

Nitrogen & NVZ Compliance



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Welcome

Annette Marshall, Agricultural Consultant

Location: Plough Inn, 48 Market Street, Forfar, DD8 3EW

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Overview



- Whose responsibility are they?
- What happens if I don't comply?
- What's included in the plan?
- Rules
- What you need to do!

Water Framework Directive



- EU legal act
- Nitrates Directive
- Here to stay?
- Vulnerable areas in NVZ (East of Scotland)
- Primary target – improve water quality and ensure better use of nutrients

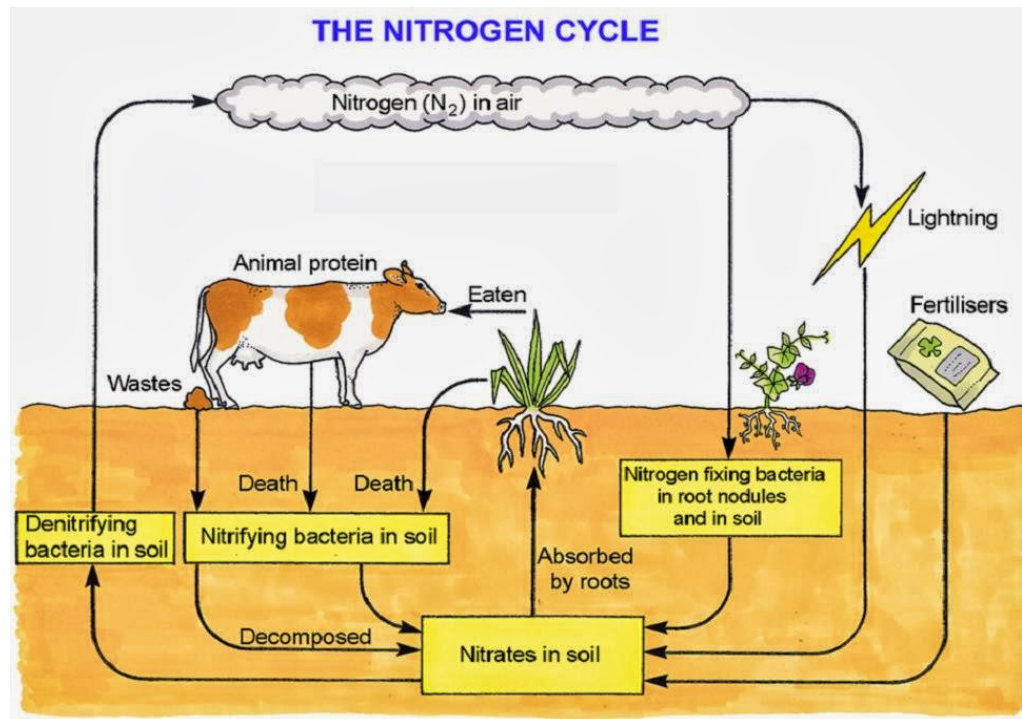
Who keeps the records?



- Occupier who uses the land for more than 2 years
- Person letting out land if grazing let or short term let
- Only for land in NVZ, can be part of farm if on boundary
- Need all records for all land including rented out eg potatoes
- If in doubt, do them!

What happens if I don't comply?

- Environmental impact:
 - Nitrates are soluble and volatile
 - 50% - 70% of applied N lost



What happens if I don't comply?



- Financial impact:
 - Inspections can go back 3 years
 - Penalties of 3-5% common.
 - Wasted fertiliser product?

Environmental impact

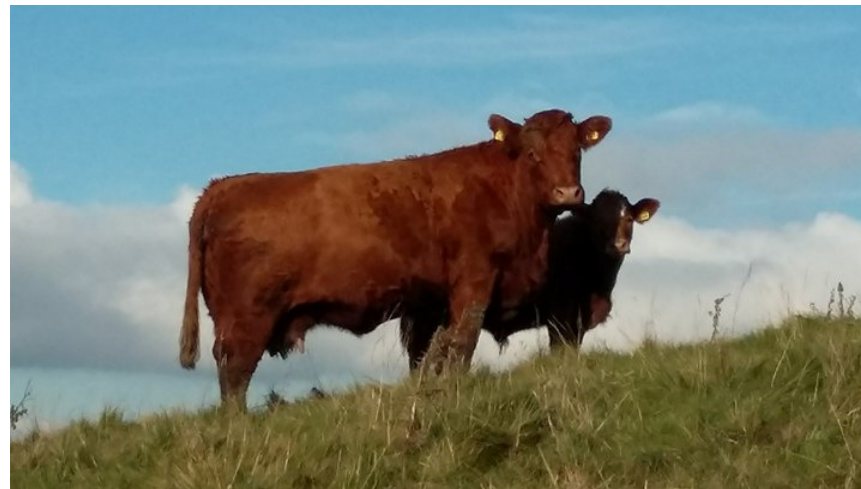
- Watercourses
- Lost to air



NVZ Plan



- To be completed annually
- To be in place by 1st March
- To be available on request from SGRPID



What should be included in the NVZ plan?

- Field details
- RAMS Map – including OM midden locations
- Livestock manure loading limit
- OM Spreading loading limit
- NMAX
- Chemical fert Inventory
- Import/export OM
- Fert/ OM spread
 - Dates, types and rates
- Slurry storage if relevant



Field Details



- Total size
- Size of cropped area
- No spread areas
- Previous crop
- Planned crop
- Soil type - http://sifss.hutton.ac.uk/SSKIB_Stats.php
- Buffers

RAMS Map – Risk Assessment for Manures and Slurry

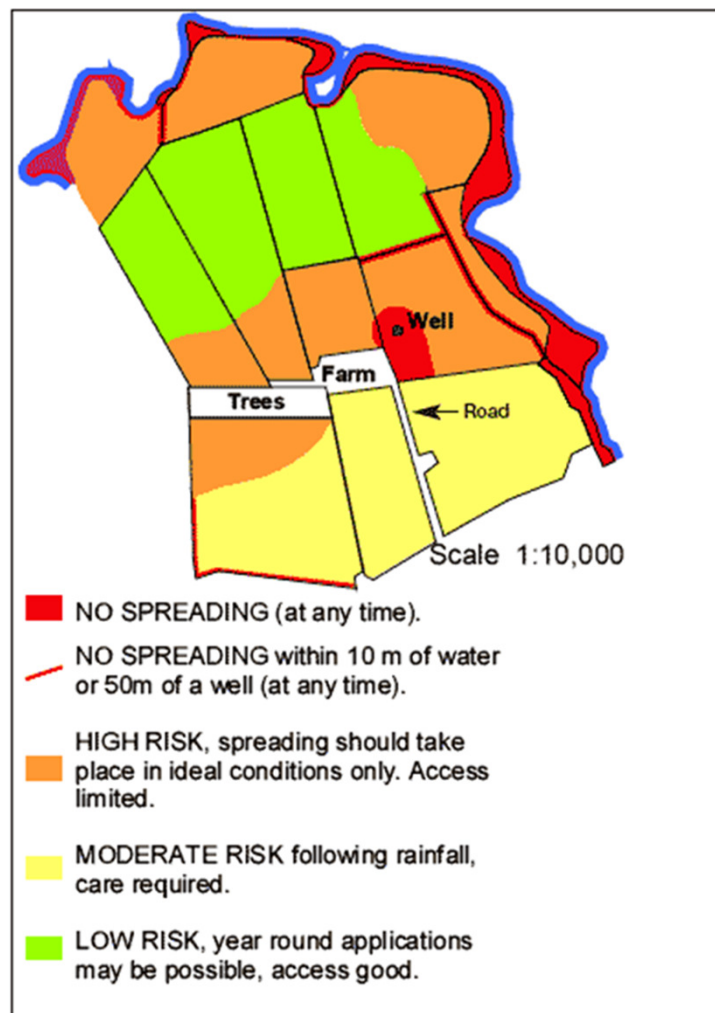


No Spread	No spreading at anytime. Within 50m of borehole or 10m watercourse
High Risk	Slopes of 12° or steeper, waterlogged land, or land which floods more than 1 in 5 years
Moderate Risk	Slopes between 4° and 12°, slopes draining towards water courses, imperfectly drained land
Low Risk	Good access, no artificial drainage

RAMS Maps



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Features on a RAMS Map



- Identify surface waters e.g ditches, burns, rivers, lochs, ponds and any wet areas especially areas that are prone to flooding
- Identify unavailable areas where spreading cannot be carried out e.g woodlands, steading areas, roads, yards. Deduct from spreadable area.
- Annually mark the location of field middens – NOT on no spread or high risk areas

Temporary Field Heaps



- Not more than 12 months in the same place
- Site cannot be reused within 24 months
- 10m from surface water and 50m from a borehole
- Not on high risk area
- No pollution incident
- Location identified on map annually
- Poultry manure not mixed with litter, must be covered

Livestock manure loading limit



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- 170kg/ha of N across whole holding
- Nitrogen excreted by animals on the farm or imported Organic Manures less exported Organic Manures
- Standard production figures
- Assessed across **utilisable** agricultural area of the land within the NVZ.

Spreading organic manure loading limit

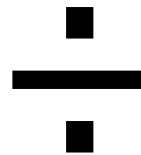


- 250kg/ha of N
- All organic manures (with the exception of compost)
- Applied in any 12 month period
- Excludes grazing deposition and manufactured nitrogen fertiliser
- Assessed across the **spreadable** area of the field

Livestock manure loading limit – organic



Total nitrogen content of all organic manures to be
applied to the field



The available spreading area of the field
(must be within 250kg/ha)

Standard Figures

Manure Type	kg/m ³ or kg/t
Cattle Farmyard Manure	6
Pig Farmyard Manure	7
Sheep Farmyard Manure	7
Duck manure	6.5
Poultry layer manure	19
Poultry Broiler manure (litter)	30
Turkey manure (litter)	30
Cattle Slurry (2% Dry Matter)	1.6
Cattle Slurry (6% Dry Matter)	2.6
Cattle Slurry (10% Dry Matter)	3.6
Pig Slurry (2% Dry Matter)	3
Pig Slurry (4% Dry Matter)	3.6
Pig Slurry (6% Dry Matter)	4.4
Strainer Box cattle slurry	1.5
Weeping-wall cattle slurry	2
Mechanically Separated Cattle slurry	3
Mechanically Separated Pig slurry	3.6
Dirty water, less than 1% dry matter	0.5

Own analysis figures
can be used

Estimated production FYM per winter



- Cows 7.25t FYM
- Fatteners 4.75t FYM
- Stores 3.5 FYM

Compost



- 500kg/ha limit for compost (including other organic manures)
- Within a 24 month period
- Compost must comply with PAS 100 regulations

NMAX



- Total nitrogen applied as manufactured fertilisers plus the crop available nitrogen from organic manure applications
- Assessed across a crop type - **not on a field level**
- Gives flexibility at a field level
- 26% of NVZ breaches were because the NMAX was exceeded.

Calculating Nmax for Crops



Stage 1 - Gather field information.

Stage 2 - Use simple look- up tables to work out standard nitrogen requirement.

Stage 3 – Deduct N from OM from total N allowed

Stage 4 – Adjust for rainfall.

Stage 5 - Calculate the Nmax for the crop type by adding up the nitrogen requirement for each field growing that crop type.

Standard NMAX Figures – OMS Soils – kg/ha N



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Crop	Residue Group 1 (Eg cereals)	Residue Group 2 (eg WOSR, Vining peas)	Residue Group 3 (eg beans, 1-2 yr low N grazed withing 2 months)	Residue Group 6 (eg PGRS high N)
WW	200	190	180	90
WB	180	170	160	70
SB	130	120	110	20
Potatoes	225	215	205	115

Average yields used for Nmax



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Crop	Standard Yield (t/ha)
Spring barley	5.5
Winter barley	6.5
Winter wheat	8.0
Spring oats	5.0
Winter oilseed rape	4.0

Grassland NMAX is decided by the cuts of silage, grazing and clover content

49% of NVZ breaches were due to farmers using higher yields with no proof.

Yield Increases



Wheat – 20kg/ha for every tonne over standard

– WW 8t/ha

SW 7t/ha

Barley and Oats -15 kg N for every tonne over standard yield

WB 6.5t/ha

SB 5.5t/ha

WO 6t/ha

SO 5.0t/ha

Almost half suffered breach when using higher yields with no proof.

Nmax Increases



- Milling WW varieties increase of 40kg/ha N
- High N distilling SB 15kg/ha N
- WOSR yields over 4t/ha extra 30kg N/ha
- Rainfall not relevant in area

Chemical Inventory



- Opening stock on 1st January
- Purchased
- Closing stock 31st December
- Date and type

Running total not required but SGRPID could calculate usage

[illegible]

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Movement of Livestock Manure



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- Type of manure
- Nitrogen content of manure (standard figures or own analysis)
- Quantity moved
- Date of movement
- Name and address of person supplying or receiving the manure (amounts must match and can be checked)

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Slurry Storage



- Pig slurry minimum 26 weeks
- All other livestock slurry minimum 22 weeks
- Must use standard values for excretion figures
- Take rainfall and washings into account

Chemical Fertiliser Closed Periods



No applications within the following periods:

Grassland

15th September to
15th February

Other Land

1st September to 15th
February

Chemical Fertiliser



- Only allowed WOSR and brassicas autumn application
- All applications must be recorded
- No applications if land is:
 - Waterlogged
 - Flooded
 - Frozen for 12 in 24 hours

High Available N OM Closed Periods



No spreading within the following dates

<u>Soil</u>	<u>Grassland</u>	<u>Other Land</u>
Sandy or shallow	1 st September to 31 st December	1 st August to 31 st August
All other	15 th October to 31 st January	1 st October to 31 st January

High Available N OM Closed Period



- Allowed:
 - Up to 15th Sept if cereal crop sown
 - Up to 30th Sept if WOSR, catch or cover crop sown
- Max applications 4 weeks prior to closer period and until 14th Feb
 - 5t/ha poultry manure
 - All other organic manures 30m³

Converting units –kg/ha!



1 bag = 50kg

1cwt/acre = 125.5kg/ha

$\text{Kg/ha} \times 0.8 = \text{units/ac}$

$\text{Units/ac} \times 1.25 = \text{kg/ha}$

For example:

$(130\text{kg/ha } 20:10:10 \times 0.8) = 104 \text{ units/ac } 20:10:10$

$(2\text{cwt/ac } 34.5\% \times 1.25) \times 100 = 250\text{kg/ha } 34.5\%$

Kg of nutrient

$$\begin{aligned} 2\text{cwt of } 20:10:10 &= ? \text{ Kg N} \\ &= (2 \times 125\text{kg}) \times 20\% \\ &= \underline{50\text{kg N}} \end{aligned}$$

$$\begin{aligned} 7.5 \text{ bags of } 20:10:10 &= ? \text{ Kg N} \\ &= (7.5 \times 50\text{kg}) \times 20\% \\ &= \underline{75 \text{ kg N}} \end{aligned}$$

What you need to do! (if we do the plan)



- Check application does not exceed NMAX
- Field records – update!
- Ensure have a RAMS map
- Where Midden is located
- Manure movement
 - Muck for straw is included
- Manufactured fertiliser inventory



Example 1 – Field Record



SB crop

Previous crop SB

25t/ha dung in autumn

375kg/ha of 14:14:21 on 15th March

175kg/ha of 34.5% N on 15th April

NMAX 130kg/ha

- **Is the NMAX exceeded?**

Answer 1 – Field Record



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Field Number: Field 1			Field Area: 10ha			Harvest year: 2018			
Calculated NMAX for crop type: 130kg/ha			Soil Type: OMS						
Field use details		Manufactured nitrogen applied			Organic manure applications				
Date fert or manure applied	Crop type	Date sown	Fertiliser type	Amount applied kg/ha	Total nitrogen applied	Manure reference number	Analysis of N content kg/t	Quantity applied m ³ /t per ha	Total N applied kg/ha
10/1/2018	SB	15/3/2018				1	0.6	25	15
15/3/2018			14:14:21	375	52.5				52.5
15/4/2018			34.5%	175	60				60
								Total	127.5kgN/ha

Example 2 – Stocking Records



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50 continental cross sucklers

– One cow dies in December

Autumn calving (90% calving rate)

Young stock sold at 13 to 14 months

2 Stock bulls

- **What are the average stock numbers?**

Answer 2 – Stocking Records



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Livestock Type	Number present on first day of calendar month												Average
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1 Dairy Cow, High Milk Yield (> 9000kg)													
1 Dairy Cow, Med Milk Yield (6000 to 9000kg)													
1 Dairy Cow, Low Milk Yield (less than 6000kg)													
1 Dairy Heifer Replacement, 13 mths to first calf													
1 Dairy Heifer Replacement, 3 to 13 mths													
1 Large Beef Suckler, 25 mths and over (over 500kg)	50	50	50	50	50	50	50	50	50	50	50	49	50
1 Small Beef Suckler, 25 mths and over (up to 500kg)													
1 Beef Grower, 25 mths and over													
1 Beef Grower, 13 to 25 mths										45	45	22	9
1 Beef Grower, 3 to 13 mths	45	45	45	45	45	45	45	45	45				48
1 Bull Beef 3 mths and over													
1 Bull for breeding 25 mths and over													
1 Bull for Breeding, 3 to 25 mths	2	2	2	2	2	2	2	2	2	2	2	2	2
1 Calf up to 3 mths										23	45	45	13

Example 3 – Manure Records



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- You sell 1000t of cattle FYM to Mr Brown, Green Farm, Forfar on the 30th March (This is a straw for muck deal).
- You buy 500t of hen pen from Mr Smith, Town Farm, Brechin on the 15th July.
- **Fill out the manure records**

Answer 3 – Manure Records



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Date of Import/Export	Tonnes Supplied (S) / Received (R)	Manure type	Nitrogen content kg/t/m ³	Received from / Supplied to
30/03/2018	1000t (S)	1	6	Mr Brown, Green Farm, Forfar
15/07/2018	500t (R)	8	19	Mr Smith, Town Farm, Brechin

1 = Cattle FYM

8 = Layer manure

Example 4 – Fertiliser Inventory



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You started 2018 with 3t of 20:10:10,
purchased a further 30t and spread 33t.

You started 2018 with no 34.5% N, purchased
20t, but only spread 15t.

- **What are the closing stocks?**

Answer 4 – Fertiliser Inventory



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Calendar year 2018

Fertiliser type	Opening stock in tonnes	Purchased fertiliser in tonnes (01/01/2018)	Closing stock in tonnes (31/12/2018)
20:10:10	3	30	0
34.5%	0	20	5

PLANET Scotland



- Field-level nutrient and lime recommendations based on SAC technical notes
- Field-level records to meet NVZ compliance requirements
- Farm Gate Nutrient Balance (NPK)
- Library of range of key reference documents
- <http://www.planet4farmers.co.uk>

Thank You

