Appendix 1 – The Nitrates Code

The Code of Good Agricultural Practice to control nitrate loss and to protect against nitrate pollution.

Article 4 of the EC Nitrates Directive (91/676/EEC) requires the WAG to provide a Code to be implemented by farmers, on a voluntary basis, to provide all waters with a general level of protection from nitrate pollution. This Nitrates Code draws together all of the advice given within the Code for Good Agricultural Practice which contributes to this purpose.

Land Managers within Nitrate Vulnerable Zones **must** comply with the mandatory rules as laid out in Wales' Action Programme (Ref 3).

Nitrogen (N) fertiliser refers to both manufactured fertiliser and organic manures.

'Organic Manures' includes all livestock manure and slurry.

Spreading periods for organic manures

- Livestock manures, such as cattle and pig slurries and poultry manure, and liquid digested sewage sludge contain a relatively high proportion of readily available nitrogen (i.e. greater than 30% of total nitrogen is present in a readily available form). You should apply these at times when crops can use the nitrogen efficiently. Where practically possible you should not apply them in the autumn and early winter months. This is particularly important on sandy and shallow soils where the risk of nitrate leaching is greatest.

- You can apply organic manures that do not contain much readily available nitrogen (i.e. less than 30% of total N is readily available) such as farmyard manure, sewage sludge cake and compost made from green waste at any time, if field conditions are suitable to avoid causing run-off.

Spreading periods for manufactured nitrogen fertiliser

- It is important to apply manufactured nitrogen fertiliser only at times when the crop can use the nitrogen. You should not apply it to grass between 15 September and 15 January and to other crops between 1 September and 15 January unless there is a specific crop requirement at this time.

Keeping nitrogen out of surface waters

- You should not apply organic manures, or manufactured fertiliser when the soil is waterlogged, flooded, frozen hard or snow-covered.

- You should be particularly careful when applying any kind of nitrogen fertiliser to fields where there is a risk of nitrogen getting into surface water via run-off. You should take into account the slope of the land, weather conditions, ground cover, proximity to surface waters, soil conditions and the presence of land drains.

- You should not apply organic manures within:

  - 10 metres of surface waters, including field ditches; or
  - 50 metres of a spring, well or borehole.

- You should be particularly careful when applying organic manures to steeply sloping land close to surface waters.

- You should spread organic manures as accurately as practically possible. You should avoid using high pressure, high trajectory techniques (e.g. rain guns, slurry guns and jetters) when spreading slurries as these cause atomisation (small droplets) and subsequent drift.

- You should spread manufactured nitrogen fertiliser accurately and at the right rate. You should not apply it within 2m of ditches or watercourses.

Storage of organic manures

- You should provide sufficient storage capacity to allow optimum timing and use of manure nutrients, which may allow you to reduce the amount of fertiliser you buy. For operational reasons and to avoid nitrate pollution you may require 5 months storage for cattle slurry (increasing to 6 months in the case of pig slurry or poultry manure).

- Slurry should be stored in a specially constructed vessel, which should be impermeable and not allow liquids to escape. Other forms of storage (e.g. in livestock housing or a temporary field heap) may be sufficient for some non-slurry manures.

- Organic manures stored in temporary field sites should be solid (i.e. stackable and not draining liquid). Solid poultry manure that does not have bedding mixed into it and is stored on a temporary field site should be covered with an impermeable material.

- Temporary field sites should not be in a field liable to flooding or becoming waterlogged. Heaps should be located at least 10 metres away from surface waters and land drains and 50 metres away from any springs, wells or boreholes. They should not be located in any single position for more than 12 months, nor located in the same place as an earlier one constructed within the last two years.

The organic manure N field limit

- To reduce nitrate leaching losses, you should not apply more than a total of 250 kg/ha of nitrogen in organic manures to any field in any 12 month period.

- The available nitrogen applied, i.e. the amount of the total nitrogen that is readily available to the crop depending on time of year and method of spreading, should not exceed the needs of the crop. This may mean applying less than the 250 kg/ha total nitrogen limit.

- There are simple on-farm kits that can estimate the nitrogen in animal slurries that is readily available to crops (Ref 26), or you can use look up tables (Ref 25).

Planning Nitrogen Use

- You should carefully work out the amount of nitrogen fertiliser needed for each crop in each field. You should not exceed the crop requirement, as this increases the amount of nitrate lost by leaching as well as being a waste of money. You should take into account the amount of nitrogen supplied by the soil. This will depend on the type of soil, previous cropping, rainfall and any organic manure you have applied. There are various recommendation systems available to help you (Refs 29 and 30). Where the soil nitrogen supply is high, soil analysis for mineral nitrogen can provide a more precise guide to fertiliser requirement.

- You should keep accurate records of the amounts and dates of applications of manufactured nitrogen fertilisers, organic manures and other nitrogen containing materials that are used as nitrogen fertilisers (e.g. digested sewage sludge) to help work out how much nitrogen fertiliser is needed for future crops.

Appendix 2 – Soil Erosion Risk Mapping

Taken from:

Controlling Soil Erosion, Defra, 2005 – Chapter 2: Field guide for an erosion risk assessment

Water erosion

This risk assessment refers to the movement of sediment within the field and possible transfer to watercourses or other places such as neighbouring properties or on to roads.

Soils	Steep slopes > 7 degrees	Moderate slopes 3 - 7°	Gentle slopes 2 - 3°	Level ground <2°
Sandy and light silty soils	Very high	High	Moderate	Lower
Medium and calcareous soils	High	Moderate	Lower	Lower
Heavy soils	Lower	Lower	Lower	Lower

Signs of erosion that may be associated with each of the risk classes are described below. Such observations should override an assessment derived solely from the table.

Very High Risk Areas – Rills are likely to form in most years and gullies may develop in very wet periods.
High Risk Areas – Rills are likely to develop in most seasons during wet periods.
Moderate Risk Areas – Sediment may be seen running to roads, ditches or watercourses and rills may develop in some seasons during very wet periods.
Lower Risk Areas – Sediment rarely seen to move but polluting runoff may enter ditches or watercourses.

Runoff or soil wash

This risk assessment refers to runoff which is usually but not always discoloured. This runoff may carry very fine soil particles, soluble pollutants such as plant nutrients and pesticides or manures to watercourses.

Signs of run-off that may be associated with each of the risk classes are described below.

High Risk Areas – slopes greater than 7° where run-off is seen in most years during wet periods.

Moderate Risk Areas – slopes between 3 and 7° where run-off is seen in some years during wet periods and in most years during very wet periods.

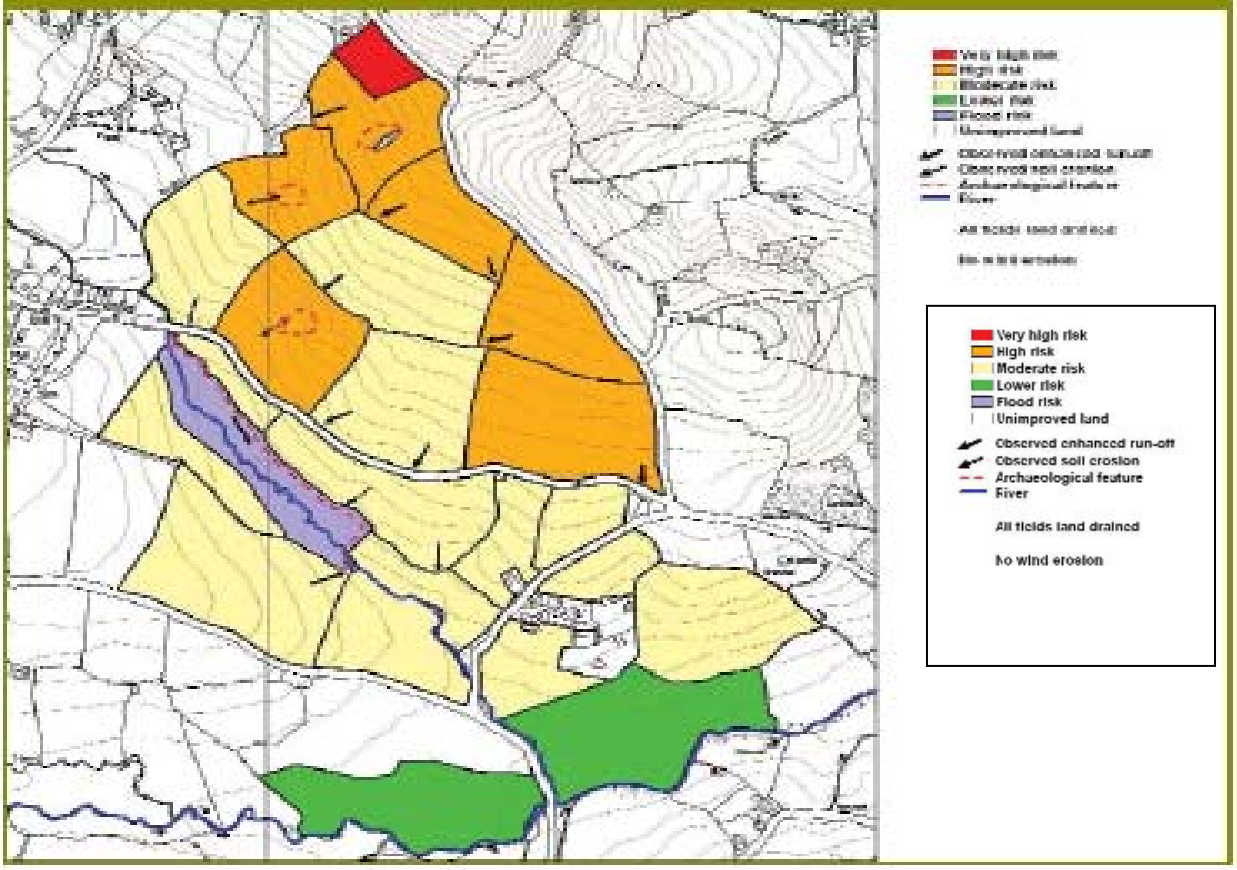
Lower Risk Areas – level ground or slopes up to 3° where run-off is seen in some years during very wet periods.

Flood risk

Land that floods is susceptible to erosion and runoff, particularly when under cultivation. Land that floods regularly (at least 1 year in 3) must be regarded as highly vulnerable and should be indicated on your map.

The map below showing the erosion risk categories outlined above should serve as a basis for planning crop rotations and management to reduce run-off risks and soil loss.

Example of farm erosion risk map:



Note: The accumulated run-off from a catchment with a large proportion of only lower risk fields can still cause serious damage to watercourses and may require action to be taken.

Farm and crop planning

The risk map shows which fields or parts of fields are most at risk when exposed to heavy or prolonged rain or flooding. At this stage, it might become clear that new hedge plantings could usefully reduce erosion risks or relocation of field entrances could reduce deposition of sediment onto roads or into watercourses.

The next step is to plan crop rotations and land use to minimise exposure of bare, vulnerable land to the erosive effects of rainfall. The susceptibility of soil to erosion is dependent upon the land cover or livestock enterprise using the land, and can be considered in three broad categories. Some examples of land management practices within each category are listed on the next page.

Highly susceptible land use

On **Very High Risk** and **High Risk** sites, avoid these land uses unless precautions are taken:

- Late sown winter cereals
- Potatoes
- Sugar beet
- Field vegetables
- Outdoor pigs
- Grass re-seeds
- Forage maize
- Outwintering stock
- Grazing forage crops in autumn or winter

Moderately susceptible land use

On **Very High Risk** and **High Risk** sites these moderately susceptible land uses can be carried out with care:

- Early sown winter cereals
- Oilseed rape – winter and spring sown
- Spring sown cereals
- Spring sown linseed
- Short rotation coppice/Miscanthus

Less susceptible land use

Consider the following land uses on **Very High Risk** and **High Risk** sites as a means of reducing the overall erosion risk:

- Long grass leys
- Permanent grass
- Woodland (excluding short term coppice)

By altering rotations and changing land use, for example, switching from late sown autumn to spring sown crops on higher risk sites, the likelihood of erosion can be reduced significantly.

Appendix 3 - Manure management plan risk map
(Figure 1 and title needs removing before reproduction)

Figure 1: Example of farm waste management plan.

Don't spread in the red areas.

Avoid orange areas in winter and in a dry summer when the soil cracks down to the drains, or when the soil is compacted.

You can use yellow areas throughout the year subject to ground conditions, but restrict application rates in the winter.

Green areas can be used throughout the year.

Bore hole.