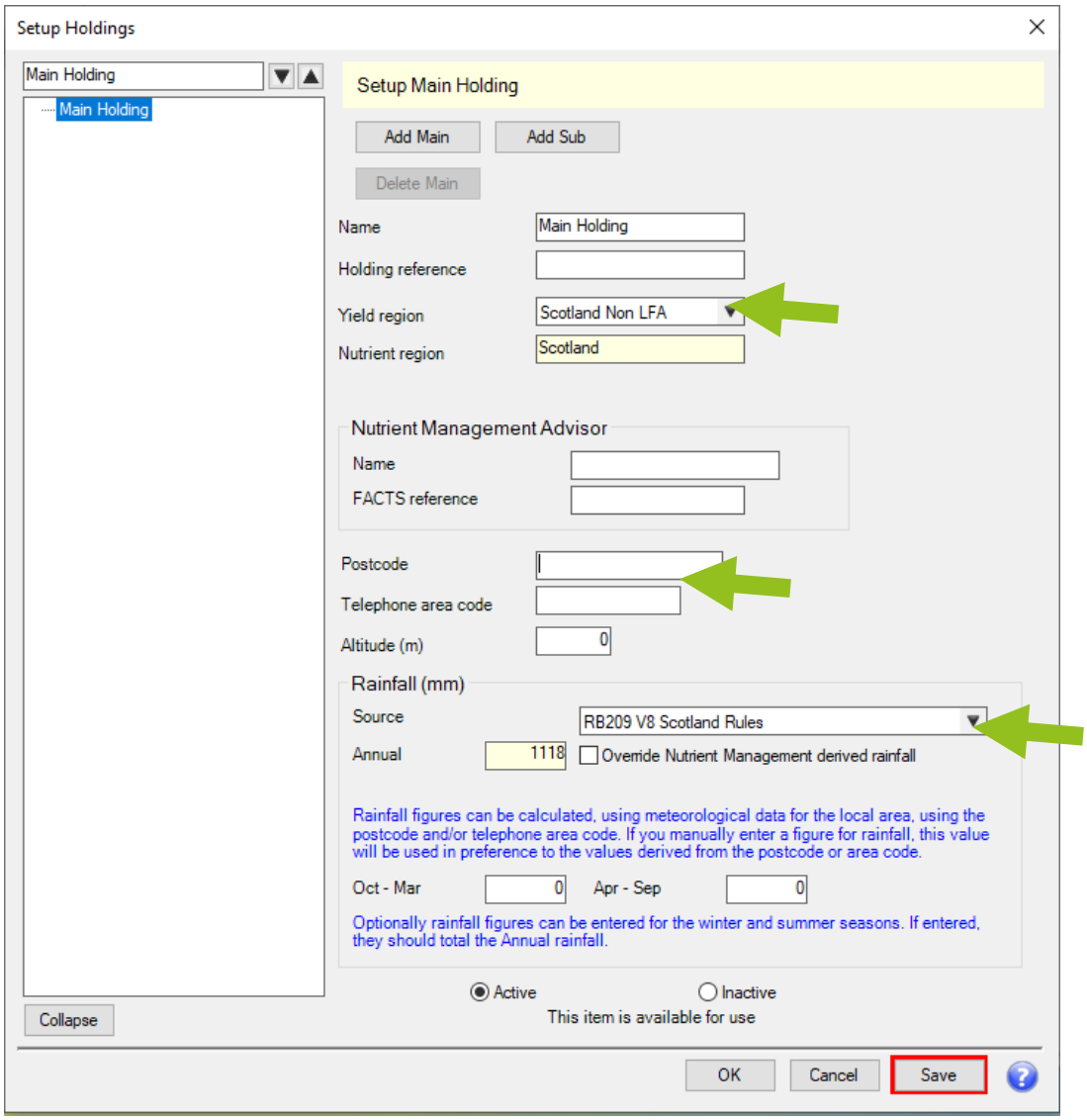
The following information must be entered in the following locations for an NMP to be created:

Location	Information required	Refer to section
Setup > Holdings	Yield Region Postcode Annual rainfall figure	Holding details
Setup > Products (Business)	For manufactured fertilisers: nutrient contents For organic manures: manure type, total nutrient contents.	Product details
Previous field records	At least one year's previous cropping information. Cover crops, double crops, and failed first crops must be recorded as a crop sequence with an appropriate harvest.	Cropping details
Field details screen	NVZ region Soil type details	Field details
Cropping record, cropping tab	Straw management (removed or incorporated)	Cropping record details
Cropping record, nutrient management tab	Target yield Crop specific additional information Previous grass history Application of straw mulch or paper crumble	Cropping record details
Grass fields only: cropping record, grass periods tab	Grass period information	Cropping record details
Field records, sampling tab	Soil sample information	Soil sampling information
Field records, operations tab	Field operation records Organic manure application conditions	Field operation records

Holding details

The holding details screen is accessed through *Setup* > *Holdings,* and the following information should be added:

1. Select a Scottish yield region from the dropdown selector
2. You may wish to enter the name and FACTS reference of your advisor (or your own details) if you want these to be displayed on any NMP reports.
3. Enter a postcode or telephone area code.
4. If the average altitude of your farm is over 300m, enter it in the 'Altitude' box
5. Ensure the source shown in 'Rainfall' is selected to 'RB209 v8 Scotland Rules' (this should happen automatically). The annual rainfall for your area will then be calculated based on information entered in step 3. If you wish, you can override the automatically calculated rainfall figure by ticking 'Override Nutrient Management derived' rainfall, and enter your own figure.
6. Optional: if required, enter your annual rainfall split into winter and summer periods. If this option is used, the two numbers must add up to the total annual rainfall of step 5.



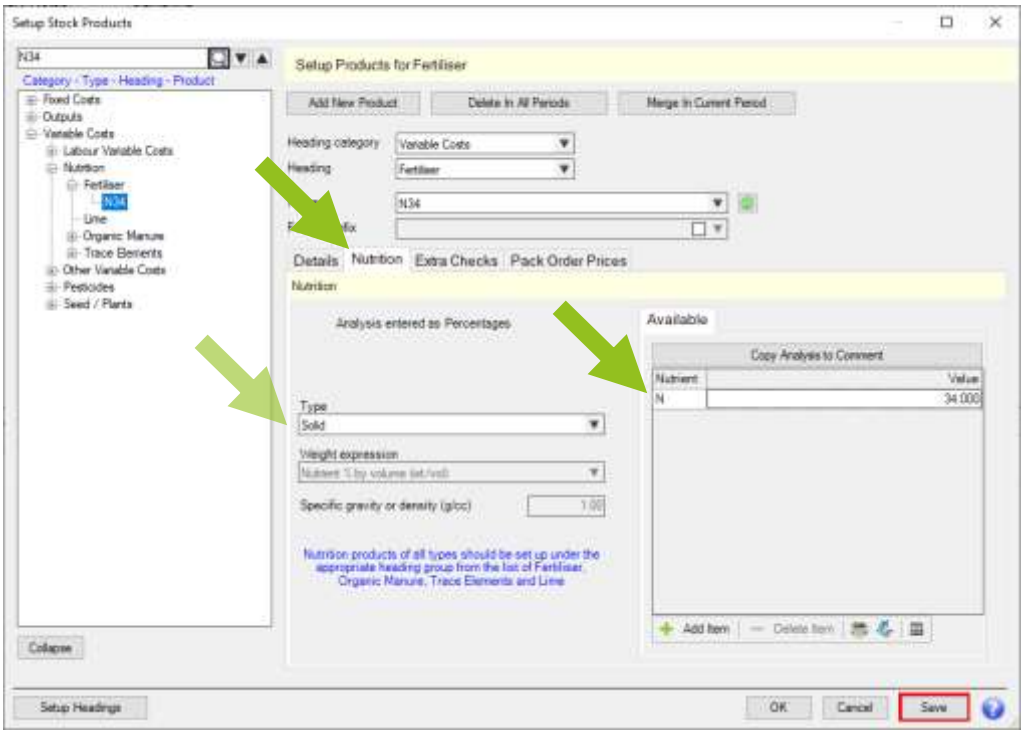
Product details

Any product with a nutrient value (fertilisers, farmyard manures, slurries and digestates, etc) must have this information allocated to the product. This information is stored on the 'Nutrition' tab of a product's setup. This enables Gatekeeper to work out the rates of nutrient applied from rates of product recorded.

The product details screen is accessed through *Setup > Products (Business)*, but users with site or organisation catalogues should refer to the section Editing products for catalogue users before proceeding.

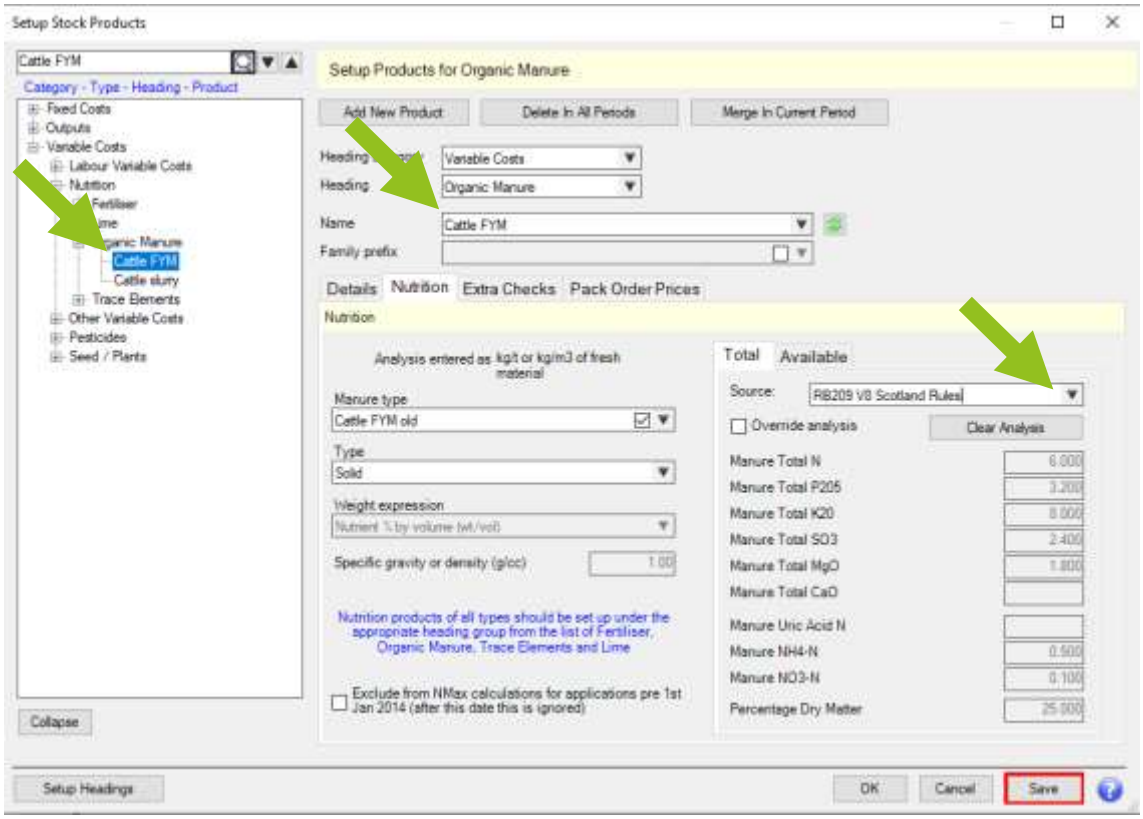
The following steps will show how to add nutrient details to a fertiliser product. Please be aware that UK fertiliser declarations are made in terms of the nutrient oxide – for example, K_2O not elemental K. This means that for users in the UK, MOP should be setup with K_2O at 60%, rather than K (elemental).

Adding nutrient information to a fertiliser product



1. Select the product from the list on the left hand side
2. Select the 'Nutrition' tab
3. For liquid fertilisers only:
    a. Select type 'Liquid'
    b. Select appropriate weight expression (w/w or w/v)
    c. For w/w fertilisers, enter the specific gravity
4. For all fertilisers, to add nutrient information:
    a. Click 'Add Item'
    b. Select the nutrient from the dropdown list
    c. Enter the nutrient value on the right hand side
    d. Repeat as required for each nutrient in the product.

Adding nutrient information to an organic manure



1. Select the product from the list on the left hand side
2. Select the 'Nutrition' tab
3. Select a manure type from the dropdown list:
    a. Tick the box to activate the dropdown
    b. Select the best fit manure type
4. Select the ruleset 'RB209 v8 Scotland Rules' to source organic manure information from. The 'Manure total' boxes will be populated as appropriate.

If you have your own manure analysis figures and wish to enter these against the product, an appropriate manure type must still be selected from the 'Manure type' dropdown. Place a tick in the 'Override analysis' box, and enter your own figures as required.

Editing products for catalogue users

If you are using the site or organisation catalogue functions in Gatekeeper, it is particularly important to be sure that nutrition products are setup correctly before they are used in any of your businesses. The first time you use a catalogue product inside a business, the product is automatically added to that businesses individual product list, and this is the product which is then used in the field records.

Therefore if you have used a nutrition product from a catalogue that was not setup correctly, you must edit the nutrition tab of the product in the *Setup > Products (Business)* menu of every business as well as correcting the catalogue product itself.

Cropping details

The nutrient management module requires at least one year's previous cropping information to create an NMP. If this information does not already exist in Gatekeeper records, it should be entered through the cropping summary screen (*Setup > Fields*).

For new Gatekeeper users who do not have previous cropping history, to copy existing fields into the previous cropping year and add cropping:

1. Open the fields module
2. Click 'Setup Fields'
3. Click once into the previous year column (e.g., 2020)
4. Click 'Add Field in 2020' at the bottom of the page, which will be yellow
5. In the new screen that opens, change the 'Source fields drop' dropdown selector to the current year (e.g., 2021)
6. To copy all fields from current year to previous year:
    a. *Recommended:* tick 'In all cases override cropping making it Unallocated' if the majority of fields had different crops in 2020 and 2021.
    b. Click 'Copy ALL Fields From Source Year'
    c. Accept warning message by clicking 'Yes'
    d. Work through new cropping records and add crops as appropriate
    e. Click 'OK' to save and close
7. To copy only some of the fields from current year to previous year:
    a. Select the required field on the left hand side of the screen
    b. Click 'Copy Source Field'
    c. Select crop
    d. Click 'OK' to save and close
    e. Repeat as required.

Cover crops, crop failures, or double cropping must be recorded using the crop sequence function, with an appropriate harvest figure against the first sequence. For more information on adding crop sequences, please click here.

For any field with split cropping in the previous season, it is necessary to nominate which crop you wish to be used in the calculation of SNS. Further details can be found in the Cropping record details section of this guide.

Field details

The field details screen can be accessed by:

- *Setup > Fields*
- Double click on a cropping record of the field required
- Select the field name itself from the list on the left hand side

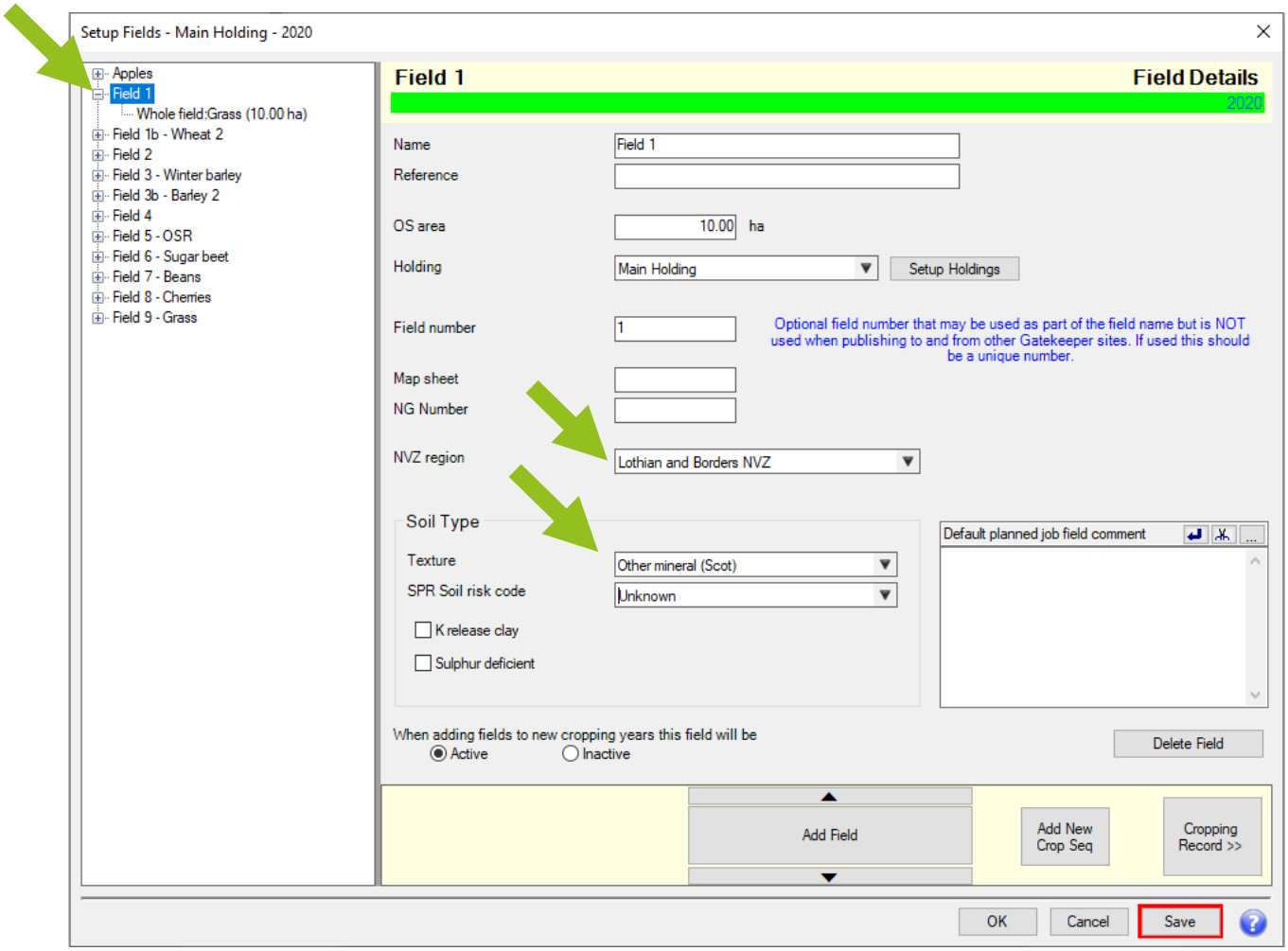
Or while viewing the field in the fields module:

- Select the field tab
- Select 'Setup cropping'
- Select the field name itself from the list on the left hand side

In both cases, ensure that you are on the field details screen rather than the cropping record by checking the top right of the screen – it should say field details.

In the field details screen:

1. Select the correct NVZ region from the dropdown list
2. Select soil texture and risk codes from the dropdown lists
3. Tick if soils are K releasing or sulphur deficient as appropriate.



Cropping record details

The cropping record can be accessed by:

- *Setup > Fields*
- Double click on a cropping record of the field required, for the correct cropping year

Or while viewing the field in the fields module:

- Select the field tab
- Select 'Setup cropping'

The following sets of information are stored in the cropping record and should be checked before the process of creating an NMP is begun:

On the 'Cropping' subtab:

1. Tick 'Straw or crop residue removed post harvest' if the field will be baled at the end of the current year

On the 'Nutrient Management' subtab:

1. Enter a target yield. You can use the 'Copy Target Yield' button to share this target yield with all fields of the same crop, but this action will overwrite any other target yields already entered, so may not be appropriate if you are using different target yield rates on different fields of the same crop.
2. Select the appropriate options from any visible 'Additional Info' dropdowns (for example, feed or milling for wheat crops)
3. Select the appropriate previous grass history from the dropdown
4. Tick 'Previous or current crop received an application of straw for mulching or paper sludge (paper crumble)' if appropriate

On the 'Previous Cropping' subtab, if the field was split in the previous year:

1. Nominate one crop to be used in SNS calculations by ticking 'Use' against the appropriate crop.

For grass fields only, on the 'Grass Periods' subtab, ensure grass periods are set correctly. For more information on grass periods, please see Appendix 2: Understanding Grass Periods.

Soil sampling information

The nutrient management centre will look to the field records for soil sampling results. Soil sampling information may be entered manually with a planning or recording job, or imported using the devices module where the results are available in a digital format.

Users may create an NMP with no soil sample information against a field, but P & K calculations will display a warning against them.

Manual entry of soil sampling results

Where soil sampling results are available in paper records:

1. In the recording module, click 'Add Job'
2. In the screen which opens, select 'Field Sampling' as the job type
3. Click 'Add Field Sampling Job'
4. Select all fields you wish to add results to
5. In the screen that opens:
    a. Expand 'Soil Nutrients' group
    b. Select the nutrients you have results for
    c. Use single right facing blue arrow to select nutrients
    d. Optional but recommended: click and drag nutrients so that they match the order of results to make it easier to enter results
    e. Click 'OK'
6. In the screen that opens, change 'Job date' to the analysis or sampling date as required
7. Enter analysis results for each field in the 'mg/L' column, except pH which should be entered into 'Index Num'. Indexes will be automatically populated based on mg/L values.

8. If appropriate to your analysis results: select the option 'Modified Morgans (SAC lab)' under the 'Soil Sampling Methodology' section

Importing non-spatial results

Soil sampling results can be imported into Gatekeeper through the devices module, saving the need for manual entry. Formats from NRM and Yara (Lancrop) laboratories are supported as standard, but if you have results from a different lab in another format, it may well be possible to set up a custom import option – for more information please contact support.

1. In the devices module, select the appropriate device from the tree view on the left hand side (e.g., *NRM > NRM Lab Results > NRM Non Spatial Results* or *Yara > Yara Lab Results > Yara Non Spatial Results*)
2. Click 'Device Sync'
3. Check settings on the 'Import Options' grid – you may wish to untick 'Move source to archive after import' if you do not wish the lab results file to be moved after the import is complete
4. Click on the 'Import' tab
5. Select path to data
6. In the 'Data to import' grid, match Gatekeeper field names to the field names found in the files.
7. Click 'Import with Preview'
8. A job with sample results will be shown:
    a. Check the job date and change if required
    b. If appropriate to your analysis results: select the option 'Modified Morgans (SAC lab) under the 'Soil Sampling Methodology' section
    c. You may wish to click on the 'Plan' tab and enter a plan name before closing
    d. Click 'OK' to save and close

Using spatial sampling results

Imported spatial analysis results, such as those from a soil sampling service provider, will automatically create a soil sampling record for the appropriate fields. The nutrient management centre has no spatial capabilities, so the field average result for each nutrient sampled will be used.

Field operation records

Once a nutrient management plan is created, it can be updated through the season using the field operation records. This can be useful to double check applications against planned nutrient amounts, or to calculate outstanding requirements.

For this to be correct, applications of fertilisers (including starter fertilisers and organic manures) must be recorded against the field using planning or recording, and the products involved must have nutrient contents set up (see 'Product details').

Confirming applications of organic manures

Where organic manures have been spread onto fields, there are additional information fields required in order for the nutrient management centre to correctly calculate nutrients applied.

When confirming applications of organic manures in either planning or recording, users will need to:

1. Enter fields, products, rates, dates and areas as usual
2. Click on the 'Implement' tab at the bottom of the page and pick an application method from the dropdown selector
3. Click on the 'Fields' tab at the bottom of the page
4. Click on the 'Nutrient Management' subtab
5. Enter the following information:
    a. Incorporation method
    b. Incorporation delay
    c. Optional: End of soil drainage date and rainfall
    d. Either use 'Copy all organic manure requirements to all fields in job' if all conditions are the same, or use individual 'Copy to all fields' buttons for different factors as required.
6. Click 'OK' to save and close.

Creating a new nutrient management plan

The following steps will guide you through the process of creating a new NMP. Ensure you are in the correct cropping year before beginning; it is possible to create nutrient management plans in planning (purple) years, as long as the cropping is set up.

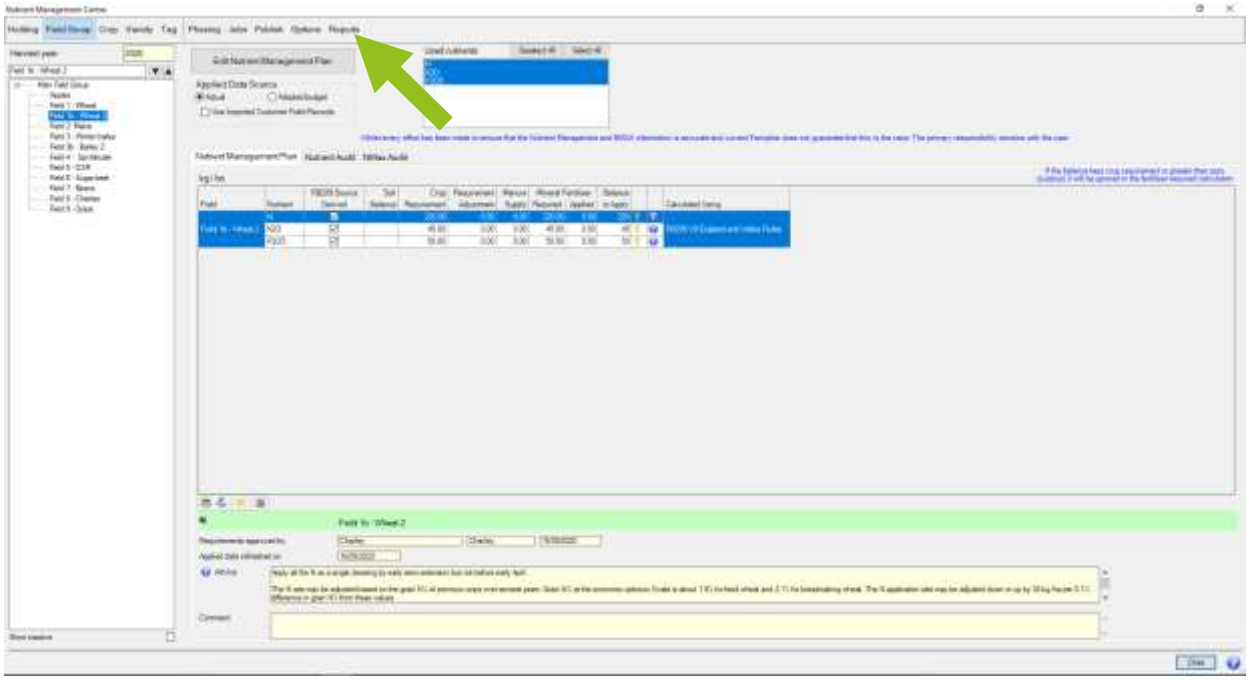
1. Go to the fields module.
2. Click 'Nutrient Management'.
3. The nutrient management centre will open. Select the fields you wish to include in your NMP on the left hand side (you may wish to use the list filters to enable to you select a block of fields at the same time – for example, all first wheat fields, etc). We highly recommend working through blocks of 10-15 fields at a time, rather than selecting all fields at once.
4.
5. Click 'Edit Nutrient Management Plan'.
6. Ensure the 'Calculate using' dropdown is displaying 'RB209 v8 Scotland Rules'
7. Select the option 'Calculate nutrient requirements using RB209 v8 Scotland Rules'
8. Click 'Calculate'
9. The 'Sampling Heading Selector' screen will appear:
    a. Select all nutrient(s) you wish to include in the NMP
    If you are calculating for grass fields – it is always necessary to select 'Lime Neutralising Value' alongside 'N'.
    b. Use the single right facing blue arrow to send nutrients to plan
    c. Click 'OK'
10. The nutrient management figures will be calculated. Click 'OK' to save and close

When you are returned to the nutrient management centre, the calculated figures will be displayed for all fields selected on the left hand side. For more information on the results of an NMP, please see Outcomes of an NMP.

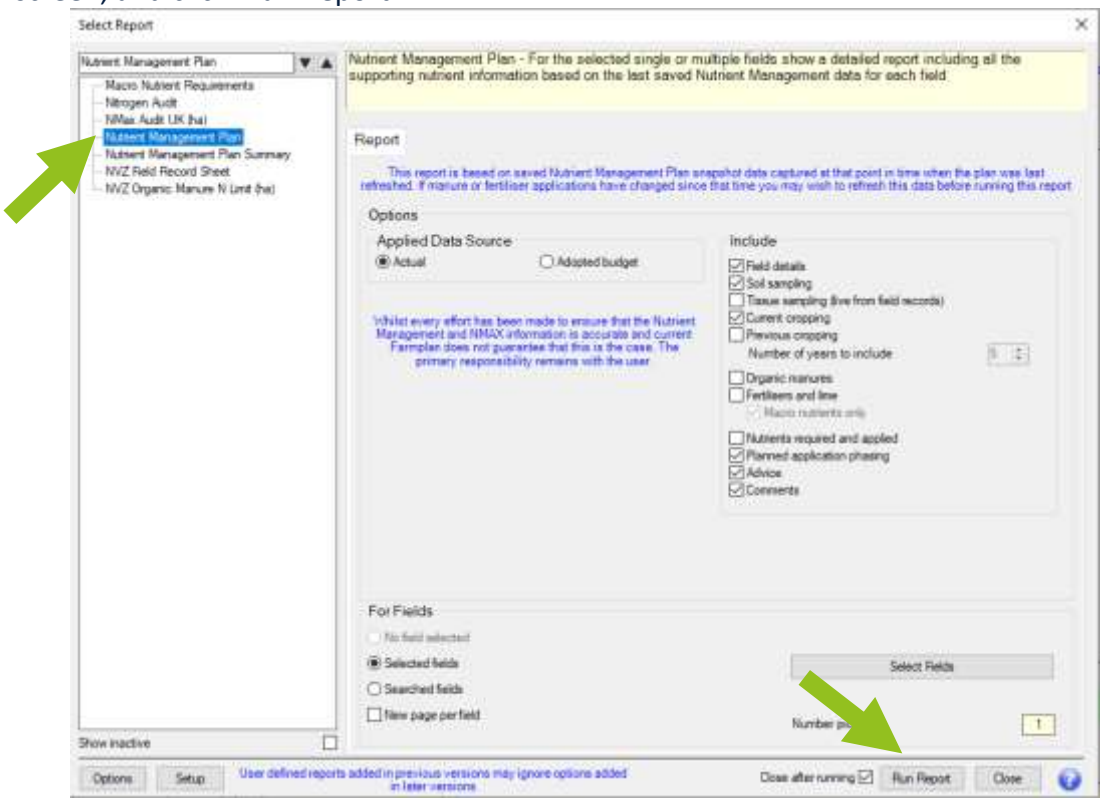
Creating reports

Once an NMP is created or adjusted, it is recommended to save a PDF copy of the plan for your records. This ensures that you have a copy of the initial plan as well as any later adjusted versions.

There are a number of default reports available in the nutrient management centre. They can all be accessed using the 'Reports' button:



Select the report required from the tree view on the left, adjust any selections as required in the main screen, and click 'Run Report'



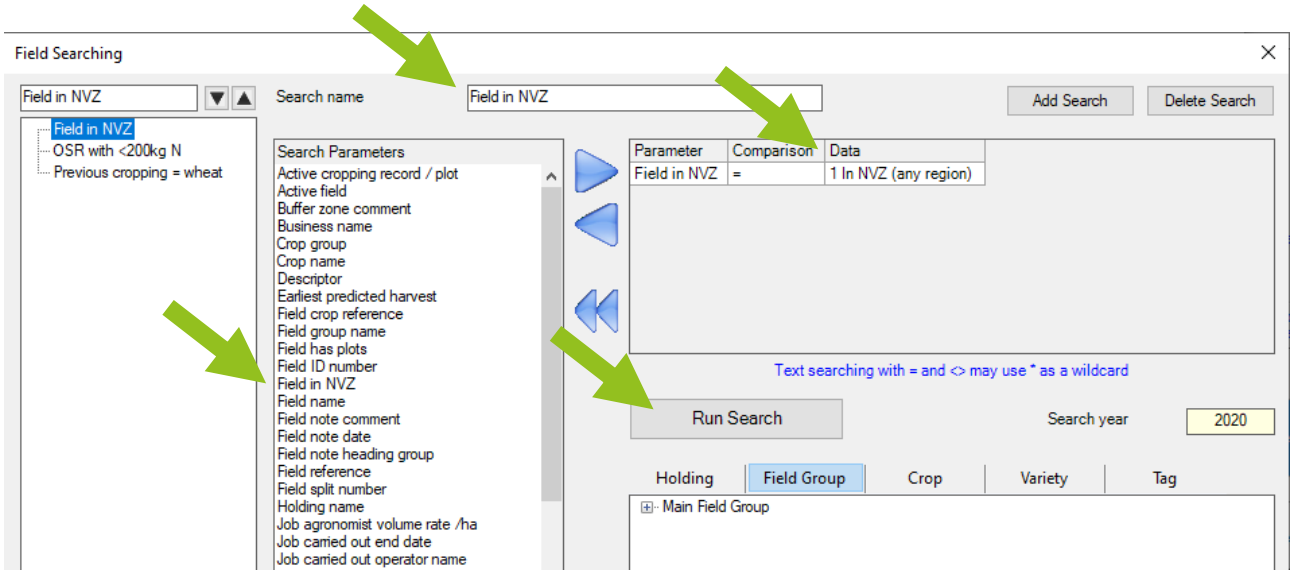
Using field search for reports

For certain nutrient management reports, users may wish to only include certain fields. For example, if your farm contains fields which are in an NVZ and some which are not, you may only wish to include your NVZ fields in any NMax reporting.

The field search function means you can ask Gatekeeper to only include fields which meet specified criteria into any report, and saves you having to select the fields manually.

To use the field search function from the nutrient management centre to select fields which are in an NVZ:

1. Click 'Reports'
2. Select the report required from the left hand side
3. In the 'For Fields' section of the report screen, select the option 'Searched fields'
4. In the window that opens:
    a. If this is the first time you have used the field search function, you will be asked 'Would you like to add a field search?'. Click 'Yes'.
    If you already have existing field searches, you will be shown the search screen. Click 'Add Search'
    b. Enter a search name (e.g., 'Field in NVZ')
    c. Select the appropriate search parameter(s) from the left hand side – in this case, 'Field in NVZ' and use the single right facing arrow to select it.
    d. Double click in the 'Data' column and select '1 in NVZ (any region)'
    e. Click 'Run Search'
    f. Fields which meet search parameters will be shown in the white box. Click OK to return to reports screen
5. Click 'Run Report', and the report will run for the searched fields.



Useful stock module reports

The stock module reports 'Stock Balancing Between Dates' (for the fertiliser heading) and 'Product Audit' (for individual products) may be useful to satisfy the reporting requirements of Scottish NVZ regulations.

Updating a nutrient management plan

The figures visible in the nutrient management centre are not automatically updated to take account of any changes to field records, including fertiliser applications. It is necessary to update the NMP in order for this to take place.

If you are updating a nutrient management plan because field information has changed (cropping information, expected yield, soil sample data etc), you will need to follow the steps as if creating a nutrient management plan for the first time – see Creating a new nutrient management plan.

To update the nutrient management centre with details of fertilisers applied, and recalculate nutrient requirements:

1. Ensure you are in the correct cropping year.
2. Go to the fields module.
3. Click 'Nutrient Management'.
4. The nutrient management centre will open. Select the fields you wish to update in your NMP on the left hand side (you may wish to use the list filters to enable to you select a block of fields at the same time – for example, all first wheat fields, etc).
5. Click 'Edit Nutrient Management Plan'
6. Select the option 'Refresh applied data using RB209 V8 Scotland Rules'
7. Click 'Refresh'
8. The figures will be updated to take account of any applications recorded since the nutrient management plan was run. Click 'OK' to save and close

Publishing nutrient management plans

NMPs can be published between Gatekeeper users – for example, between an agronomist and a grower. Both users should already have exchanged publishing keys to enable the exchange of information. For more information on exchanging publishing keys, please click here.

Ideally, where an advisor is going to create an NMP for a grower, the flow of information should be as follows:

- Grower publishes field records to advisor (including details of previous cropping, soil sampling, and field operations)
- Advisor imports field records and creates NMP
- Advisor publishes NMP to grower
- Grower imports NMP to Gatekeeper, and then updates it throughout the year for up-to-date crop requirement totals.

Once a grower has imported an NMP from their advisor, care should be taken not to alter the plan itself, but only refresh it to take account of applied data. Particular care must be taken if an imported NMP contains soil sampling data which is not held in the growers' Gatekeeper. If the plan is recalculated (rather than refreshed), Gatekeeper will re-source the sampling information from the growers' field records.

Exporting a nutrient management plan

To send a nutrient management plan to another Gatekeeper user:

1. Open the nutrient management centre
2. Click 'Publish'
3. In the 'Add New Publication' window that opens:
    a. Select a contact to publish to
    b. Add message if required
    c. Select fields to include (if you do not wish to send all fields in plan)
    d. Select nutrients to include (if you do not wish to send all nutrients in plan)
4. Click 'OK' to create publication, which will be sent the next time you synchronise or perform a send/receive

Importing a nutrient management plan

Before importing an NMP for the first time, it is necessary to change your permissions to allow the import of NMPs:

1. Open the nutrient management centre
2. Click 'Options'
3. Place a tick in the option 'Import published nutrient requirements'. You may wish to untick the options 'Edit nutrient requirements' and 'Calculate nutrient requirements using selected Nutrient Management rules' to ensure you do not accidentally edit the published NMP.
4. Click 'OK' to save and close

To import an NMP:

1. Click 'Edit Nutrient Management Plan'
2. Click the 'Import' tab at the top of the window
3. Click 'Import'
4. The publishing centre will open. Select the nutrient management plan publication
5. Click 'Import Published Data'
6. Check import options as required then click 'Import Data'
7. The field matching window will open, but no action will be necessary if the publication fields match your Gatekeeper fields. If any fields do not match, to select the correct Gatekeeper field
    a. Double click in the Gatekeeper 'Field' column
    b. Select the correct field from the dropdown list. If the status does not change to 'Matched', select field regions and split numbers from the neighbouring columns as required.
8. Click 'Import'
9. Click 'Close' to close the publishing centre
10. Click 'Close' to close the nutrient management plan update window
11. The nutrient management plan will now be visible in the nutrient management centre.

Once an NMP has been imported, you can use phasing and jobs, and update the NMP with details of field applications, as normal.

Adjusting a nutrient management plan, or creating bespoke plans

Once created, a nutrient management plan can be adjusted to overwrite calculated requirements, or to add nutrients which are not supported by the AHDB or ADAS engines. Alternatively, you may wish to create a custom NMP which does not refer to the pre-existing rulesets.

To use either option, you will need to turn on your ability to edit a nutrient management plan:

1. Within the nutrient management centre, click 'Options'
2. Tick the option 'Edit nutrient requirements'

To create a bespoke nutrient management plan from scratch

Use this option to enter nutrient requirements manually, without referring to any of the existing rulesets within Gatekeeper:

1. Within the nutrient management centre, select the field(s) you wish to include from the list on the left hand side
2. Click 'Edit Nutrient Management Plan'
3. Click on the 'Edit' tab
4. Click 'Edit'
5. Select the nutrients you wish to include. If you wish to add a nutrient not present in the pre-populated list:
    a. Click 'Setup Sampling Heading'
    b. Navigate through the list on the left hand side to *Soil Nutrients* and either an existing nutrient heading group, or 'Other Nutrients', and click on the heading group itself
    c. Click 'Add Heading'
    d. Enter nutrient name
    e. Click 'OK' to save and close
6. Click 'OK'
7. Enter totals required in any of the 'Soil Balance', 'Crop Requirement', or 'Requirement Adjustment' column.
8. If required, comments or warnings may be added to nutrients by:
    a. Selecting the appropriate level from the 'Information warning level' dropdown
    b. Entering text into 'Advice' or 'Comment' boxes as required. You may wish to make use of the comments library to reduce data entry at this point.
9. When all fields and nutrients have been added, click 'OK' to save and close.

To edit the totals in an existing nutrient management plan

Adjustments to existing NMPs may be positive or negative – for example, you may wish to add an additional amount to a field allowance, or to reduce the calculated total. It is not necessary to use this method to take account of standard adjustments made to NMax calculations as these are automatically calculated by the nutrient management centre as long as the field information is correct. For more information on NMax adjustments, see Appendix 1.

Use this option to edit the totals calculated by the nutrient management centre, or to add nutrients which cannot be calculated by nutrient management centre:

1. Within the nutrient management centre, select the field(s) you wish to include from the list on the left hand side
2. Click 'Edit Nutrient Management Plan'
3. Click on the 'Edit' tab
4. Click 'Edit'
5. To edit nutrient totals, adjust totals required in any of the 'Soil Balance', 'Crop Requirement', or 'Requirement Adjustment' column.
6. To add additional nutrients:
    a. Click 'Select nutrients'
    b. Select nutrient(s) required. If you wish to add a nutrient not present in the pre-populated list:
        i. Click 'Setup Sampling Heading'
        ii. Navigate through the list on the left hand side to *Soil Nutrients* and either an existing nutrient heading group, or 'Other Nutrients', and click on the heading group itself
        iii. Click 'Add Heading'
        iv. Enter nutrient name
        v. Click 'OK' to save and close
    c. Use the single right facing blue arrow to add selected nutrients
    d. Click 'OK'
    e. Enter nutrient requirements in appropriate columns
7. Click 'OK' to save and close

To edit nutrient allocation across grass periods

Use this option to share the nutrient requirements already calculated by the nutrient management centre across the grass periods present:

1. Within the nutrient management centre, select the field(s) you wish to include from the list on the left hand side.
2. Click 'Edit Nutrient Management Plan'.
3. Click on the 'Edit' tab
4. Click 'Edit'
5. Edit the 'Crop Requirement' column figures as required
6. Click 'OK' to save and close.

Outcomes of a nutrient management plan

Once an NMP has been created, the results are displayed across three tabs in the nutrient management centre.

Nutrient management plan tab

This tab displays an overview of the NMP created:

Nutrient Management Plan | Nutrient Audit | NMax Scotland

kg / ha

Field	Nutrient	RB209 Source Derived	Soil Balance	Crop Requirement	Requirement Adjustment	Manure Supply	Mineral Fertiliser Required	Mineral Fertiliser Applied	Balance to Apply			Calculated Using
Field 2	N	☑		240.00	0.00	4.00	236.00	227.80	8			RB209 V8 Scotland Rules
	P2O5	☑		78.00	0.00	48.00	30.00	0.00	30			
	K2O	☑		28.00	0.00	120.00	-92.00	0.00	-92			

Column	Contents
RB209 Source Derived	If the NMP has been created using the RB209 guidelines, this box will be ticked. If an NMP has been created using user defined parameters, this box will not be ticked.
Soil Balance	Where the NMP has used multi-year soil balance calculations to determine the current soil nutrient levels, the balance used for the start of the current NMP's calculations will be shown here.
Crop Requirement	The crop requirement for each nutrient as calculated.
Requirement Adjustment	Any adjustment made to the requirement will be shown here.
Manure Supply	The nutrient supply from organic manures as recorded against the field is shown here.
Mineral Fertiliser Required	The crop requirement minus manure supply gives the total mineral fertiliser required.
Mineral Fertiliser Applied	The nutrient supply from mineral fertilisers as recorded against the field is shown here.
Balance to Apply	The mineral fertiliser required minus mineral fertiliser applied gives the balance to apply.
Status icons	Icons indicate the status of applications and requirements: oversupply (nutrients applied exceed crop requirement) nutrient supply matches crop requirement undersupply (crop requirement exceeds nutrients applied)
Information icons	Where advice or warnings are part of the NMP, icons here indicate the presence of comments in the 'Advice' or 'Comment' sections below the NMP overview.
Calculated Using	Shows which ruleset has been used to calculate the figures displayed.

The text boxes below the nutrient management plan tab will display any advice and comments generated with the NMP.

Nutrient audit tab

This tab provides a quick overview of the nutrient amounts calculated by the NMP, and nutrients applied (up to the last time the nutrient management centre was refreshed).

The information displayed will depend on the fields and nutrients selected, but this display can be useful to view a single field's general status:

Nutrient Management Plan | Nutrient Audit | NMax Scotland

kg / ha

Crop	Field	Nutrient	Area	Applied Manure Supply	Applied Mineral Autumn	Applied Mineral Other	Applied Mineral Total	Applied	Total Nutrient Management Plan
Wheat Winter	Field 2	N	12.00	4.00	0.00	227.80	227.80	231.80	240.00
	Field 2	P2O5	12.00	48.00	0.00	0.00	0.00	48.00	78.00
	Field 2	K2O	12.00	120.00	0.00	0.00	0.00	120.00	28.00
	Crop average rates	N	12.00	4.00	0.00	227.80	227.80	231.80	240.00
	Crop average rates	P2O5	12.00	48.00	0.00	0.00	0.00	48.00	78.00
	Crop average rates	K2O	12.00	120.00	0.00	0.00	0.00	120.00	28.00

It can also be used for a quick check of planned and applied nutrients across a number of fields, grouped by the selection filters (such as crop):

Nutrient Management Plan | Nutrient Audit | NMax Scotland

N kg / ha

Crop	Field	Area	Applied Manure Supply	Applied Mineral Autumn	Applied Mineral Other	Applied Total	Total Nutrient Management Plan
Wheat Winter	Field 1b	12.00	0.00	0.00	0.00	0.00	200.00
	Field 2	12.00	4.00	0.00	227.80	231.80	240.00
	Field 4	12.00	4.00	0.00	236.30	240.30	200.00
	Crop average rates	36.00	2.67	0.00	154.70	157.37	213.33

NMax Scotland tab

This tab displays nitrogen totals against permitted NMax limits and the NMP planned amount:

Nutrient Management Plan | Nutrient Audit | NMax Scotland

kg / ha

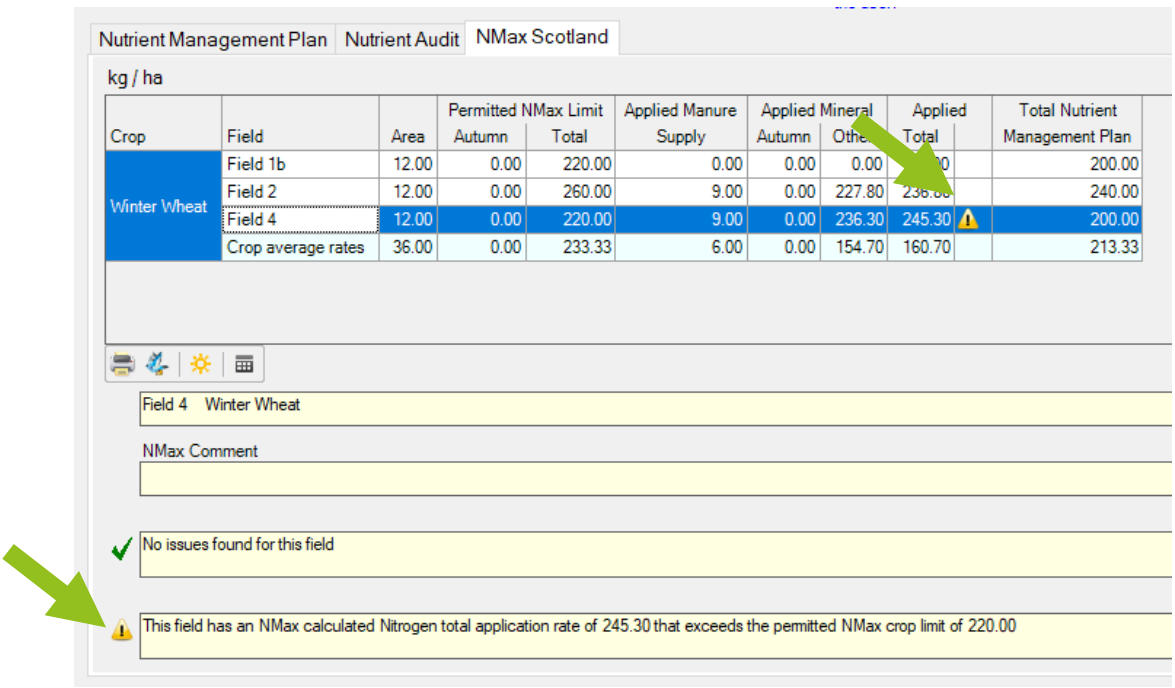
Crop	Field	Area	Permitted NMax Limit		Applied Manure	Applied Mineral		Applied	Total Nutrient
			Autumn	Total	Supply	Autumn	Other	Total	Management Plan
Winter Wheat	Field 1b	12.00	0.00	220.00	0.00	0.00	0.00	0.00	200.00
	Field 2	12.00	0.00	260.00	9.00	0.00	227.80	236.80	240.00
	Crop average rates	24.00	0.00	240.00	4.50	0.00	113.90	118.40	220.00

Column	Contents
Permitted NMax Limit - autumn	The maximum permissible autumn application of nitrogen for this field
Permitted NMax limit – total	The maximum permissible total application of nitrogen for this field
Applied Manure NMax Calculated	The nitrogen supply from organic manures for this field
Applied Mineral – autumn	The actual supply from organic manures for this field
Applied Mineral – other	The actual supply from mineral fertilisers applied in the rest of the year
Applied Total	The sum of actual supply from organic manures and mineral fertilisers
Total Nutrient Management Plan	The total supply requirement calculated by the NMP ('Crop requirement' from the Nutrient Management Plan tab)

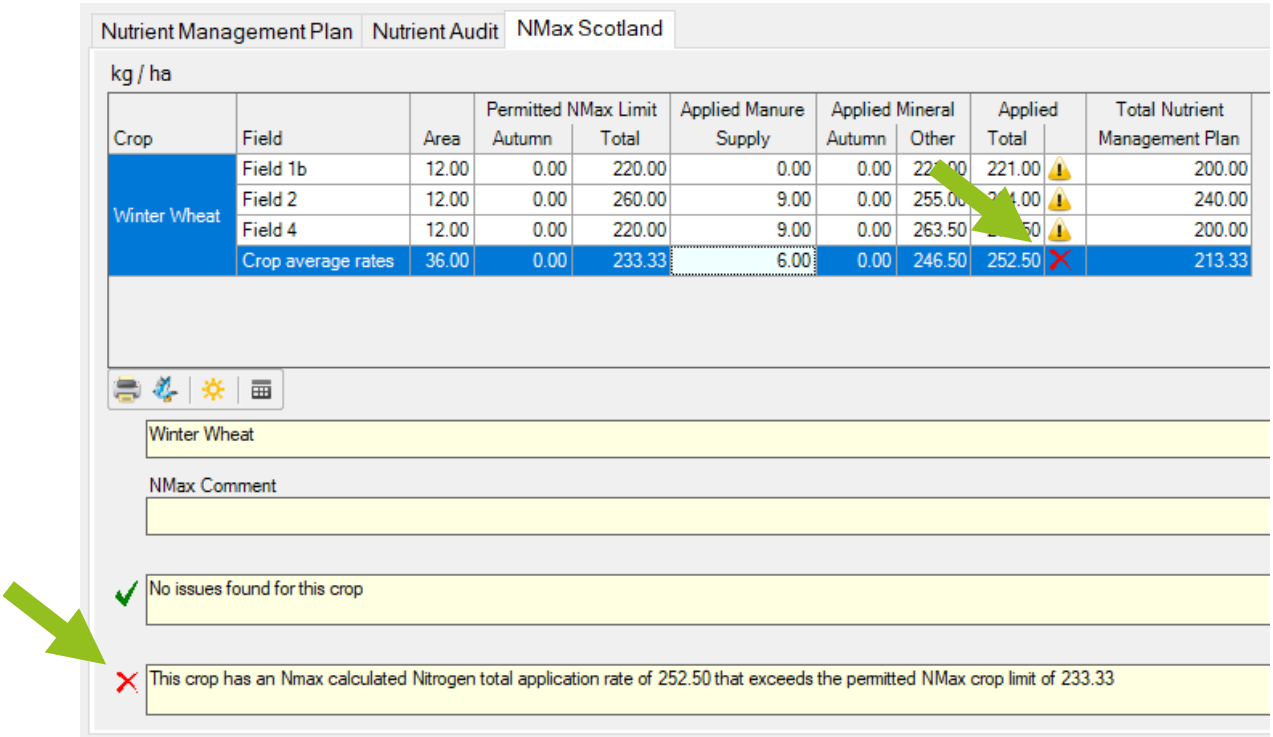
In addition, the comments provide further detail on the information used by the NMP during calculations and the effect on the final plan. These comments are specific to the individual field selected.

As NMax figures are calculated across crop groups, it is possible for a single field's applied amount of nitrogen to exceed its permitted NMax limit without indicating a farm NMax exceedance. As a result, where NMax has been exceeded, one of two warnings will be displayed.

Where an individual field's application levels exceed the crop NMax, it will be marked with a yellow warning triangle and explanatory text will give details:



Where the selected fields exceed the crop NMax, in addition to the yellow warning triangle by each field which individually exceeds the NMax a red cross will indicate that the NMax has been breached:



Creating application plans from an NMP

Once the nutrient management centre has been used to establish crop nutrient requirements, it can also be used to convert these requirement into planned jobs. There are two stages to creating an application plan from an NMP: phasing, and creating jobs.

If the nutrient in question will be applied in more than one dressing (e.g., 3 doses of N in a season), the phasing option can be used to split the different doses and plan their timings.

Jobs can be created either using phases (if prepared), or using the total outstanding nutrient requirement. This option can be used directly where a nutrient's application will not be split into multiple dressings – it is not necessary to phase if you are planning a single application.

Creating phases

The phasing option can be used to divide a total nutrient requirement into multiple planned applications.

Once an NMP has been created, from the nutrient management centre screen

1. Select the field(s) you wish to create phases for
2. Click 'Phasing'
3. Select the required nutrient from the dropdown list, and then follow the most appropriate scenario below:

To create phases for individual fields one by one, or multiple fields with exactly the same nutrient requirement:

1. Click 'Add Item' as many times as you will want to have applications (for three splits, click three times)
2. Adjust the timings by selecting from the 'Month' and 'Week' dropdown lists
3. Enter the required application rates in kilograms of nutrient. The total of the phases must add up to the total requirement calculated by the nutrient management centre and displayed on the phasing screen – therefore the final phase 'rate' box cannot be edited, it is calculated automatically as the difference between the total requirement and the sum of all other phases.
4. Click 'Save' to apply phases to field
5. Select either:
    a. The next field to phase for the same nutrient, by selecting fields from the list on the left hand side
    b. Or, the next nutrient to phase for the same field, by selecting the required nutrient from the dropdown list at the top right

   And repeat from step 1 as required.

To create phases for multiple fields with differing nutrient requirements:

1. Select the option 'Use all listed fields' from the 'Field Mode' selection

2. Click ‘Add Item’ as many times as you will want to have applications (for three splits, click three times)
3. Adjust the timings by selecting from the ‘Month’ and ‘Week’ dropdown lists
4. Enter the required application rates in kilograms of nutrient. The total of the phases must add up to the total requirement calculated by the nutrient management centre and displayed on the phasing screen – therefore the final phase ‘rate’ box cannot be edited. It is calculated automatically as the difference between the total requirement and the sum of all phases; the difference in applications between different fields will be automatically allocated to the final phase.
5. Click ‘Allocate to Fields’
6. If required, select the next nutrient to phase for the same group of fields by picking from the dropdown list at the top right, and repeating steps 2-5 as necessary.
7. Click ‘OK’ to save and close.

Planned phasing will be visible in the bottom right corner of the nutrient management centre, if a field with phasing is selected on the left hand side, and nutrient with phasing is selected in the ‘Used nutrients’ box.

Phases and grass fields

Phasing does not work in the same way with grass fields, because grass fields already have planned splits of application via the grass periods functionality.

Where the RB209 v8 ruleset is used, applications of nitrogen will automatically be split into the grass periods as appropriate:

Nutrient Management Plan | Nutrient Audit | NMax Scotland

N kg / ha

Field	Grass Period	RB209 Source Derived	Soil Balance	Crop Requirement	Requirement Adjustment	Manure Supply	Mineral Fertiliser Required	Mineral Fertiliser Applied	Balance to Apply			Calculated Using
Field 9 - Grass	1	☑		120.00	0.00	0.00	120.00	0.00	120			RB209 V8 Scotland Rules
	2	☑		60.00	0.00	0.00	60.00	0.00	60			
	3	☑		50.00	0.00	0.00	50.00	0.00	50			

However other nutrients as calculated will be allocated to the first period, and users may wish to move or split this allocation – for example, to split K_2O requirement into two doses. To do this it is necessary to use the steps as shown in [To edit nutrient allocation across grass periods](). Manually edit the nutrient allocation so that the same total is split across grass periods as required:

K2O kg / ha

Field	Grass Period	RB209 Source Derived	Soil Balance	Crop Requirement	Requirement Adjustment	Manure Supply	Mineral Fertiliser Required	Mineral Fertiliser Applied	Balance to Apply		
Field 9 - Grass	1	☐		160.00	0.00	0.00	160.00	0.00	160		
	2	☐		0.00	0.00	0.00	0.00	0.00	0		
	3	☑		0.00	0.00	0.00	0.00	0.00	0		

K2O kg / ha

Field	Grass Period	RB209 Source Derived	Soil Balance	Crop Requirement	Requirement Adjustment	Manure Supply	Mineral Fertiliser Required	Mineral Fertiliser Applied	Balance to Apply		
Field 9 - Grass	1	☐		60.00	0.00	0.00	60.00	0.00	60		
	2	☐		60.00	0.00	0.00	60.00	0.00	60		
	3	☐		40.00	0.00	0.00	40.00	0.00	40		

Once grass periods have nutrients allocated as required, they can be used to create jobs as below.

Creating application jobs from the nutrient management centre

To create a fertiliser job plan, either from phasing or from the total nutrient requirement:

1. In the nutrient management centre, select the field(s) you wish to create a job for from the left hand side
2. Click 'Jobs'
3. Ensure the correct nutrient(s) are selected on the right hand side
4. *Grass fields only*: ensure the correct grass period is selected at the 'Source grass management period' option
5. Either:
    a. Select 'Use total outstanding mineral fertiliser' to create a job for the total nutrient requirement
    b. Select 'Single phase' only and then the correct phase as required
6. Click 'Prepare Jobs'
7. Create a new job in a new plan, or a new job in an existing plan as required:
    a. To create a brand new plan:
        i. Ensure 'New work plan' is selected from the 'Build jobs into' section
        ii. Tick any comments you wish to appear in the job once it is created
        iii. Add a new plan reference
        iv. Click 'Add Jobs to Plan'
    b. To add a job into an existing draft plan:
        i. Ensure 'Existing work plan' is selected from the 'Build jobs into' section
        ii. Select the work plan to add a job to from the dropdown list
        iii. Tick any comments you wish to appear in the job once it is created
        iv. Click 'Add Jobs to Plan'
8. Optional - To convert the created fertiliser job into a product job:
    a. Click 'Convert nutrient job to products' on the bottom left of the screen
    b. Select the required fertiliser product
    c. If required, edit product rate or total quantity in the 'Planned applications' section, or tick 'Round product rates down to whole numbers'
    d. Click 'Convert to Single Job'
    e. If required, add fixed cost or associate machinery and implements to the job as usual.
    f. Click 'OK' to save and close.

You will be returned to the nutrient management centre and may continue to plan jobs as required. To view, edit, or issue the jobs created, go to the planning module, where plans will be visible in the 'Draft' section.

Appendix 1 – NMax adjustments

The nutrient management centre will automatically make the following adjustments to NMax figures based on field and cropping information. If any of the criteria apply to any of your fields, the Gatekeeper information entered must reflect this so that the correct adjustments can be applied. Entering this information is shown in Cropping record details.

Adjustment	Parameters
Target yield	Wheat, barley, and oilseed rape NMax limits may be adjusted for yields above the standard crop yields (as specified in the NMax guidelines). Grass cut at least three times a year can also have an adjusted NMax.
Specific crop end use	An additional amount of N is permitted for milling wheat varieties.
Incorporation of paper sludge or mulching straw	Where the previous or current crop has received an application of paper sludge or straw for mulching, additional allowable N will be calculated.
Actual local rainfall	Rainfall adjustments are made based on the rainfall figures held within the 'Holdings' settings. If known, the automatically derived rainfall figures can be replaced with farm specific figures.
Soil type	For light sand soils where the NVZ guidelines give an adjusted N allowance, the soil type in Gatekeeper must be selected as 'shallow not sandstone'.

Appendix 2 – Understanding grass periods

In order to reflect the different growth periods of grass during a single season, it is necessary to define grass periods to create an NMP for grass fields.

The grass periods tab requires the user to enter either one, or a series of, grass growth periods. The information required when entering a grass period and the options available is:

Heading	Available options
Grass Management	Grass with high clover Grazing only (low clover) Hay plus grazing One cut of silage plus grazing Two or more cuts of silage plus grazing

Then for each grass period added:

Management type	Available description
Establishment	Autumn sown
	Spring sown
	Undersown
	Existing sward
Grazing	Dairy
	Beef
	Sheep
Cutting	Silage
	Hay

Where grazing or cutting are selected as period actions, a yield may be added.

All selections for grass periods must be logically sound in order for the nutrient management centre to be able to make a calculation. This applies to selections within a single period (e.g., if the grass management selection is 'Grazing only', the management type selection cannot be 'Cutting'), and to the selection across all periods (e.g., if the grass management selection is 'One cut of silage plus grazing', there cannot be two periods of cutting present).

An example of a valid grass periods selection is shown below, with some examples of common mistakes when entering periods.

Grass Management	Grass Period	Management Type	Description	Yield t/ha	Date Grass Ploughed Out Out
Two or more cuts of silage plus grazing	1	Grazing	N/A	0.00	
	2	Cutting	Silage	0.00	
	3	Cutting	Silage	0.00	

Management description matches management types – more than one cutting period, plus grazing period

Grass Management	Grass Period	Management Type	Description	Yield t/ha	Date Grass Ploughed Out Out
Two or more cuts of silage plus grazing	1	Grazing	N/A	0.00	
	2	Cutting	Silage	0.00	
	3	Grazing	N/A	0.00	

Periods added do not match management description – two or more cuts specified but only one cut entered

Grass Management	Grass Period	Management Type	Description	Yield t/ha	Date Grass Ploughed Out Out
One cut of silage plus grazing	1	Grazing	N/A	0.00	
	2	Cutting	Hay	0.00	

Management description does not match management type description – hay cuts not permitted in silage management group

To use this table:

1. Identify the appropriate management combination from column A.
   Single management options: grazing only, hay only, silage only
   Double management options: grazing and hay, grazing and silage; establishment and grazing, establishment and hay, establishment and silage
   Triple management options: establishment, grazing, and hay; establishment, grazing, and silage
2. Identify the appropriate combination of sequences from columns B or C. Column C key: G = grazing period, H = hay cut, S = silage cut
3. Enter grass periods into Gatekeeper:
   a. Column D identifies permitted grass management selection options for the identified scenario
   b. Columns 1-5 display permitted grass period selections for the identified scenario.

Example from table shown in Gatekeeper screen, using table to look up permitted periods to add two cuts of silage plus a graze:

Required scenario identified

Grazing + silage	1-4 grazing periods in combination with 1-3 silage cuts	SSG, SSGG	Two or more cuts of silage plus grazing	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	Grazing	

Correct grass management option selected

Required grass periods added and correctly selected

Grass Management	Grass Period	Management Type	Description	Yield t/ha	Date Grass Ploughed Out Out
Two or more cuts of silage plus grazing	1	Cutting	Silage	0.00	
	2	Cutting	Silage	0.00	
	3	Grazing	N/A	0.00	

A	B	C	D	Permissible sequences of grass periods (periods shown in bold are mandatory for the management selection and combination shown)					
Possible combinations	**Possible sequences**	**Permitted sequence combinations**	**Permitted grass management selection**	**1**	**2**	**3**	**4**	**5**	**6**
Grazing only	1-5 grazing periods	G, GG, GGG, GGGG, GGGGG	Grass with high clover	**Grazing**	Grazing	Grazing	Grazing	Grazing	
			Grazing only (low clover)	**Grazing**	Grazing	Grazing	Grazing	Grazing	
Hay only	1 or 2 hay cuts	H, HH	Grass with high clover	**Cutting > Hay**	Cutting > Hay				
			Hay plus grazing	**Cutting > Hay**	Cutting > Hay				
Silage only	1-4 silage cuts	S, SS, SSS, SSSS	One cut of silage plus grazing	**Cutting > Silage**					
			Two or more cuts of silage plus grazing	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	Cutting > Silage	Cutting > Silage	
Grazing + hay	1-3 grazing periods in combination with 1-2 hay cuts	GH, GHG, GHGG	Hay plus grazing	**Grazing**	**Cutting > Hay**	Grazing	Grazing		
		GHH		**Grazing**	**Cutting > Hay**	Cutting > Hay			
		HG, HGG, HGGG		**Cutting > Hay**	**Grazing**	Grazing	Grazing		
Grazing + silage	1-4 grazing periods in combination with 1-3 silage cuts	GS, GSG, GSGG, GSGGG	One cut of silage plus grazing	**Grazing**	**Cutting > Silage**	Grazing	Grazing	Grazing	
		GGSG, GGSGG		**Grazing**	**Grazing**	**Cutting > Silage**	Grazing	Grazing	
		SG, SGG, SGGG,		**Cutting > Silage**	**Grazing**	Grazing	Grazing	Grazing	
		GSS, GSSS, GSSG	Two or more cuts of silage plus grazing	**Grazing**	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage OR grazing		
		SSG, SSGG		**Cutting > Silage**	**Cutting > Silage**	**Grazing**	Grazing		
		SSSG		**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	Grazing		
Establishment + grazing	1 establishment period followed by 1-5 grazing periods	EG, EGG, EGGG, EGGGG, EGGGG	Grass with high clover	**Establishment > Autumn sown**	**Grazing**	Grazing	Grazing	Grazing	Grazing
				Establishment > Spring sown	**Grazing**	Grazing	Grazing	Grazing	Grazing
			Grazing only (low clover)	**Establishment > Autumn sown**	**Grazing**	Grazing	Grazing	Grazing	Grazing

				Establishment > Spring sown	**Grazing**	Grazing	Grazing	Grazing	Grazing
Establishment + hay	1 establishment period followed by 1 or 2 hay cuts	EH, EHH	Grass with high clover	**Establishment > Autumn sown**	**Cutting > Hay**	Cutting > Hay			
				Establishment > Spring sown	**Cutting > Hay**	Cutting > Hay			
			Hay plus grazing	**Establishment > Autumn sown**	**Cutting > Hay**	Cutting > Hay			
				Establishment > Spring sown	**Cutting > Hay**	Cutting > Hay			
Establishment + silage	1 establishment period followed by 1-4 silage cuts	ES, ESS, ESSS, ESSSS	One cut of silage plus grazing	**Establishment > Autumn sown**	**Cutting > Silage**				
				Establishment > Spring sown	**Cutting > Silage**				
			Two or more cuts of silage plus grazing	**Establishment > Autumn sown**	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	Cutting > Silage	
				Establishment > Spring sown	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	Cutting > Silage	
Establishment + grazing + hay	1 establishment period followed by 1-3 grazing periods and 1-2 hay cuts	EGH, EGHH	Hay plus grazing	**Establishment > Autumn Sown**	**Grazing**	**Cutting > Hay**	Cutting > Hay		
				Establishment > Spring Sown	**Grazing**	**Cutting > Hay**	Cutting > Hay		
		EGHG, EGHGG		**Establishment > Autumn Sown**	**Grazing**	**Cutting > Hay**	Grazing	Grazing	
				Establishment > Spring Sown	**Grazing**	**Cutting > Hay**	Grazing	Grazing	
		EHG, EHGG, EHGGG		**Establishment > Autumn Sown**	**Cutting > Hay**	**Grazing**	Grazing	Grazing	
				Establishment > Spring Sown	**Cutting > Hay**	**Grazing**	Grazing	Grazing	
Establishment + grazing + silage	1 establishment period followed by 1-4 grazing periods and 1-3 silage cuts	EGS, EGSG, EGSGG, EGSGGG,	One cut of silage plus grazing	**Establishment > Autumn Sown**	**Grazing**	**Cutting > Silage**	Grazing	Grazing	Grazing
				Establishment > Spring Sown	**Grazing**	**Cutting > Silage**	Grazing	Grazing	Grazing
		ESG, ESGG, ESGGG, ESGGGG		**Establishment > Autumn Sown**	**Cutting > Silage**	**Grazing**	Grazing	Grazing	Grazing
				Establishment > Spring Sown	**Cutting > Silage**	**Grazing**	Grazing	Grazing	Grazing
		EGGSG, EGGSGG		**Establishment > Autumn Sown**	**Grazing**	**Grazing**	**Cutting > Silage**	Grazing	Grazing

				Establishment > Spring Sown	**Grazing**	**Grazing**	**Cutting > Silage**	Grazing	Grazing
		EGSS, EGSSS	Two or more cuts of silage plus grazing	**Establishment > Autumn Sown**	**Grazing**	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	
				Establishment > Spring Sown	**Grazing**	**Cutting > Silage**	**Cutting > Silage**	Cutting > Silage	
		EGSSG		**Establishment > Autumn Sown**	**Grazing**	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	
				Establishment > Spring Sown	**Grazing**	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	
		ESSG, ESSGG		**Establishment > Autumn Sown**	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	Grazing	
				Establishment > Spring Sown	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	Grazing	
		ESSSG		**Establishment > Autumn Sown**	**Cutting > Silage**	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	
				Establishment > Spring Sown	**Cutting > Silage**	**Cutting > Silage**	**Cutting > Silage**	**Grazing**	