

NVZ Workshop

Alastair Beattie & Sam Henderson

11th September 2017












The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas





Scottish Government
Riaghaltas na h-Alba
gov.scot

NVZ Workshop



Topics to cover:

- NVZ regulations in Lower Nithsdale - Requirements
- What records you need to keep to be compliant
- How to create a RAMS map
- Common errors found on inspections
- Nutrient budgeting, maximising efficiency and reducing fertiliser costs
- Update on cross compliance and greening rules.



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas





Scottish Government
Riaghaltas na h-Alba
gov.scot

2

NVZ Workshop



Revised NVZ Map - Lower Nithsdale

(Effective from February 2015)



3

NVZ Plan



- To be completed annually
- To be in place by 1st March each year
- Kept for at least 3 years



4

NVZ requirements



You must prepare annually a Fertiliser and Manure Management Plan:

1. RAMS map
2. Calculation and record of storage capacity of livestock manures (if applicable)
3. Calculation and record of 170kg N/ha loading limit for livestock manure (based on livestock numbers & area farmed)
4. An N-max calculation for each crop type (based on field records)



Scottish Government
Riaghaltas na h-Alba
gov.scot

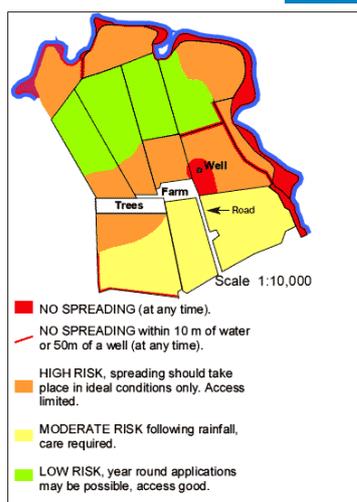
5

1 RAMS Map



(Section 4)

- Field boundaries
- Field size
- Surface water (blue)
- Non-spreading areas
- High risk
- Moderate risk
- Low risk
- Location of field heaps

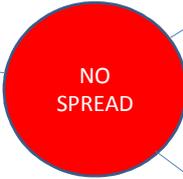


Scottish Government
Riaghaltas na h-Alba
gov.scot

6

Risk Assessment for Manures & Slurry





No spreading at any time

Areas within 50m of a well or borehole

Areas within 10m of a watercourse


The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas





Scottish Government
Riaghaltas na h-Alba
gov.scot

7

Risk Assessment for Manures & Slurry





- Land with a slope of more than 12 degrees

Spreading in ideal conditions only

Access limited

Risk of flooding more than once in 5 years

Fields with new drains installed in previous 12 months

No field heaps allowed

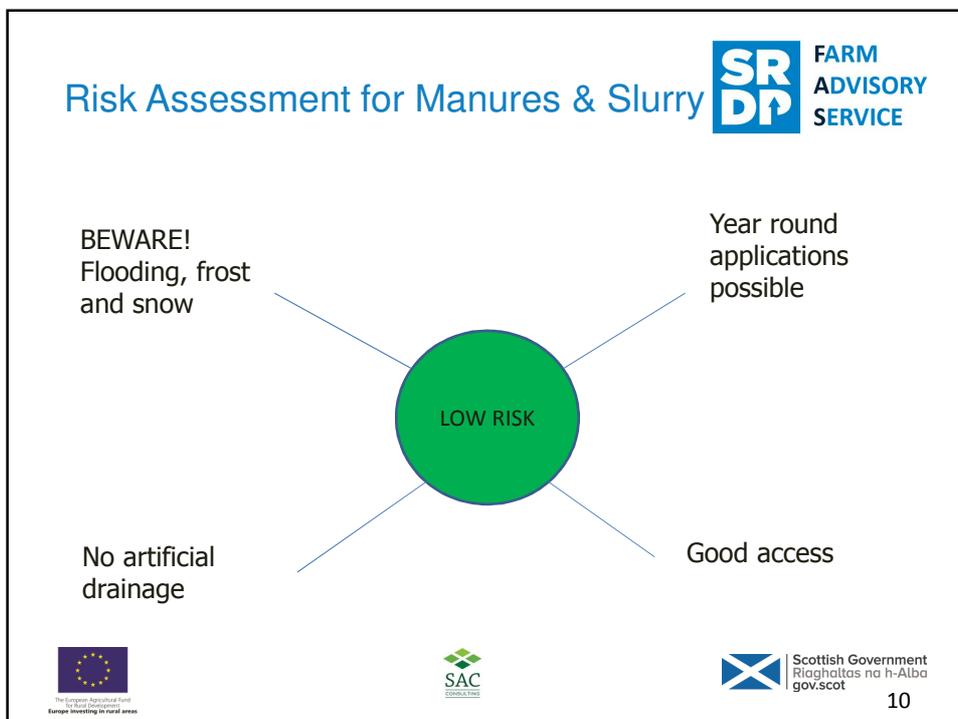
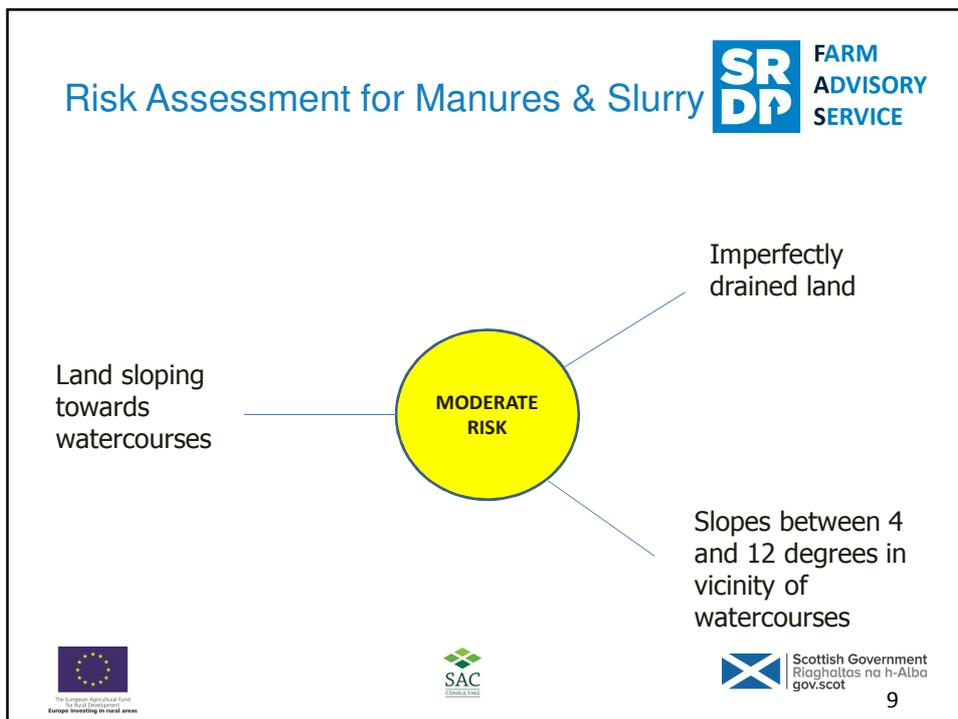

The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas





Scottish Government
Riaghaltas na h-Alba
gov.scot

8



Other Features on 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.
- Mark the location of **field middens** – NOT located on no spread or high risk areas



11

2. Record capacity of storage facilities for livestock manure



12

Slurry Storage



Slurry	Storage Capacity
Pig	26 Weeks
All other livestock	22 Weeks

- Maintained free from structural defect
- Sufficient standard to prevent run off or seepage entering groundwater
- Storage capacity requirement calculated using **standard production figures** per head, rather than actuals.



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

13

Storage of solid manures



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

14

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 sited on land sloping toward surface water
- Location identified on RAMS map
 - **Not located on high risk areas**
- Poultry manure which is not mixed with litter must be covered



15

Permanent storage (Manures – sect 5, pg 12)



- Manure that cannot be stacked without slumping
- Manure that produces free drainage of liquid

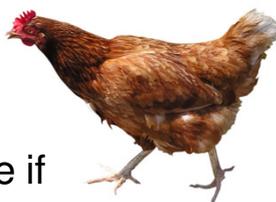
Storage:

- Impermeable base and run off collected
- Covered to prevent rainfall ingress **or**
- Facilities to collect and store run off
(constructed farm wetlands for FYM run-off)



16

Poultry manure



- 26 weeks storage if cannot be stored in a temporary field heap or exported off the farm

Storage

- In the livestock house or on a concrete base
- Covered by a roof or provisions for safe storage of run off



17

3. Calculate Loading Limit for Livestock Manure



- 170kg N/ha/year – loading limit for livestock (organic) manure
- Nitrogen excreted by animals on the farm – spread on land or deposited during grazing
- Nitrogen content of any imported livestock manure
- Standard production figures ([sect 4, pg 10](#))
- Assessed across **utilisable** agricultural area of the land within the NVZ.



18

170 kg/ha/yr – loading limit for livestock manure



Total N excreted by livestock on the farm plus the N content of imported manure



the total agricultural area of the farm within the NVZ



250 kg N/ha – field application limit for organic nitrogen



- All organic manures
- Applied in any 12 month period
- Excludes grazing deposition and manufactured nitrogen fertiliser
- Assessed across the **spreadable** area of the field

(see sect 2, pg 6)



250 kg/ha – field limit for organic nitrogen



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



The available spreading area of the field



21

4. Calculate nitrogen requirement for each crop including grassland (section 6)



22

N-max (section 6)



- 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 basis
- Gives flexibility at a field level



23

Calculating Nmax for crops



Stage 1

- Gather field information: Previous Crop, Planned crop, Soil type

Stage 2

- Use simple look-up tables to work out standard nitrogen requirement ([look-up tables in section 9, pages 6-11](#))
- Adjust for higher than standard yields – rainfall & expected yield - CAUTION!



24

Calculating Nmax for crops



Stage 3

- Account for livestock and other organic manures
- Deduct the crop available nitrogen from the crop requirement to give the balance that can be applied as bagged fertiliser (Sect 9, Pg 12-15)

Manure type	Typical N (kg/t)	NVZ Minimum% Available to crop	Available N (kg/t)
Cattle Slurry	2.6	40	1.04
Pig Slurry	3.6	50	1.8
Layer Manure	19	30	5.7
Cattle FYM	6	10	0.6



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

25

Calculating Nmax for crops



Stage 4

- Adjust for rainfall. An upward adjustment can be made if the actual localised rainfall 1st Oct – 1st March exceeds 450mm (Not on residue group 1)
- See N residue tables 1 – 6 (Section 9, Pg 6-11)

Stage 5

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



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

26

Example NMax for Spring Barley



Crop type:	SB	Previous Crop	Soil Type	Standard yield: 5.5t/ha		Average yield for this farm: 6.5t/ha				Balance to be applied as manufactured N	
				Standard N Rate	Adjustments	Adjusted Nmax limit		Available N from organic manure		Balance to be applied as manufactured N	
Field	Crop Area ha			kgN/ha	Yield	Market	N rate	Total N			
Field 1	10	SB	OMS	130	15		145	1450	150		1300
Field 2	12	SB	SAND	150	15	15	180	2160			2160
Field 3	5	PEAS	OMS	120	15		135	675			675
Field 4	20	PGRS	OMS	90	15		105	2100			2100

Total Area 47ha

SB Nmax 6235 kgN
133kgN/ha



Scottish Government
Riaghaltas na h-Alba
gov.scot

27

Calculating Nmax for grassland



Stage 1

- Determine site class – see section 9, Pg 4

Stage 2

- Use look-up tables to determine nitrogen requirement for intended management – i.e grazing/ cutting

Stage 3

- Deduct crop available nitrogen from manure applications
= Nmax for whole grassland area



Scottish Government
Riaghaltas na h-Alba
gov.scot

28

Nmax for Grassland



Grass Management	Site Class 2 kgN/ha
2 or 3 cut silage + grazing	300
Grazing with low clover	270
1 cut silage + grazing	260
Hay + grazing	210
Grazing with high clover	90

(See section 9, Pg 4)



The European Agricultural Fund
Rural Development
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

29

NVZ requirements



You must prepare annually a Fertiliser and Manure Management Plan:

1. RAMS map
2. Calculation and record of storage capacity of livestock manures (if applicable)
3. Calculation and record of 170kg N/ha loading limit for livestock manure (livestock numbers)
4. An Nmax calculation for each crop type (field records)



The European Agricultural Fund
Rural Development
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

30

NVZ Records



- Record the area of a farm within an NVZ.
- Field records
- Livestock numbers
- Movement of livestock manure on and off farm
- Artificial fertiliser inventory



31

2. Field Records



- Area
- Soil type
- Crop and date of sowing
- Quantity and type of chemical fertilisers and organic manures
- Already doing this?



32

Example Field Record



Field Number: Field 1	Field Area: 10ha	Harvest year: 2016
Calculated Nmax fo crop type: 133kg/ha	Soil Type: OMS	

Date fert or manure applied	Field use details		Manufactured nitrogen applied			Organic manure applications			Total N applied kg/ha
	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	
10/01/2016	SB	15/03/2016				1	6	20	120
15/03/2016			14:14:21	375	52.5				52
15/04/2016			34.50%	175	60				60



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

33

3. Livestock Numbers



- Species
- Type
- Length of time on the farm



The European Agricultural Fund
for Rural Development
Europe Investing in Rural Areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

34

Example stocking records



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	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													
1 Beef Grower, 3 to 13 mths		25	50	50	50	50	50	50	50	50	50	50	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
1 Calf up to 3 mths		25								25	50	50	13
1 Hill Ewe with suckled lamb(s) up to 6 mths													
1 Lowground Ewe with suckled lamb(s) up to 6 mths													
1 Lamb from 6 mths up to 9 mths													
1 Lamb, 9 mths & over to 1st lambing/tupping or slaughter													
1 Goat													
1 Breeding Deer Hind													
1 Deer Calf Finisher													
1 Horse													



Scottish Government
Riaghaltas na h-Alba
gov.scot

35

4. Movement of livestock manure on or off the farm



- 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



Scottish Government
Riaghaltas na h-Alba
gov.scot

36

Example Manure Records



Date of Import/Export	Tonnes Supplied (S) / Received (R)	Manure type	Nitrogen content kg/t/m ³	Received from / Supplied to
30/03/2013	1000t (S)	Cattle FYM	6	Mr Brown, Green Farm, Haddington
15/07/2013	500t (R)	Layer manure	19	Mr Smith, Town Farm, Haddington



Scottish Government
Riaghaltas na h-Alba
gov.scot

37

5. Manufactured fertiliser inventory



- Purchases
- Used
- Retained



Scottish Government
Riaghaltas na h-Alba
gov.scot

38

Example Fertiliser Inventory



Calendar year 2017

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



The European Agricultural Fund
Technical Assistance
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

39

Rules relating to the application and storage of N fertiliser



- Must complete Nmax for a crop before applying any N fertiliser
- Total N available to the crop must not exceed the crop requirement (Nmax)
- No applications to take place when land: is waterlogged, is flooded, has been frozen for 12 hours or longer, is snow covered
- No applications to slopes >12 degrees if risk of N entering water
- All N fertiliser must be applied accurately to land
- All applications of N fertiliser must be recorded



The European Agricultural Fund
Technical Assistance
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

40

Rules relating to the application and storage of N fertiliser



- No application of manufactured N fertiliser during the following periods:

	Grassland	Other land
Nithsdale NVZ	15 th September to 15 th February	1 st September to 15 th February

- Applications to WOSR permitted, a max 100kg/ha can be applied to other brassica crops during closed period



Scottish Government
Riaghaltas na h-Alba
gov.scot

41

Rules relating to the application and storage of N fertiliser and specific manure types



Organic manure:

- 250kg N/ha/field application limit for organic N
- No spreading within 10m of a watercourse
- No spreading within 50m of a well, borehole or other water supply



Scottish Government
Riaghaltas na h-Alba
gov.scot

42

Rules relating to the application and storage of N fertiliser and specific manure types



Organic manure with a high available N content

- No spreading within the NVZ during the following periods:

	Grassland	Other land
Sandy or shallow soil	1 st September to 31 st December	1 st August to 31 st December *
All other soils	15 th October to 31 st January	1 st October to 31 st January

- *applications permitted up to and including 15th September if a cereal crop is sown before that date, also permitted up to 30th September if the land is sown with OSR, catch crop or cover crop before that date.



The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

43

Rules relating to the application and storage of N fertiliser and specific manure types



- Quantitative restrictions apply during the 4 weeks prior to the commencement of the relevant closed period and from the day following the last day of the closed period until 14th February.
- If applied to bare ground during July, August or September, crop must be sown within 6 weeks of first application.
- At least 3 weeks must elapse before a repeat application of organic manures



The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

44

Rules relating to the application and storage of N fertiliser and specific manure types



Solid manure:

- Can be stored in temporary field heaps for no longer than 12 months. Site of temporary field heap cannot be reused for 24 months. Not sited in no spread or high risk area on RAMS map
- Any permanent storage site must be on an impermeable surface which prevents drainage to the water environment. Must be enclosed by waterproof covering or have adequate facilities to collect run off. At least 3 weeks must elapse before a repeat application of organic manures



Scottish Government
Riaghaltas na h-Alba
gov.scot

45

Rules relating to the application and storage of N fertiliser and specific manure types



Slurry:

- 26 weeks min storage for pigs
- 22 weeks min storage for cattle
- Must not be applied by high trajectory splash plate, except where application is to growing arable crop
- Poultry manure – 26 weeks min storage



Scottish Government
Riaghaltas na h-Alba
gov.scot

46

Common errors found upon inspection



- NVZ plan not available
- Applications of nitrogen within closed periods
- Nmax breach (plan not being followed or understood)
- Incorrect records
- 250kg/ha N organic manure limit exceeded
- Spreading in closed period
- Over application during restriction period



Scottish Government
Riaghaltas na h-Alba
gov.scot

47

No plan in place



- 3 years of NVZ plans must be available
- RAMS map
- Slurry Storage
- 170kg Loading
- Nmax for each crop type.



Scottish Government
Riaghaltas na h-Alba
gov.scot

48

Applications of nitrogen within closed periods (Booklet 2)



<p>(2) "Chemical Fertiliser" or "Manufactured Fertiliser" means nitrogen fertiliser which is manufactured by an industrial process.</p>	Closed period: No application to land within the NVZ during the following periods:		
		Grassland	Other land^{1,2}
	Moray, Aberdeenshire, Banff and Buchan NVZ	15th September to 20th February	1st September to 20th February
	All other NVZs	15th September to 15th February	1st September to 15th February
<p>¹ application to winter oilseed rape permitted (use autumn value in crop requirement tables). ² a maximum 100 kg/ha can be applied to other brassica crops during the closed period.</p> <p>No application in a location or manner that makes it likely that fertiliser will directly enter any surface water.</p> <p>No application within 2m of a surface water (not an NVZ rule, but included as covered by General Binding Rule 18 of the Water Environment (Diffuse Pollution) (Scotland) Regulations 2008).</p>			
<p>(4) "Organic Manure with a high available N content" means more than 30% of the total nitrogen content of the organic manure is present in molecular forms that will be released in the year in which it is spread on land. This includes slurry, poultry manure and some organic wastes such as liquid digested sewage sludge.</p>	Closed period: No spreading within the NVZ during the following periods:		
		Grassland	Other Land
	Sandy or shallow soil	1st September to 31st December	1st August to 31st December*
	All other soils	15th October to 31st January	1st October to 31st January
<p>* Applications permitted up to and including 15th September, if a cereal crop is sown before that date, also permitted up to 30th September if the land is sown with oilseed rape, a catch crop or a cover crop before that date.</p> <p>Quantitative restrictions apply during the 4 weeks prior to the commencement of the relevant closed period and from the day following the last day of the closed period until 14th February.</p> <p>If applied to bare ground during July, August or September, crop must be sown within 6 weeks of first application.</p> <p>For other rules that apply see definitions (1) & (3) in this booklet.</p>			



The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

49

Nmax breach



- Not accounting for organic nitrogen in calculations
- Incorrect calculation of Nmax
- Incorrect previous crop
 - grassland, brassicas, N fixing, rape with high residue groups



The European Agricultural Fund
Rural Development
Europe Investing in Rural Areas



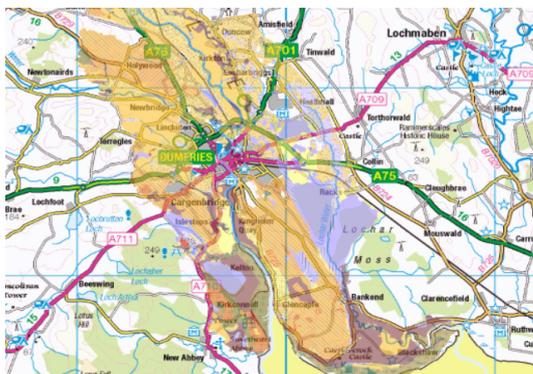
SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

50

Nmax breach due to wrong soil texture



[Soils for Scotland website](#)
(click here for link)

http://map.environment.gov.scot/Soil_maps/?layer=9#



The European Agricultural Fund
Rural Development
Europe investing in rural areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

51

Incorrect records



- Incorrectly recorded fertiliser applications
- Recording 33.5% N and applying 34.5%N
- Incorrect livestock numbers
- Wrong slurry DM used



The European Agricultural Fund
Rural Development
Europe investing in rural areas



Scottish Government
Riaghaltas na h-Alba
gov.scot

52

250kg/ha N organic manure limit exceeded



- 250kg/ha N limit of total N from all organic manures other than compost applied to land in any 12 month period.



PLANET

NUTRIENT MANAGEMENT



SR DP FARM ADVISORY SERVICE



The European Agricultural Fund
Rural Development
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

55

Cross Compliance

SR DP FARM ADVISORY SERVICE



The European Agricultural Fund
Rural Development
Europe Investing in rural areas



SAC
CONSULTING



Scottish Government
Riaghaltas na h-Alba
gov.scot

GAEC 1- Buffer Strips along watercourses







Scottish Government
Riaghaltas na h-Alba
gov.scot

57

GAEC 1- Buffer Strips along watercourses



- **You must not**
 - apply pesticides within 2m of the top of a bank
 - apply nitrogen fertilisers to land if there is significant risk of nitrogen entering surface water
 - apply organic manure or locate field heaps* to/on any land which is situated within
 - 10 metres of any surface water
 - 50 metres of any well, borehole, etc for the supply of water
 - Cultivate land within 2m of the top of a bank of surface water





Scottish Government
Riaghaltas na h-Alba
gov.scot

58

GAEC 5 - Minimum land management reflecting site specific conditions to limit erosion



- You Must
 - prevent the erosion of the banks of watercourses, watering points and feeding areas from overgrazing or heavy poaching by livestock
 - put in place appropriate measures to limit soil erosion if agronomic or weather conditions prevent the subsequent crop or a cover from being sown



Scottish Government
Riaghaltas na h-Alba
gov.scot

59

GAEC 7- Retention of landscape features



Scottish Government
Riaghaltas na h-Alba
gov.scot

60

GAEC 7- Retention of landscape features



- **You must not**
 - Remove or destroy remove or destroy drystone or flagstone dykes, turf and stone-faced banks, walls, hedges, ponds, watercourses or trees
 - trim hedges or lop branches off trees during the bird nesting and rearing season starting on 1 March and ending on 31 August except for road safety reasons
 - cultivate land within two metres of the centre line of a hedge
 - apply fertilisers or pesticides within two metres of the centre line of a hedge
 - alter, damage or destroy a Scheduled Ancient Monument



61

Greening



- EFA 5% of your arable area
- Arable area including temporary grass & arable crops
- Fallow 1, Field Margin 1.5, Buffer Strip 1.5, Nitrogen fixing crop 0.7. Catch crop 0.3, Green Crop 0.3
- PGRS nutrient plan
- Fallow no production 15th January – 15th July
- Field Margins & Buffer Strips no production 1st January – 31st December



62

Thank You

