

The Need-to-Know on NVZ's

Nitrate Vulnerable Zones

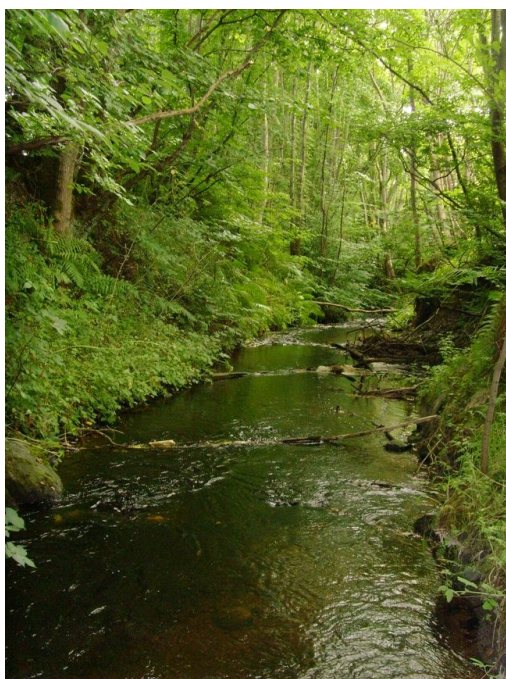
Nitrate Vulnerable Zones have been a feature of farming life in the more intensively farmed parts of Scotland for more than 20 years.

The first NVZs were designated at Balmalcolm, Fife in 1996 and at the Ythan, Aberdeenshire in 2000. In 2003 these were replaced by four new NVZs covering 14% of Scotland at Lower Nithsdale, Lothian & Borders, Strathmore & Fife and Moray, Aberdeenshire, Banff & Buchan.

In 2016, the extent of the existing NVZs was reduced in size by 24% following a scientific review, but a fifth NVZ was created in the Stranraer Lowlands



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Why do we have NVZs?

Nitrate run-off from fertilisers and organic manures can stimulate excessive growth of algae in watercourses and waterbodies, which can reduce oxygen levels such that fish, amphibians and aquatic insects find it difficult to survive. In addition, high levels of nitrates in drinking water can lead to health risks during pregnancy and for young children.

For these reasons, in 1991 the EU introduced the Nitrates Directive, which required action to be taken to reduce the risk in areas where Nitrate limits are likely to be exceeded. This led to the designation of Nitrate Vulnerable Zones and the requirement for farmers to follow the NVZ action programme in these areas.

The NVZ rules form part of the cross-compliance requirements that farmers must follow to receive subsidies and other government support schemes.

NVZ requirements

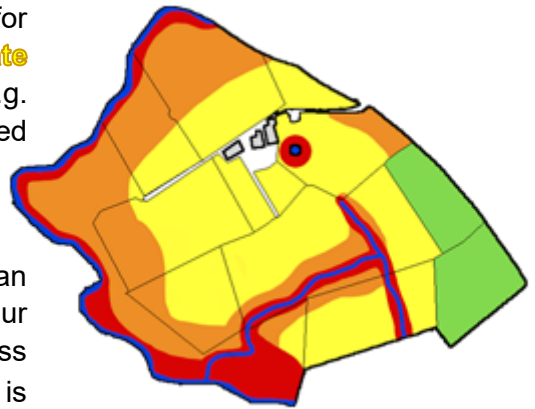
All farmers within an NVZ are required to follow the rules highlighted in this publication.

RAMS Map

All farms in NVZs must have a RAMS (Risk Assessment for Manures and Slurries) Map identifying areas of **low**, **moderate** and **high** risk for spreading as well as **no spread** areas (e.g. within 10m of any surface water or within 50m of any uncapped well or a spring used for human consumption).

Handy Hint:

Slope is one of the main factors affecting spreading risk. This can be calculated by looking at the distance between 10m contour lines on a map. If they are more than 140m apart, the slope is less than 4° (low risk). If they are less than 70m apart the slope is greater than 8° (high risk). If they are less than 40m apart, the slope is greater than 12° (no spreading).



Nitrogen limits for crop type (NMax)

- NMax is the maximum amount of Nitrogen that can be applied each year to a particular crop type. Grass is classed as a crop type and winter barley is classed as a separate crop type from spring barley (and the same for other spring and winter crops).
- You must have completed the NMax calculation for each crop type before any applications, and have a record of the calculation and of subsequent fertiliser applications to show that the NMax limits have not been exceeded.
- NMax is calculated for each individual field and then added together to provide the total limit per crop type.
- The limit is applied across the crop type as a whole, so applications may exceed the NMax for an individual field, so long as the total Nitrogen application rate does not exceed the limit across all fields of that crop type.

NMax pitfalls to avoid

- Remember to take account of the N from organic inputs such as slurry, farmyard manure, digestates, sewage sludge and distillery waste when planning bagged N applications, otherwise NMax could be breached!
- Remember to take account of residual N from previous cropping when calculating NMax - crops following grass, fodder crops, potatoes and legumes have reduced NMax limits compared to crops following cereals.
- Make sure you have proper records (sale receipts, weight tickets, combine yield tickets) that demonstrate high yields before taking advantage of NMax increases for high yielding crops.

Organic Manure Field Application Limits

There is an annual limit of 250kg/ha of total N from organic manures in any 12 month period. Unlike NMax, this limit applies to each individual field, not across the whole crop type. This includes any fertiliser derived from animal, human or plant sources (e.g. FYM, slurry, sewage sludge, digestate) but **does not** include dung deposited by grazing livestock. For compost the limit is 500kgN/ha of total N from compost and other organic manures over any 24 month period. In practice, based on standard analysis, these limits are equivalent to:

Cattle FYM	41 Tonnes/ha	16 Tonnes/acre
Poultry Broiler Litter	8 Tonnes/ha	3 Tonnes/acre
Cattle Slurry (6% dry matter)	96m ³ /ha	8500 gallons/acre
Pig Slurry (4% dry matter)	69m ³ /ha	6150 gallons/acre

Pitfalls to avoid: It is important to remember that these limits must not be exceeded on any individual field, and that they apply over any 12 month period.

If you are in the habit of applying organic manure to the same fields every year, it will be impossible to keep applications more than 12 months apart indefinitely unless you always apply on exactly the same day every year! Similarly you must take care if applying manure before sowing a winter crop following a spring crop that also received manure as the two applications are unlikely to be more than 12 months apart.

In these situations, **it is safer to never apply more than half of the annual limit on each occasion** to avoid accidentally exceeding the limit later in the same 12 month period.

Farm-Based Livestock Nitrogen Loading Limit

In addition to the field-based limit of 250kgN/ha for organic manure applications, the NVZ rules state that the total Nitrogen from livestock must not exceed an average of **170kg/ha** across the agricultural area of the whole farm (or part of farm within the NVZ). In this case the limit includes all Nitrogen from livestock: dung deposited by grazing livestock as well as livestock manures spread onto the land.

In practice, compliance with this farm-based limit is assessed by looking at records of the different classes of livestock kept on the farm over the preceding year. There are standard figures for the amount of Nitrogen excreted by each class of livestock over one year and this can be multiplied by the average number of each livestock class kept on the farm to give the total amount of Nitrogen produced by the livestock. If any livestock manures are exported from or imported to the farm, these must be subtracted or added to the total. After any adjustments for imports and exports of manures, the total Nitrogen from livestock is then divided by the agricultural area of the farm and must be less than 170kg/ha.



Closed Periods for spreading fertilisers and manures

NVZ rules specify closed periods when certain fertilisers cannot be spread on the land due to the high risk that Nitrogen will leach into watercourses at these times of year. Closed periods apply to chemical (manufactured) fertilisers and to organic manures with a high available Nitrogen content (>30% of the total N content is likely to be released in the year that it is spread)



Chemical (manufactured) fertilisers

Fertilisers manufactured by an industrial process can't be applied to land within NVZs during the following closed periods:

	Grassland	Other land (e.g. crops)
Moray, Aberdeenshire,	15th Sep - 20th Feb	1st Sep - 20th Feb
All other NVZs	15th Sep - 15th Feb	1st Sep - 15th Feb

However, autumn applications of Nitrogen to winter oilseed rape and other brassica crops are permitted during the closed period (up to crop requirement table value for rape and up to 100kg/ha for other brassicas).

Organic manure with high available N

Manures in this category include slurry, poultry manure and some organic wastes such as liquid digested sewage sludge and any other organic manures where >30% of the total N content is in a readily available form (i.e ammonium, uric acid, nitrate).

	Grassland	Other land (e.g. crops)
Sandy or shallow soil	1 Sep - 31 Dec	1 Aug - 31 Dec
All other soils	15 Oct - 31 Jan	1 Oct - 31 Jan

However, applications are permitted up to 15 September on cereal crops sown before that date or 30 September on oilseed rape, catch crop or cover crop sown before that date.



Organic manure pitfalls to avoid

- Slurry and other high available N organic manures can't be applied to **bare ground** in July, August or September unless a crop is sown within 6 weeks of first application
- Quantitative restrictions** apply to applications of slurry and other high available N organic manures during the 4 weeks prior to the closed period and between the end of the closed period until 14th February. During these periods immediately before and after the closed period, **you must not apply more than:**
 - 5 tonnes/ha poultry manure
 - 30 m³/ha other high available N organic manures (e.g. slurry)
- Closed periods do not apply to low available-N farmyard manure, but they must not be applied to land that is waterlogged, flooded, snow-covered or been frozen for more than 12 hours in the previous 24.

Storage of Organic Manures

Within an NVZ, farms must have sufficient storage available for organic manure to meet the following requirements:

- Cattle — 22 weeks minimum storage
- Pigs — 26 weeks minimum storage
- Poultry — 26 weeks minimum storage

Storage facilities must be free from structural defect and prevent run-off or seepage of effluent to the water environment, including groundwater (run-off from concrete-based solid farmyard manure storage can be directed to a constructed farm wetland).

Solid farmyard manure can be stored in field middens, although poultry manure that is not mixed with bedding material must have a waterproof cover.



However, **field middens cannot remain in the same place for more than 12 months** and must not return to a previous location until at least 24 months have passed.

Record-keeping requirements

The key annual records that must be kept and retained for at least three years to demonstrate NVZ compliance are:

- RAMS Map
- Cropping details for each individual field (including area, soil type and dates sown)
- NMax calculation for each crop type
- Dates and quantities for each type of fertiliser (including organic) applied to each field
- Details of livestock including species and type and length of time kept on farm
- Details of any imports and exports of organic manure
- Calculation of storage capacity for slurry and poultry manure
- Location of field middens for each year
- Inventory of manufactured fertilizer (quantities and types brought onto the farm, used and retained at the end of the year)

Help with calculations can be found in the NVZ guidance for farmers link below or can be calculated using suitable software such as [planet4farmers](#)

Further Information

For further information visit the FAS site and search for 'NVZ' or visit the NVZ guidance for farmers on the Scottish Government website:



www.fas.scot



[NVZ guidance for farmers](#)

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