Cleaning up our Act

Diffuse Pollution from Agricultural Sources:

Opportunities within Common Agricultural Policy reform to support the implementation of the Water Framework Directive in Scotland

RSPB Scotland
April 2006
Diffuse Pollution from Agricultural Sources:

Opportunities within Common Agricultural Policy (CAP) reform to support the implementation of the Water Framework Directive (WFD) in Scotland.

1. Summary
2. Introduction
3. Diffuse pollution from agricultural sources
4. The impact of diffuse pollution
5. Existing measures to address diffuse pollution in Scotland
7. Changing Water Policy
8. Changing Agriculture Policy
9. Initiatives in England and Wales
10. Conclusions
11. Recommendations
12. Glossary
13. References

Report prepared by Caroline Davies for RSPB Scotland
Many of Scotland’s rivers, lochs, coastal and groundwaters are affected by diffuse pollution from agricultural sources. SEPA considers this to be the most significant cause of poor river quality in certain parts of Scotland, and expects it to be the largest cause of water pollution in Scotland by 2010.

Water bodies affected by diffuse pollution from silts and excess nutrients become eutrophic with devastating consequences for aquatic biodiversity. Water dependent species and habitats are often of national and international importance - many sites are designated as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Sites of Special Scientific Interest (SSSI). There is also considerable economic cost associated with the clean up of polluted water bodies which are used as public water supplies and for recreational purposes.

At this time comprehensive changes in agriculture and water policy are underway in Europe and in Scotland. The Water Framework Directive (WFD) is changing the way we protect, plan and manage our water environment requiring higher water quality standards to be met. The WFD measures the quality of the water environment through a comprehensive assessment of hydro-morphological, physical, biological and chemical characteristics with the aim of achieving ‘good ecological status’ of our water environment, including groundwaters by 2015.

At the same time, reform of the Common Agriculture Policy (CAP) and the new Rural Development Regulation give greater emphasis to environmental objectives including protection of the water environment. Water bodies which are considered to be eutrophic as a result of pressures such as diffuse pollution are unlikely to be considered as being in good ecological status as required by the WFD. If better water quality is not achieved then Scotland could be in breach of European law, potentially with severe legal and financial repercussions.

Existing measures which aim to tackle the cause and effects of diffuse pollution problem are inadequate, and it is clear that a new approach is needed to address this major environmental problem. RSPB Scotland considers that careful integration and co-ordination of agriculture and water policy to tackle diffuse pollution can achieve multiple objectives. There has been no better opportunity to develop an effective package of measures which simultaneously address water quality, benefit biodiversity, achieves more sustainable farming and flood management, helps reduce greenhouse gas emissions whilst delivering benefits for human health and cutting down on clean-up costs.

This report identifies the opportunities which exist to align objectives of the WFD with Scotland’s agriculture and rural development policy reforms. A range of measures is proposed to tackle the problem, aiming to target and prioritise actions across the country and within catchments. Recommendations aim to minimise
regulatory requirements on the farming sector whilst encouraging the delivery of public goods, including better water quality and enhancement of aquatic biodiversity across Scotland.

RSPB Scotland recommends the following key elements in addressing diffuse pollution:

- Development of a diffuse pollution strategy for Scotland, with a key regulatory role for SEPA
- Inclusion of soil and nutrient plans as part of cross compliance
- Introduction of a regulatory framework of national and targeted General Binding Rules backed up by licences in particular problem areas
- Identification of priority areas for targeted action
- Provision of free advice from a national Farm Advisory Service, and Catchment Advisors in priority areas
- Land Management Contract incentives to encourage targeted measures e.g. buffer strips, farm wetlands, catchment scale wetland restoration, partnership working
- Effective policy integration with River Basin Management Plans
- Promotion of low input farming systems and practices
- Links with these measures to deliver biodiversity benefits
There are many threats to the aquatic environment, but there is little doubt that
diffuse pollution from agricultural sources, primarily excess nutrients, pesticides
and silt, is causing major problems for both water quality and the vulnerable water
habitats and species which depend on it. This is a problem on a global scale:

“Human-kind is engaged in a gigantic global experiment as a result of the
inefficient and often overuse of fertilisers the discharge of untreated sewage and the
ever rising emissions from vehicles and factories. The nitrogen and phosphorus
from these sources are being discharged into rivers and the coastal environment or
being deposited from the atmosphere, triggering alarming and sometimes
 irreversible effects”.

Klaus Toepfer, UNEPs Executive Director 1999.

In Scotland, a plentiful water supply shapes characteristic landscapes, enables
production of world-class goods, and supports highly popular recreational
activities – all of which are vital to the Scottish economy. Many of our most
valuable wildlife habitats are water dependent and often of national and
international significance. Rivers and lochs, coastal saltmarshes and lowland
grasslands, reedbeds and vast tracts of upland blanket bogs support a diverse array
of Scottish biodiversity including aquatic species such as atlantic salmon and
freshwater pearl mussel, and huge numbers of wading birds and wildfowl.

However, the water environment is suffering considerable damage from pollution
originating primarily from agricultural land use. SEPA considers that the
problem is growing and that pollution from agricultural sources is likely to be the
largest cause of water pollution in Scotland by 2010. The issue is politically and
practically complex and there is currently no overall solution to the problem of
diffuse pollution.

Diffuse pollution is a priority water policy issue for the UK Government and
Scottish Parliament, with the main driver for current action being the WFD1. This
Directive requires a co-ordinated approach to protect and restore aquatic ecology –
both water quality and quantity - at the river basin scale. This includes a
requirement for specific measures to address pollution from both point and diffuse
sources. At the same time, reform of the CAP and the new Rural Development
Regulation give greater emphasis to environmental objectives including protection
of the water environment. These fundamental shifts in policy offer the opportunity
to tackle the problems caused by diffuse pollution in Scotland.

1 EC Directive 2000/60/EC establishing a framework for Community action in the field of water
policy – the Water Framework Directive
3 DIFFUSE POLLUTION FROM AGRICULTURAL SOURCES

Some pollution arises from single, identifiable point sources, such as factories or sewage works and can be relatively easily addressed. Diffuse pollution, in contrast, arises from the cumulative effect of many small discharges. The total effect of a number of individually minor sources of contamination becomes increasingly significant over an entire catchment area and causes considerable harm to the environment.

Diffuse pollution is defined as “pollution arising from land-use activities (urban and rural) that are dispersed across a catchment or sub-catchment and do not arise as a process industrial effluent, municipal sewage effluent, deep mine or farm effluent discharge.”

D’Arcy et al 2001

Diffuse pollution comes from a variety of sources and activities, both rural and urban, but the major cause is excess nutrients and sediment run-off from farmland. Poor soil management which increases the amount and speed of run-off increases the risk. Other sources include pesticides, pathogens, veterinary medicine, organic matter (slurry, and manure), and other air-born pollutants.

Nitrogen (N) from inorganic fertilisers, slurries and manure gets transported in surface and groundwater in the form of highly soluble nitrate. Nitrate is a major polluter of many saline and freshwater systems, where it increases the growth of certain aquatic plants and algae at the expense of less competitive species.

Phosphorus (P) from chemical fertilisers is also a major plant nutrient and generally the limiting factor in freshwater systems. Whilst nitrate is highly soluble and generally transported by run-off, phosphorus binds strongly to soil particles, and is often associated with pollution by silts. However, as soils become saturated with phosphorus more P becomes dissolved in water and reaches watercourses in a soluble form.

Silts are particles of soil that are washed into rivers and lochs from the surrounding land. Some silts reach water bodies as part of natural catchment processes. However, poor soil management combined with heavy rainfall greatly increases this natural level of erosion.

Pesticides can be toxic to aquatic life, and have potentially serious consequences for wildlife, including fish. These can include plant, insect or fish kills, hormonal disruptions, impacts on food chains as a result of changes or reductions in numbers of plants, or invertebrates providing food to mammals and birds. Assessing impacts of individual pesticides on the ecology of water environment is very

---

2 Characterisation and impacts analysis required by Article 5 of the WFD, SEPA, 2005
difficult, but there is sufficient evidence to suggest that action is needed to provide better control of pesticide input into water.

Agricultural diffuse pollution problem in Scotland
Ploughing, seedbed preparation, crop spraying, fertiliser spreading and application of slurry to land can all contribute to diffuse pollution. Modern farming practices have tended to increase the risk of nutrient and silt loss.

Since the 1950s:

- The amount of inorganic nitrogen applied to agricultural land has increased sevenfold (+600%)
- Phosphorus application has almost doubled (+70%)

![Box]

SEPA estimates that some 45,000 tonnes of nitrate, and 2,800 tonnes of phosphate are lost from agriculture to surface waters and groundwater every year. Soil losses from agricultural activities are estimated at 780,000 tonnes a year.

The relatively low cost and ready availability of inorganic fertilisers, together with the geographical separation of crop and livestock production systems, has limited the re-cycling of N and P from manures and slurries as fertilisers. The cost of storing and transporting manures and slurries has also reduced the likelihood of these being spread on the farm at times and in places where crop uptake will reduce the risk of nutrient loss. Where excess nutrient is available, and not taken up by a crop, it inevitably reaches surrounding watercourses. Current estimates suggest that 40-50% of P and 60-70% of N in waters is derived from agricultural activity, specifically the application of fertilisers and manure.

There can be little doubt that diffuse pollution is widespread and having a major detrimental impact on the health of our water environment. SEPA has identified for the Scotland River Basin District a total of 488 rivers, 57 lochs, 18 transitional, 59 coastal and 21 groundwater bodies currently affected by diffuse source pollution pressures – mainly caused by agricultural activities (Figures 1&2).

---

3 Diffuse water pollution from rural land use, SEERAD consultation paper, 2005
4 Defra, 2003
5 Scotland River Basin District: Characterisation and impacts analysis required by Article 5 of the Water Framework Directive, SEPA, 2005
A further 198 rivers, 13 lakes, 3 transitional, 2 coastal and 16 groundwater bodies are affected by or at risk from diffuse pollution pressures in the Solway Tweed River Basin District (Figures 3&4).

Whilst some nutrient loss is the inevitable result of tilling the soil and keeping livestock, a substantial proportion could be avoided by better soil husbandry, improved on-farm nutrient management and more efficient use of existing sources of N and P to reduce reliance on inorganic fertilisers.

The loss of hundreds of kilometres of riverine systems and associated wetlands over recent decades exacerbates the problem. Naturally functioning wetland systems can soak up pollutants and clean water in the process, as well as acting as natural sponges which absorb flood waters. However, development on floodplains, extensive land drainage and the construction of embankments along

---

rivers to protect agricultural land from flooding all limit the capacity of natural habitats to cope with flood events and pollution.

Measures to control N generally need to be applied over very broad areas, whilst those needed to control P and silt are most likely to require change in specific ‘high-risk’ situations, particularly on farms where soil erosion is a significant issue. Effective attempts to control N, P and silt diffuse pollution are likely to require combinations of measures at the farm and at the catchment scale.
Implications for biodiversity and the environment
Rivers and waterbodies throughout Scotland have been highly modified by human activities with a major influence on function and water quality. The cultivation of land for food production, and higher livestock densities have increased loads of sediment, nutrients and chemicals reaching surface and ground waters.

The cumulative effect of excess nutrients and silt entering aquatic ecosystems results in severe ecological implications for those water bodies and the water dependent wildlife. Enrichment of surface waters by nutrients, particularly nitrogen and phosphorus, can lead to eutrophication, the process by which excessive growth of potentially toxic algae and other plants has adverse effects on water quality and the fragile balance of biodiversity within aquatic habitats. Competitive species are favoured over those adapted to conditions of limited nutrient availability, leading to the local extinction of species and communities adapted to nutrient-poor conditions; for example, evidence is emerging that eutrophied waters, with large masses of surface vegetation affect the distribution of bat species, such as Daubenton’s bat, by interfering with echo-location systems. Further evidence suggests that nutrient enrichment is having an impact on aquatic and riparian communities.

Silts can change the structure of river habitats by clogging up naturally gravely substrates, making them unsuitable for some fish and insect species. They can also make water turbid and prevent submerged plants from growing. Declines in mayfly populations are considered to be the result of a combination of silt and nutrient pollution, whilst silt deposition in rivers has serious impacts on salmonid fish which lay eggs in gravel. Excessive silt reduces oxygen flow to the eggs and provides a physical barrier to the hatching fry, resulting in serious reductions in breeding success. Other species vulnerable to silt pollution include freshwater pearl mussel and native white-clawed crayfish.

Many areas identified at risk from diffuse pollution are of international and national importance for wildlife. The Scotland RBD includes 235 water dependent Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The Solway Tweed RBD includes 36 water dependent SACs and SPAs. Of these, many may not meet the WFD’s environmental objectives in their current state. The intense pressure of diffuse pollution on some of our most important aquatic habitats and species means that these sites may fail to meet the statutory favourable condition required by the Habitats and Birds Directives, as well as SSSIs requirements. Reporting under the Habitats and Birds Directives is due in 2006, and Protected Area objectives for water dependent Natura 2000 sites have been assessed by SNH to determine if there is a risk of failure of objectives.

---

7 SACs are designated under the Habitats Directive (92/43/EEC)
8 SPAs are designated under the Birds Directive (79/409/EEC)
The UK Biodiversity Action Plan (UKBAP) and Scottish Biodiversity Strategy\(^9\) focus on a number of priority habitats and species which depend on good quality water. Priority habitats include mesotrophic lakes, rivers, fens, reedbeds and grazing marsh. Priority species include otter, water vole, medicinal leech, northern blue damselfly, great crested newt, freshwater pearl mussel, vendace, yellow march saxifrage, slender naiad, river jelly lichen, marsh clubmoss and Shetland pondweed. Actions Plans for each of these habitats and species highlight the threat from nutrient enrichment\(^{10}\). Many of these are of principle conservation importance in Scotland – the new Nature Conservation Act (Scotland) requires the Minister to designate a list of such species and habitats in order to further their conservation.

**SPAs** affected by or at risk from diffuse pollution include the Caithness Lochs, Loch of Strathbeg, the Ythan Estuary, Insh Marshes, Loch of Skene, Loch Lomond, Loch Ken and Dee Marshes, Loch of Kinnordy, Flanders Moss and Lake of Menteith, and Loch Leven.

**SACs** affected by or at risk from diffuse pollution include the Dunkeld-Blairgowrie Lochs, and the Rivers Spey, Tay, Dee, South Esk and Tweed.

**Social and Economic costs**

In addition to the environmental cost, damage to aquatic ecosystems reduces the value of water bodies for amenity, recreation and drinking water supply with significant health and economic implications. The total costs of agricultural pollution in the UK have been estimated to be in the order of £250 million pounds per year, with significant clean-up costs borne by the taxpayer.

---

\(^9\) Scotland’s Biodiversity; its in your hands. A strategy for the conservation and enhancement of biodiversity in Scotland, Scottish Executive, 2004

\(^{10}\) UKBAP.org.uk
5 EXISTING MEASURES TO ADDRESS DIFFUSE POLLUTION FROM AGRICULTURAL SOURCES IN SCOTLAND

There is currently no comprehensive piece of legislation which targets diffuse pollution in Scotland. There is limited regulation in certain areas but, generally, measures which aim to address the issue are based on voluntary participation, guidance and support. Various initiatives are in place to help farmers use nutrients more efficiently and reduce the risk and effects of pollution. These aim to encourage better targeting and timing of inorganic and organic fertiliser application, more effective recycling of nutrients in manures and slurries, managing soils to prevent unnecessary run off and erosion, and protecting sensitive water courses using wide buffer strips and farm wetlands.

However, evidence suggests that the problem remains, and is growing. Take up of schemes, and general awareness and understanding of the problem is low. A number of factors act as policy barriers and despite the initiatives there is presently no real imperative for carrying out better management practices. Incentives are generally small, and compliance monitoring is patchy.

The main measures which are currently available to address diffuse pollution are highlighted below. However, it should be noted that there are significant new proposals currently under development as a consequence of WFD requirements and of CAP reform – these are highlighted in sections 7 and 8 of this report.

i Nitrate Vulnerable Zones (NVZ)
Approximately 16% of the Scottish mainland is designated as NVZ under the Nitrates Directive\textsuperscript{11}
- Moray, Aberdeenshire, Banff and Buchan
- Strathmore and Fife
- Lothian and Borders
- Lower Nithsdale

Farmers within these areas are required to implement an Action Programme of measures targeted at reducing nitrate loss where nitrate levels exceed, or could exceed, 50mg/l and where waters are, or may become, eutrophic. Key requirements include:
- Record keeping; annual, field-by-field use of all organic and inorganic fertiliser, as well as annual preparation and implementation of a Fertiliser and Manure Plan
- Limits on the application of nitrogen; N from organic or inorganic sources must not exceed the crop or grassland requirement
- Closed periods when no nitrogen applications are to be made during months where there is unlikely to be plant uptake

\textsuperscript{11} EC Nitrates Directive 91/676/EEC
Restrictions on nitrogen application; where there is a risk of run off or in the proximity of water courses or drinking supplies.

A capital grant scheme to assist farmers in improving slurry storage was available within NVZs. SEERAD Agricultural staff is responsible for enforcement of NVZ Action Programme Regulations including record checking and field inspections. Failure to comply with the Regulations is a criminal offence with associated fines. From 2005, any breach of NVZ rules can lead to deductions from the Single Farm Payment.

The NVZ concept of identifying areas at risk of pollution allowing for targeted monitoring and enforcement coupled with grants and advice is sound. However, their effectiveness is in doubt - some areas are still over the 50mg/l limit and show no signs of improvement or even getting worse. The basic Action Programme measures are less onerous than expected with some farmers commenting that their farming plans have not been curtailed and that record-keeping is not very different for that required under quality assurance schemes. More stringent measures are required if NVZs are to be effective in protecting waterbodies from excess nutrients.

The EC has expressed concern at the UK’s implementation of the Nitrates Directive. As a result, Action Programme measures are currently being reviewed in Scotland, England and Wales and a consultation paper proposing future standards is to be issued in 2006. This could include longer closed periods, increased slurry storage requirements, extension of the closed period to all soil types, and the setting of a lower nitrogen limit of 170kg/ha.

In Northern Ireland the whole territory has been designated under the Nitrates Directive and its Action Programme includes tighter controls than those currently applicable in Scotland. Over half of England has been identified as exceeding 50mg/l nitrate and consequently designated as NVZ. However, current trends indicate that exceedance will persist in many parts of the country resulting in new breaches. The extent of NVZs is currently being reviewed with additional designations expected in 2006.

ii PEPFAA code

The Scottish Executive’s revised PEPFAA Code of Good Practice aims to provide farmers, crofters and agricultural contractors with practical advice on how to prevent pollution from diffuse sources. The summary “Do’s and Don’ts Guide” highlights steps which are either mandatory because of particular legislation, required for receipt of the Single Farm Payment, or recommended as voluntary measures which would minimise the risk of pollution.

12 Prevention of Environmental Pollution from Agricultural Activity, Code of Good Practice, Scottish Executive, 2004
The Code encourages the preparation and implementation of farm Nutrient / Soil Management Plans but currently this is a recommendation rather than a requirement for farmers outwith NVZs. Within NVZs there is a requirement to prepare and implement a fertiliser and manure plan, but only a recommendation to produce a farm nutrient plan.

PEPFAA contains much good practice and is a valuable source of advice but there is currently little proof of uptake. A more effective way of ensuring farmers undertake best practice as part of their farming operations is to include certain measures as part of cross compliance requirements (see 8.1 below), Land Managements Contracts (see 8.2), and General Binding Rules (see 7.3).

### iii  Rural Stewardship Scheme (RSS)

The RSS agri-environment scheme currently in operation contains a number of prescriptions aimed at reducing diffuse pollution, for example, management of wetland and water margin. This incentive scheme is currently run on a competitive basis.

Monitoring of RSS carried out to date suggests that it is difficult to ascertain the actual environmental benefits of the scheme, including the contribution to mitigating diffuse pollution. The RSS is likely to be subsumed by a new Land Management Contract scheme of farm support from 2007 (see 8.2).

### iv  SEPA’s Diffuse Pollution Initiative (DPI)

SEPA’s Diffuse Pollution Initiative began in 2001 in response to the increasing awareness of the threat to water quality. It aimed to develop a strategy for dealing with diffuse water pollution and incorporate actions into SEPAs routine business. Research carried out as part of the DPI included the establishment of diffuse pollution monitoring stations in the Cessnock catchment in Ayrshire (to investigate pathogens) and on the Greens Burn in Fife (for nutrients and pesticides).

Identification and promotion of good practice which limits the case and effect of diffuse pollution is a key aim of the DPI. A Best Management Practice (BMP) Handbook is to be produced focusing the desirability of developing Farm Scale Audits, as well as the siting and suitability of BMPs. The project aims to provide farm advisors with detailed guidance on how to conduct a farm scale audit including issues not explicitly covered by the PEPFAA code and current regulations. The second phase provides general guiding principles on the selection, location and installation of a range of BMPs for farm advisors\(^\text{13}\). The use and promotion of BMPs is considered in more detail in section 4 below.

### v  4 Point Plan

The 4 Point Plan aims to minimise pollution risk for livestock farmers by focusing on four areas:

- Dirty water management around the steading

\(^{13}\)BMP Handbook, SEPA, produced by SAC, FWAG, Soil & Water Scotland
• Better nutrient use
• Risk assessment for manure and slurry
• Managing water margins.

The Plan is intended as a simple DIY document that can help identify pollution risk, protect the environment and benefit the farm business. This is a voluntary approach supported by the Scottish Executive, SAC, NFUS, SEPA, SNH and environmental NGOs.

vi Farm Soils Plan
A new document aimed at farmers, crofters and agricultural contractors across Scotland is to be launched at the end of 2005. The Farm Soils Plan aims to provide basic guidance on recognising and rectifying poor soil conditions, targeted nutrient application, preventing soil loss and protecting water quality. It also aims to help farmers assess GAEC compliance regarding soil related issues, in respect of the SFP.

The Farm Soils Plan is a joint initiative supported by SAC, SEERAD, SNH, WWF Scotland, FWAG Scotland, SEPA and NFU Scotland.

vii LEAF Accreditation Scheme
The Linking Environment and Farming Initiative is a voluntary scheme which aims to promote integrated farm management. LEAF demonstrates and provides examples of how integrated farming methods can produce affordable food with minimal impact on the environment.

viii Organic Aid Scheme
Organic farming seeks to work with natural processes instead of dominating them, using methods which are designed to achieve a sustainable production system with limited use of external inputs. The potential for pollution and other environmental damage is lessened as organic farming avoids the use of artificial fertilisers and synthetic pesticides. Instead, it relies more on practices such as crop rotation in helping to maintain soil fertility and to combat pest and disease problems, and the use of fertility building crops and natural fertilisers such as animal manures.

The OAS is a SEERAD scheme\textsuperscript{14} which aims to encourage the expansion of organic food production in Scotland to help meet increasing demand. The scheme forms part of the Scottish Rural Development Programme and is jointly funded by SEERAD and the EC. OAS provides payment for land in conversion to organic management, capital activities, advisory support and maintenance.

There have been a number of reviews of the environmental performance of organic versus conventional farming systems. A recent review of the biodiversity benefits of organic farming\textsuperscript{15} concluded that the majority of the 76 species reported tended

\textsuperscript{14} Organic Aid Scheme, Explanatory Booklet, SEERAD 2005
\textsuperscript{15} Hole et al, 2005
to demonstrate that species abundance and/or richness across many taxa was higher on organic than locally representative conventional farms - this was true for all seven studies that included birds. However, it is unclear whether adopting the whole-farm approach of organic farming offers more for biodiversity than the selection of specific key practices on conventional farms.

Other environmental impacts, in particular pollution and resource use, have also been reviewed\textsuperscript{16}. Again, results tend to indicate that organic systems show benefits in soil quality, nitrate and pesticide pollution, nutrient balance and use, carbon dioxide emissions and energy use. On balance it appears that organic farming systems are better for the environment and biodiversity than conventional farming systems.

ix Bathing Waters
The EC Bathing Water Directive\textsuperscript{17} requires Member States to identify bathing waters – fresh or seawaters regularly used by the public for swimming - and take all necessary measures to bring these up to the quality standards prescribed. These are set to protect the environment and public health and include limits for safe microbiological, physical and chemical parameters. The Directive requires sampling, analysis and inspection of the 60 bathing waters in Scotland. It is currently under revision, but will operate within the context of the WFD.

Pollution from agricultural sources remains a cause for concern in bathing waters – agricultural run-off from livestock slurries and manure may give rise to the presence of microbiological indicators. The bacteria and viruses present may cause illness as a result of ingestion or infection.

SEPA is responsible for implementing the Directive. In 2004, the number of bathing waters reaching the EC mandatory standard was 56 out of 60 (93%). The number of beaches reaching guideline standard was 34 (57%). Failures included those from diffuse pollution sources\textsuperscript{18}.

x Voluntary Initiative (VI)
The VI seeks to demonstrate how the farming community, crop protection industry and environmental groups can work together to build on best practice achievements in producing quality food with a focus on maintaining and improving biodiversity and water quality. Led by the crop protection industry and supported by Government, the VI encourages farmers to do three things to support the initiative:

- Join the National Register of Sprayer Operators
- Have sprayers tested under the National Sprayer Testing Scheme
- Complete a Crop Protection Management Plan

\textsuperscript{16} Shepherd, M et al, 2003
\textsuperscript{17} EC Bathing Water Directive 76/160 EEC
\textsuperscript{18} Scottish Bathing Waters 2004, SEPA
Best practice is encouraged in the selection and use of insecticides, and water protection. The VI was established by the Crop Protection Industry in order to stave off the introduction of a Pesticides Tax, claiming that crop yield and quality can be optimised, money can be saved and the environment can be improved through the use of best practice.
6 BEST MANAGEMENT PRACTICE TO TACKLE DIFFUSE POLLUTION

Best Management Practices (BMPs) are measures that can be applied to control farm pollution that results from small distributed sources rather than from a single point source. A recent report\(^{19}\) assesses the value and effectiveness of particular measures in controlling diffuse pollution and enhancing biodiversity. The report recognises the need to apply particular measures in a hierarchy, or “treatment train”;

- Firstly, to reduce inputs,
- Secondly, to detain water to reduce peak flows,
- Third, to prevent dislodgement of bare soil and soil bound pollutants,
- Fourth, to prevent runoff downslope,
- And finally, to intercept sediment before it reaches watercourses.

It identifies a number of key points of application from farms. Some of the most effective BMPs for each point are highlighted below:

i Planning / general farm BMPs.
Central to this BMP is the development of farm and field based nutrient management plans. Greater attention to existing levels of nutrients in the soil and records of all applied fertiliser to land would help in assessing only the necessary amount for the crop. Such plans should consider the restricted spatial and temporal application of crop nutrients and manure to least damaging area and times e.g. avoiding watercourses and periods of excessive rainfall.

Nutrient management planning aims to match crop nutrient requirements with those supplied from all sources by optimising the utilisation of nutrients on farms and minimising the environmental impacts associated with poor management techniques. This process has the benefit of increasing net returns and protecting natural resources. A number of factors are considered including:

- Targeted and appropriately timed application of inorganic and organic fertilisers
- More effective recycling of nutrients in manures and slurries
- Management of soils to prevent unnecessary run-off and erosion
- Use of buffer strips and farm wetlands to protect water bodies.

Nutrient management planning is clearly an important element in any strategy to tackle diffuse pollution from agricultural sources but research in England\(^{20}\) suggests that many different approaches are used and the understanding of what is required is highly variable. In particular:

\(^{19}\) Appraisal of rural BMPs for controlling diffuse pollution and enhancing biodiversity, SNIFFER, 2005
\(^{20}\) Use of Nutrient Management Plans in England, NMSG paper, June 2005
• Just over half of farmers took into account the level of nutrients supplied by manures, or whether recent applications of manures had been made, when deciding how much inorganic fertiliser to apply;
• Just over half of farmers considered the condition of the land and soil (waterlogged, frozen, steeply sloping) before making fertiliser/more applications;
• Nearly three quarters of farmers used their own judgement when deciding how much fertiliser to apply.

ii In-field BMPs
Provision of a good vegetative over-winter ground cover is considered highly desirable in controlling both leaching and surface runoff. A suitable ground cover can be simply the straw and stubble of last season’s crop, which also benefits wildlife.

A switch to spring-sown rather than winter-sown crops is highly desirable. Sowing in spring can avoid large amounts of nitrate loss compared to winter sowing. While conversion from winter to spring sown cereals can produce lower yields and hence be less attractive to farmers the move from production to environmental payments as a result of CAP reform, and the GAEC requirements (see 8.1) give an opportunity to promote the wider cultivation of spring sown crops.

Strip cropping – sowing the crop in strips 20m wide along slope contours while leaving narrow 4m strips between can be effective in reducing surface erosion.

Maintaining a lower stocking density can significantly reduce the loss of N and P, and removing cattle from pastures in early autumn has a marked effect on lowering the availability of N in the grass sward for leaching to water courses.

Reduction in the rate of manure application to land inevitably reduces N and P. This may mean transport of manure off the farm in highly sensitive areas, e.g. intensive livestock. Application of manure to land should be avoided during periods when heavy rainfall is likely. This is likely to necessitate sufficient manure storage capacity which may be inadequate on a high proportion of Scottish livestock farms. Manure management should be part of the nutrient management plan advocated above.

iii Riparian/field margin BMPs
Measures to reduce pollution at field margins should be implemented after the ‘planning’ and ‘in-field’ BMPs highlighted above for greatest effect.

Riparian buffer strips are widely acknowledged to help tackle diffuse pollution by mopping up pollutants and trapping sediments. Usually uncultivated zones at the edges of fields next to watercourses, these strips are important for biodiversity as well as pollution control. Buffers can vary from grassy strips a few metres wide
to more complex larger zones comprising natural bankside vegetation and riparian trees particularly aspen, poplar and willow. Certain types of buffer are more appropriate in particular parts of Scotland depending on the nature of the farming – arable, livestock or mixed - the contours, soils and predominant form of pollution. In broad terms, research suggests that buffer strips of 5-20m are effective for dealing with pollution, but that actively managed wider strips (up to 90m) are of additional value for biodiversity. Farmland birds in general have undergone population declines in recent years; the provision of such strips would benefit species such as grey partridge.

In livestock areas it may not be possible to maintain full buffer strips as access to drinking water is required. However, by restricting access to points where soils are less prone to damage and poaching, and providing drinking points in fields, the problem can be reduced. This is supported by NFUS “it would make sense, in the WFD context, to have a nationwide scheme of support for exclusion of livestock from watercourses or from alternatives such as …farm ponds”.21

Managed headlands comprising 6-10m strips of uncut grassland along the edges of intensively farmed fields can enhance plant and invertebrate biodiversity considerably, and also help lower soil nutrient levels.

SEERAD is currently investigating the relationship between biodiversity and buffer strips with the intention of enhancing the value of riparian strips while ensuring the maintenance of their key function in reducing pollution. However, it is calculated that if all the water courses in Scotland had 5 or 10 meter buffer strips applied then the ‘loss’ of land from agricultural production would be approximately 1.3 or 2.7% only. This does not equate with loss from agriculture as many of these areas would be scrub or woodland already. The actual loss of land based on actual implementation is likely to be much less than this22.

iv In-stream BMPs

The management and re-creation of naturally functioning wetland habitats such as floodplain grasslands, reedbeds and coastal saltmarsh offers one of the best and most obvious solutions to the diffuse pollution problem, particularly when used in conjunction with other measures. Wetland habitats have the capability of nutrient uptake and removal through natural processes. Protection and management of such habitats is critical in any strategy to tackle diffuse pollution. However, constructed wetlands ranging from simple ponds to larger engineered systems play a valuable role in absorbing nutrients and allowing sediments to settle.

There are evidently many ways in which BMPs can be effective in reducing pollution across catchments. It is not difficult to envisage the significant effect of

22 Appraisal of rural BMPs for controlling pollution and enhancing biodiversity, SNIFFER, 2005
large scale wetland creation and management in conjunction with the widespread use of buffer strips, appropriate field management and measures to reduce nutrient input. However, it is also apparent that the **BMPs are not implemented sufficiently across the country** and that other mechanisms to encourage and require implementation need to be adopted. The major changes in water and agricultural policy we are experiencing on a European and Scotland-wide scale are the opportunity to enshrine these practices into everyday farm management. This is explored in the following sections.
7 CHANGING WATER POLICY

The WFD is a major piece of legislation which changes the way we manage and protect our water environment, and the activities which affect it. Member States are required to take action to protect, enhance and restore surface and groundwaters and to achieve Good Ecological Status (GES) by 2015\(^23\). The Directive requires man-made pressures on the water environment to be assessed and managed in an integrated way across surface and groundwaters. Its overall objective is to bring about the effective co-ordination of water environment policy and regulation across Europe in order to:

- Prevent deterioration and enhance the status of aquatic ecosystems, including those dependent on groundwater;
- promote sustainable water use;
- reduce pollution;
- help reduce the effects of floods and droughts.

The Directive requires a wider range of pressures on the water environment to be considered than our previous focus on point source pollution, and means that SEPA (the competent authority) and other interested groups will need to take a more integrated approach to water management in the future. In particular, obligations in the WFD include an explicit legal requirement for new regulation to control diffuse inputs to water.

The WFD establishes a planning cycle for river basin management which consists of four main ongoing stages (detailed in Table 1):

- **Characterisation** of river basin districts including an assessment of water bodies at risk of not achieving the Directive’s objectives as a result of man-made pressures;
- Environmental **monitoring** informed by river basin characterisation;
- Setting of environmental **objectives**; and
- Design and implementation of a **programme of measures** to achieve environmental objectives

\(^{23}\) WFD Article 4
The WFD sets challenging targets for water quality throughout the UK. It requires us to think at the catchment scale in taking action to reduce water pollution from agriculture by 2012 with the overall aim of achieving GES in water bodies by 2015. GES is a measure of the ecological health of a water body, and is made up of 15 parameters including biological, physico-chemical, and hydro-morphological quality elements – including levels of nutrients in surface waters. These should be defined and maintained at levels capable of supporting relevant ecosystems, and will form part of the legally binding classification systems established by Member

### Table 1 – WFD Timetable

<table>
<thead>
<tr>
<th>Year</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Directive comes into force</td>
</tr>
<tr>
<td>By 2003</td>
<td>Transpose requirements to member state law</td>
</tr>
<tr>
<td></td>
<td>Identify river basin districts (RBD) and Competent Authorities</td>
</tr>
<tr>
<td>By 2004</td>
<td>Undertake RBD characterisation to include:</td>
</tr>
<tr>
<td></td>
<td>• Assessment of pressures and impacts on water status</td>
</tr>
<tr>
<td></td>
<td>• Economic analysis of water use</td>
</tr>
<tr>
<td></td>
<td>• Provisional identification of heavily modified and artificial waters</td>
</tr>
<tr>
<td></td>
<td>• Register of protected areas</td>
</tr>
<tr>
<td>By 2006</td>
<td>Monitoring programmes operational</td>
</tr>
<tr>
<td></td>
<td>Finalise EU register of intercalibration sites</td>
</tr>
<tr>
<td></td>
<td>Consult on RBMP production work programme</td>
</tr>
<tr>
<td>By 2007</td>
<td>Consult on significant water management issues overview in RBD</td>
</tr>
<tr>
<td>By 2008</td>
<td>Publish full draft RBMP for consultation</td>
</tr>
<tr>
<td>By 2009</td>
<td>Publish final first RBMP to include:</td>
</tr>
<tr>
<td></td>
<td>• Environmental objectives</td>
</tr>
<tr>
<td></td>
<td>• Programme of measures</td>
</tr>
<tr>
<td></td>
<td>• Monitoring networks</td>
</tr>
<tr>
<td></td>
<td>• Register of protected areas</td>
</tr>
<tr>
<td></td>
<td>• Heavily modified and artificial water body designations</td>
</tr>
<tr>
<td>By 2012</td>
<td>Programme of Measures operational</td>
</tr>
<tr>
<td>By 2013</td>
<td>Review for the first RBMP</td>
</tr>
<tr>
<td></td>
<td>• Characterisation assessments</td>
</tr>
<tr>
<td></td>
<td>• Economic analysis</td>
</tr>
<tr>
<td></td>
<td>Consult on significant water management issues overview for 2nd RBMP</td>
</tr>
<tr>
<td>By 2015</td>
<td>Achieve environmental objectives of first RBMP</td>
</tr>
<tr>
<td></td>
<td>Publish 2nd RBMP and thereafter every six years</td>
</tr>
</tbody>
</table>
States to implement the WFD. Although the definition of GES is still to be agreed it is accepted that good status means that waters show only a slight change from what would normally be expected under undisturbed conditions. It is likely that a eutrophic water body will not be considered to be of good status.

Failure to achieve GES will leave the UK open to infraction proceedings and fines of £25m-£50m per year for a single significant breach. Following transposition of the WFD into Scots law it is now necessary for Scotland to demonstrate that effective and enforceable measures have been taken to comply with the obligation to prevent and control diffuse pollution.

7.2 Water Policy in Scotland
The WFD is transposed into Scots law via the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act). SEPA is the competent authority for implementing the WFD.

The purpose of the WEWS Act is ‘protection of the water environment’ including in particular –

WEWS Act part 1 (2)

\( a \) preventing further deterioration of, and protecting and enhancing, the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on those aquatic ecosystems,

\( b \) promoting sustainable water use based on the long-term protection of available water resources,

\( c \) aiming at enhancing protection and improvement of the aquatic environment through, amongst other things, specific measures for the progressive reduction of discharges……

\( d \) ensuring the progressive reduction of groundwater and preventing further pollution of it, and contributing to mitigating the effects of floods and droughts.

For reporting purposes much of Scotland has been designated as one River Basin District – the Scotland RBD, covering 113,920km². A cross-border District is also in place – the Solway Tweed RBD, straddling Scotland and England and covering around 17,500km².

7.3 Water policy and diffuse pollution
The new emphasis on environmental protection required by the WFD and promoted through the WEWS Act presents a turning point in the way diffuse pollution
pollution is tackled in Scotland. The required introduction of new structures, plans and objectives is already underway to fit with the WFD’s timetable.

There are many important opportunities for addressing diffuse pollution through this recent legislation. Key elements are highlighted below:

### i. Characterisation and impacts analysis

The Directive requires detailed characterisation and analysis of pressures on all waters within each RBD. The resulting reports\(^\text{25,26}\) are the most detailed assessments ever produced on the water environment in Scotland. They describe the physical nature of each district, the types of water body it contains, an initial assessment of the pressures and impacts on water bodies and identification of those at risk of not achieving the Directive’s objectives.

Diffuse pollution predominantly from agricultural sources is recognised as a key pressure in both RBDs. A significant number of waters are identified as affected by or being at risk of failing to meet the required objectives:

#### For Scotland RBD

- Rivers: 488 (24.3% of total)
- Lochs: 57 (18.4% of total)
- Transitional waters: 18 (45% of total)
- Coastal waterbodies: 59 (13.1% of total)
- Groundwater bodies: 21 (19.8% of total)

#### For Solway Tweed RBD

- Rivers: 198 (38% of total)
- Lakes: 13 (40.6% of total)
- Transitional waters: 3 (27.3% of total)
- Coastal waterbodies: 2 (25% of total)
- Groundwater bodies: 16 (66.7% of total)

The characterisation process has revealed the alarming extent of the diffuse pollution problem on the Scottish water environment. Following on from this, SEPA aims to publish a report detailing Significant Water Management Issues in the River Basin report by June 2007. This will highlight those water bodies probably at risk of failing the environmental objectives.

SEPA’s current Corporate Plan\(^\text{27}\) introduces the concept of “priority catchments” which will focus its actions and those of other partner organisations where pressures and impacts are most acute. The aim is to target advice, education, monitoring and enforcement measures in order to deliver improvements in water quality.

---

\(^{25}\) Scotland River Basin District: Characterisation and impacts analysis as required by Article 5 of the WFD, SEPA 2005

\(^{26}\) Solway Tweed River Basin District: Characterisation and impacts analyses required by Article 5 of the WFD, Environment Agency and SEPA, 2005

\(^{27}\) SEPA Corporate Plan 2005-2008
quality. Priority areas are currently being defined and will help inform the Significant Water Management Issues report as a precursor to the RBMP.

Corporate Plan targets for 2006-2008 focus on the promotion of good practice and compliance. In the longer term, targets aim to improve 650km of river by 2015 as a direct consequence of reducing diffuse agricultural pollution.

ii River Basin Management Plans (RBMP), Sub-basin Plans, and Area Advisory Groups (AAG)

The concept of river basin planning is fundamental to the implementation of the WFD, and a RBMP must be produced for each RBD. RBMPs will be based on a detailed analysis of the pressures and impacts of all surface and groundwaters within each RBD. The RBMPs and any supplementary plans should include a summary of land use and an estimate of the extent of diffuse pollution. A Programme of Measures must be developed for each RBMP which details the actions necessary within the RBD to meet the required environmental objectives – particularly good ecological status for water bodies.

As RBMPs develop it will be possible to introduce measures that are specific to particular catchments or practices. It may be appropriate to apply tighter controls in one catchment where a river is failing to meet the required water quality, but not in another where there is less of a problem. This may be achieved through the development of sub-basin or issue based plans to deal with particular aspects of water management in certain areas. SEPA intends to introduce an initial form of sub-basin planning during 2006/07 allowing stakeholders to contribute towards the development of improvements to be delivered by the key dates 2015, 2021 and 2027 – deadlines by which the environmental objectives of each RBMP are to be achieved.

A network of Area Advisory Groups will be established in spring 2006 to support production of the RBMP. The function of each Group is to advise SEPA on any matter which relates to the preparation of the RBMP for the district and diffuse pollution will clearly be a key issue for AAGs, particularly in the priority areas.

SEPA may determine the remit of an Advisory Group which may relate to a particular sub-basin area, a particular geographical area, or any other particular aspect of water management. SEPA must then have regard to any advice given by an Advisory Group in preparing the RBMP. Representation on the AAGs should include Scottish Natural Heritage, Scottish Water, responsible authorities including local authorities, district salmon fishery boards, the National Park authority where relevant, persons representative of the interests of those carrying

28 WFD Article 13  
29 WFD Article 13, 5 & WEWS Act s15  
30 SEPA Corporate Plan 2005-2008  
31 WEWS Act s17
out business which relies on the water environment – including farming, and persons having an interest in the protection of the water environment.

iii Programmes of Measures
Programmes of measures are to be established by 2012 for each RBMP with the aim of achieving environmental objectives. Each will consist of ‘basic’ measures – the minimum requirements for compliance, and may be complemented by ‘supplementary’ measures. The significance of these in terms of diffuse pollution is highlighted below.

- ‘Basic’ measures – new regulation
The requirements of the WFD have resulted in the introduction of a new regulatory regime for Scotland whereby authorisation is required for any activities which pose a threat to the water environment. A new set of Controlled Activities Regulations (CAR)\(^3\) have been introduced by the Scottish Executive, requiring that abstractions, impoundments, and engineering works which may affect water bodies will be subject to scrutiny from April 2006. The new system updates the Control of Pollution Act 1974, under which all discharges of pollution were subject to licence by SEPA.

There is currently no comprehensive piece of legislation which targets diffuse pollution. However, in response to WFD requirements the Scottish Executive is consulting on a proposed system of regulation, including proposals for General Binding Rules (GBRs) in line with the CAR to apply across Scotland\(^3\). This early introduction of a new system is welcome - if no action were taken before the implementation of the programme of measures were required (2012), farmers would be faced with the prospect of implementing additional measures and changes in farm practices over a very short period of time.

WFD Article 11, 3
‘Basic measures’ are the minimum requirements to be complied with and shall consist of:
(h) for diffuse sources liable to cause pollution, measures to prevent or control the input of pollutants. Controls may take the form of a requirement for prior regulation such as a prohibition on the entry of pollutants into water, prior authorisation or registration based on general binding rules where such a requirement is not otherwise provided for under Community legislation. These controls shall be periodically reviewed and, where necessary, updated;

SEPA has the prime role as competent authority for the implementation of WFD measures, and should be the regulator responsible for ensuring compliance with the proposed new set of rules:

\(^{32}\) Water Environment (Controlled Activities) (Scotland) Regulations, 2005
\(^{33}\) Diffuse Water Pollution from Rural Land use, consultation paper, SEERAD 2005
- **National GBRs** - the widespread application of good practice
- **Targeted GBRs** - applied in certain areas where specific problems occur and where waterbodies are at risk of not achieving Good Ecological Status as a result. SEPA can set conditions through the process of **Registration**.
- **Licencing** – detailed site specific conditions would be developed and applied in areas with persistent problems

The PEPFAA Code provides a sound background from which a set of national GBRs can be developed during 2006. Examples of activities which might be included in National GBRs are given in the Executive’s consultation paper. These might include:

- Undertaking a risk assessment for manure and slurry
- Preparing an inorganic fertiliser management plan
- Using buffer strips and no spread zones
- Using certified contractors
- Control of livestock access to watercourses and livestock feeders
- GAEC soil erosion measures
- Farm plan and / or self audit

Examples of activities which might be included in Targeted GBRs (from SEERAD’s consultation paper) include:

- Preparation of a manure management plan
- Controls on the input, timing and management of nutrients, incorporating field scale budgets
- Fencing off watercourses and provision of alternative water supply
- Soil erosion control plan
- Creation of farm wetlands
- Possible undertaking of farm scale diffuse pollution audit.

Most measures are cost neutral or low cost and are deliberately designed to be a light touch form of regulation – meeting the requirement for control but not imposing excessive burdens on farmers. However, the application of licences where activities pose the greatest risk to the water environment is an important element of this system.

This proposed system of national and targeted GBRs has the potential to have a significant impact on diffuse pollution, limiting the amount of nutrients entering waterbodies and resulting in better water quality. However, GBRs must be developed to deliver effective and comprehensive control of diffuse pollution, be based on best management practice and effectively linked with the development of LMCs and RDR. Further recommendations, linking GBR requirements to LMCs are given in section 11 below. EU rules governing the use of incentives for the purpose of achieving compliance with environmental regulations need not prove a barrier in providing support for farmers in this context where it can be demonstrated that actions are delivering wider public benefits alongside meeting regulatory objectives.
• **Supplementary measures**

Supplementary measures are those measures designed and implemented in addition to the basic measures with the aim of achieving the environmental objectives required by Article 4 of the WFD. These measures may include negotiated environmental agreements, codes of good practice, educational projects, research and demonstration\(^\text{34}\). They may also specifically include the ‘recreation and restoration of wetland areas’. Each of these measures is an important part of any effort to reduce the cause and effects of diffuse pollution and should be promoted within programmes of measures as they develop.

For example, it might be envisaged that programmes of measures may include:

- The widespread adoption of Nutrient / Soil Management Plans as part of national GBR or cross compliance requirement;
- Targeted use of buffer strips;
- Targeted recreation and restoration of wetland areas;
- Land use change in particular areas where the diffuse pollution problem is greatest - e.g. from intensive agriculture to permanent cover, reduction in stocking densities, creation of wetland areas where essential for the long-term recovery of a water body.

In order for programmes of measures to work it is essential that links are made to appropriate agricultural support mechanisms – particularly LMCs (see 8.2 below). *Advice for farmers will also be crucial* in making the synergistic links between agriculture and water policy, and employment of *Catchment Advisors* to fulfil this role is strongly recommended.

iv  **Monitoring strategy**

A new monitoring programme and the new Scottish Aquatic Environment Monitoring Strategy will be published in 2006, for implementation in 2007. New monitoring networks will be developed to measure a full range of environmental impacts which SEPA will be responsible for controlling – pollution, water resource use and engineering, for application across groundwaters, wetlands, rivers, lochs, estuaries and coastal waters.

v  **Formal recognition of the role and importance of wetlands**

Wetlands are recognised in both the WFD and the WEWS Act as being important parts of the water environment, playing a multifunctional role in fresh and transitional water ecosystems:

---

\(^{34}\) WFD Annex VI
Wetland ecosystems are ecologically and functionally significant elements of the water environment, with potentially an important role to play in helping to achieve sustainable river basin management. Wetland creation and enhancement can in appropriate circumstances offer sustainable, cost-effective and socially acceptable mechanisms for helping to achieve the environmental objectives of the Directive. In particular, wetlands can help to: abate pollution impacts, contribute to mitigating the effects of droughts and floods, help to achieve sustainable coastal management and to promote groundwater recharge.

SEPA is to identify wetlands directly associated with surface water bodies and groundwaters and establish a wetland monitoring programme for Scotland to help protect and assess these areas.

vi Protected Areas
The WFD requires no deterioration in status and the meeting of targets for protected sites listed in the Protected Areas Register, including SACs and SPAs.

vii Setting of environmental objectives
SEPA has started the process of developing the environmental objectives which are fundamental to WFD implementation. Provisional water environment objectives for achievement by 2015 are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Surface water</th>
<th>Groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>River</td>
<td>Loch</td>
</tr>
<tr>
<td>Km No.</td>
<td>km2 No.</td>
<td>km2 No.</td>
</tr>
<tr>
<td>Quality</td>
<td>2530 200</td>
<td>20 5</td>
</tr>
<tr>
<td>Quantity</td>
<td>1150 231</td>
<td>70 114</td>
</tr>
<tr>
<td>Habitats</td>
<td>910 86</td>
<td>7 5</td>
</tr>
</tbody>
</table>

These provisional objectives will provide starting points for the RBMP process defining water environment objectives for 2015, 2021 and 2027.

viii Remedial and Restoration Measures
The WEWS Act contains a radical provision for achieving the environmental objectives set out in RBMPs. Scottish Ministers are obliged to introduce regulations which give SEPA the power to require remedial or restoration measures to be undertaken for the purposes of achieving the environmental objectives set out in RBMPs.

---

36 SEPA Corporate Plan, 2005-2008
37 WEWS Act s22
Remedial or restoration measures are defined as carrying out operations or works, or taking any other action, in relation to any land or body of water with a view to:

- remedy or mitigate the effects of any pollution of the water environment,
- improve or restore the characteristics of any body of water.

Regulations under this section of the Act may make provision for SEPA or any responsible authority to undertake or arrange for the undertaking of the necessary measures. They may also allow determination of the appropriate persons to bear responsibility for remedial and restoration measures, and confer on SEPA or other responsible authority the power to serve notices requiring such persons to undertake the necessary work, or to undertake the measures at the expense of such persons.

This provision could potentially be extremely powerful in achieving environmental protection, including remedying or mitigating the effects of diffuse pollution.

 ix Sustainable flood management

A further opportunity for integration between water management and agricultural policy is the emphasis on sustainable flood management advocated in the WEWS Act. There is now a general duty on Scottish Ministers, SEPA and responsible authorities (including local authorities) to promote sustainable flood management.\textsuperscript{38} This means adopting the following elements to reduce the risk of flooding:

- A strategic, catchment based approach;
- Protecting and using natural systems, particularly wetlands;
- Promoting soft engineering techniques.

\begin{quote}
"The WEWS Bill represents a significant step forward in the co-ordination of sustainable flood prevention measures in Scotland. The river basin management planning process will provide a forum for the discussion of flood related issues at the catchment level. Local authorities will be required to promote sustainable flood management ...the threat of flooding should be managed in an environmentally sensitive way that recognises the role of soft engineering techniques – such as natural flood meadows and washlands – in attenuating flooding; where practical, the use of existing floodplains should be maximised....In due course the construction of flood defence schemes will require consent in terms of the new control regime on engineering works."

Deputy Minister for the Environment and Rural Development\textsuperscript{39}
\end{quote}

This approach offers a cost-effective, pro-active way of tackling flooding problems and fits perfectly with the management practices aimed at tackling diffuse pollution.

\textsuperscript{38} WEWS Act 2, (4) (b) (i)
\textsuperscript{39} WEWS Bill Stage 3 debate, 29/1/03
Duty to have regard to RBMPs and sub-basin plans\textsuperscript{40}

The WEWS Act requires that Scottish Ministers and every public body and office holder must, in exercising any functions affecting a RBD have regard to the RBMP and any sub-basin plans which supplement it. This is an important responsibility across government bodies and departments and should have the effect of integrating key policy areas - agriculture, water, biodiversity, flooding and so on. The development of regional prioritisation statements for LMCs must take account of RBMP and associated AAGs to ensure effective policy integration.

\textsuperscript{40} WEWS Act s16
8.1 European Context: CAP reform
Farming activities in the UK and other Member States are heavily influenced by the Common Agriculture Policy (CAP) agreed by the European Community. In January 2005, Member States moved to a new system following the Mid Term Review of the CAP.

- **Single Farm Payment (SFP), Cross-compliance and Good Agricultural and Environmental Condition (GAEC)**
Payments to farmers are now decoupled from production and the SFP replaces all previous production subsidies. The new system does not require farmers to produce anything in order to receive their SFP, as long as they comply with 18 Statutory Management Requirements (SMRs) including European Directives and Regulations – though currently not the WFD – and keep their land in Good Agricultural and Environmental Condition (GAEC)\(^{41}\).

Eight SMRs form part of cross-compliance from 2005, including the Birds and Habitats Directives. A further 7 will apply from 2006 and 3 more from 2007. Although farmers must already comply with these by law, breaches of these will now result in loss of SFP.

The CAP reform agreement requires that land in receipt of SFP should be kept in GAEC in order to avoid land abandonment and to avoid environmental deterioration through agricultural management. GAEC requires the protection of soil structure and organic content, and a minimum level of maintenance to avoid habitat deterioration. Breaches of GAEC conditions will also result in loss of SFP to varying degrees depending on the nature of the breach, whether these are negligent or intentional and the number of times a breach is committed.

- **Modulation**
From 2005, compulsory European modulation applies to all Member States and regions of them (like Scotland), which also have the discretion to apply additional national modulation. In Scotland this will have the effect of re-directing a total of 6.5% of SFP in 2005, 8% in 2006, and at least 10% in 2007. 80% of the compulsory EU element will return to Scotland. 100% of the national voluntary modulation remains in the country, attracting pound for pound Treasury matched funding. The modulation process will raise approximately £43million in 2005, £56 million in 2006 and £73 million in 2007, though not all of this is additional money as voluntary modulation has operated in Scotland since 2001.

Modulated money in 2005 will fund existing expenditure on agri-environment schemes, and the new Tier 2 Land Management Contract Menu Scheme (see 8.2). In subsequent years it will fund these and also any new Tier 3 measures. RSPB Scotland argues that a rate of at least 20% is needed to fully fund agri-environment

\(^{41}\) Council Regulation 1782/2003
measures in future if no further increases in the rural development budget are introduced.

- **Rural Development Regulation (RDR)**
  The European Commission has recently agreed the new Rural Development Regulation (RDR) for 2007-2013. This regulation provides the framework within which Member States and regions must draw up Rural Development Plans for that period. Water is identified as a priority issue for the programming period 2007-2013 and specifically, that RDR resources should be used to implement WFD objectives.

### Improving the environment and countryside

**Guideline**

*To protect and enhance the EU’s natural resources and landscapes in rural areas, the resources devoted to axis 2 should contribute to three EU level priority areas: biodiversity and preservation of high nature value farming and forestry systems, water and climate change. The measures available under axis 2 should be used to integrated environmental objectives and contribute to the implementation of the agricultural and forestry Natura 2000 network, to the Gothenburg commitment to reverse biodiversity decline by 2010, to the Water Framework Directive objectives and to the Kyoto Protocol targets for climate change mitigation.*


In order to meet this priority Member States are advised to focus on key actions such as encouraging environmental / economic win-win situations and focusing on specific resources such as water and soil.

This represents a strong and significant shift in emphasis, which is directly relevant to tackling the problems of diffuse pollution in Scotland through the Scottish Rural Development Plan (see 8.2). A strategic steering group on WFD & Agriculture sponsored by UK and jointly run by DGAgriculture and DG Environment is currently considering the new RDR and strategic guidance to deliver outcomes for water.

### 8.2 Scottish Agricultural Policy

The reformed CAP, introduced in Scotland from January 2005, gives greater emphasis to environmental objectives, including protection of the water environment. The Scottish Executive is currently in the process of developing a new Scottish Rural Development Plan (SRDP) for the programme period 2007-13 and devising a parallel Scottish Rural Development Strategy in order to implement the RDR in Scotland.
The *Forward Strategy for Scottish Agriculture*[^42] directs agricultural policy development in Scotland. An important new system of whole farm support based on Land Management Contracts (LMCs) is to be introduced in 2007, line with a high level commitment within the Scottish Parliament. This system aims to encourage more sustainable land management in keeping with the EU drive to decouple payments from production, moving towards a system of achieving public benefits in return for public funding, but shaped to Scotland’s needs.

“High environmental standards are vitally important…..protecting and enhancing the environment is not always easy while maintaining the competitiveness of business. Perhaps for the first time this Strategy faces up to these tensions. It sets out how a more joined up approach to policy, harnessing the expertise of farmers and environmental interests and finding solutions which are good for the environment and business can be used to tackle them.

The Executive will work with the industry and SEPA to develop cost effective approaches to help farmers tackle water pollution, e.g. through the development of DIY farm pollution prevention planning.

In implementing EC legislation such as the WFD ….the Executive will work closely with the industry in designing measures which take account of the practicalities of farming as well as the risk of environmental damage.”

Forward Strategy for Scottish Agriculture, 2001

The LMC system is currently under development, for launch in 2007, as the principle new delivery mechanism for agricultural and rural development support in the SRDP, and for implementing the objectives set out in the Forward Strategy. The system makes payments for the delivery of environmental, social and economic benefits focusing on achieving public goods for public funding.

**The new system will have three Tiers:**

**Tier 1: The SFP and Cross-compliance**

This tier aims to secure a basic level of environmental protection, food safety and animal welfare in order to receive the SFP. Cross-compliance includes the requirement for the farmer to keep the land in GAEC, particularly the protection of soil, in order to receive the SFP. Conditions relating to diffuse pollution require that farmers prevent soil erosion or the run-off of soils and other material to watercourses; farmers are advised to leave a buffer strip of two metres of ground uncultivated and unsprayed next to any watercourse, and to avoid the compaction of ground which can result in excessive surface water run-off.

[^42]: A Forward Strategy for Scottish Agriculture, Scottish Executive 2001
Tier 2: Land Management Contract Menu Scheme (LMCMS)

This tier comprises a series of broadbrush, non-competitive measures aimed at delivering widespread environmental, economic and social improvement. The LMCMS is the first element on Tier 2 development. The scheme contains measures which have the potential to reduce diffuse pollution and include the provision of buffer areas at least 3m wide; a contribution to the cost of drawing up and implementing a nutrient management plan to better target the application of fertilisers on improved land; and payments for the good maintenance of ditches, including the retention of bankside vegetation. Other options include management of ditches, dykes, hedges, improved access, biodiversity cropping and membership of quality assurance schemes.

The LMCMS was launched in February 2005 as a prototype Tier 2, and overall uptake has been unexpectedly high – over £17 million will be directed to over 10,000 applications representing around 50% of all farmers and crofters in Scotland. Most of these applications have been for options which relate to animal health and welfare, quality assurance and improving access, but it is encouraging that a third of applicants have opted for agri-environment measures which are longer term and more onerous. Despite this, provisional numbers of applications for buffer areas and nutrient management in 2005 are relatively low and it is clear that more needs to be done to encourage farmers to apply for these or similar options in future:

<table>
<thead>
<tr>
<th>Buffer areas:</th>
<th>Number of applicants – 880</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate - £200 per hectare</td>
</tr>
<tr>
<td></td>
<td>Projected spend - £250,000</td>
</tr>
<tr>
<td></td>
<td>Area managed - 1230 hectares</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nutrient management:</th>
<th>Number of applicants – 663</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rate - £2 per hectare</td>
</tr>
<tr>
<td></td>
<td>Projected spend - £186,000</td>
</tr>
<tr>
<td></td>
<td>Area managed – 93,000 hectares</td>
</tr>
</tbody>
</table>

Tier 3: Enhancement

It is intended that Tier 3 will be designed to reward more specific, high value benefits, and for activities to be carried out at the appropriate spatial scale - which for priority issues such as diffuse pollution is greater than an individual holding. In contrast to Tier 2, Tier 3 measures will be available on a competitive basis and should

---

43 Scottish Executive News Release, Minister announces Menu Scheme success, 25/8/2005
lead to environmental, social and economic enhancement - significant environmental or other public benefits must be demonstrated. Measures are likely to develop, in part, from those in the existing Rural Stewardship Scheme (RSS) and should aim to promote the creation and management of wetlands including ponds and reedbeds in priority areas.

Significant payments should be made at the catchment level, across landholdings in priority areas, to support the restoration or re-introduction of floodplain management, or of very low-intensity agriculture which is capable of reducing impacts on water and delivering a wide range of biodiversity benefits. The targeting of such priority areas should be linked to the achievement of objectives for water-dependent Natura 2000 sites, and to the requirements of the WFD through River Basin Management Plans. This should be considered as the process of developing LMC regional prioritisation statements evolves. Measures should aim to deliver multiple objectives, including biodiversity, reducing impacts of diffuse pollution, flooding and climate change.

8.3 Advice and guidance
Despite efforts made to address diffuse pollution from agricultural sources, evidence suggests that there remains a lack of awareness amongst farmers of the scale of the problem, and of their role. Further, although advice is given by many advisors on pollution mitigation measures there is a lack of knowledge of their effectiveness. There is a need to convince farmers of the diffuse problem both generally and locally, of their responsibility and of the potential economic benefits of participation in initiatives to reduce it. This could be addressed by including soil and nutrient planning within cross compliance requirements.

The existing SEERAD funded farm advisory service is under review and a new scheme needs to be introduced as a requirement of the Farm Advisory Service provisions of the CAP mid-term review. A new advisory package is required by 2007. Whilst the EU Farm Advisory System generally relates to Tier 1 (the SFP) the Executive is currently considering its advisory package in the context of the 3 LMC tiers.

It is imperative that advice is easily available for all farmers to support the introduction of new rules and the delivery of public goods. Farmers should have access to free advice on nutrient and soil management planning and preparing nutrient budgets, and the provision of public benefits – e.g. habitat improvement. In priority areas face-to-face advice should be available through the appointment of Catchment Advisors.

44 Policy mechanisms for the control of diffuse agricultural pollution with particular reference to grant aid. EN Research Report No. 455, 2002
45 Review of attitudes and awareness in the agriculture industry to diffuse pollution issues, Merrilees & Duncan, 2003
8.4 Innovative practices

New technologies, making it easier for farmers to assess the value of manures and slurries, apply them safely and efficiently to the land and to process them in a form that makes them attractive to re-use, should be encouraged. There is potentially a role for adequately processed sewage effluent and for using animal wastes to generate renewable sources of energy. Composting as a soil conditioner for use in gardening needs to be researched and promoted further with the potential additional environmental benefit as a peat alternative. Such technologies require Government support and investment in research and development programmes before they can become commercially attractive and brought to the market.
Diffuse pollution remains a major and growing environmental problem in England. The Environment Agency has highlighted the scale of the problem - 29% of rivers, 52% of groundwaters, 20% of transitional waters, and 13% of coastal waters are at risk, or possibly at risk, due to diffuse sources of nitrate. Further, 27% of rivers, and 32% of lakes are at risk, or probably at risk, due to diffuse sources of phosphorus. These water bodies are likely to fail to meet the Good Ecological Status required by the Water Framework Directive by 2015.

Defra recognises that, despite numerous initiatives to date, further concerted action is required to reduce inputs to the water environment. Existing and planned policies, in particular cross compliance through CAP reform, the Entry Level and Higher Level Scheme of Environmental Stewardship and the Whole Farm approach will help reduce agricultural emissions to water. However, recent research which modelled a number of catchments in England suggests that while adopting codes of good practice and environmental schemes will decrease diffuse pollution these measures will be insufficient to meet WFD targets. It concludes that it may be necessary to reduce current livestock levels by more than 70%, and that more radical land use change will need to be considered if these targets are to be met.

**Nutrient Management Steering Group (NMSG)**

This new group, chaired by Defra, has been established to oversee the development of integrated Government policy for nutrient management. It aims to do so by:

- Steering evidence gathering, policy development and delivery work related to nutrient management and co-ordinating this with work undertaken by related policy divisions, other agencies and external partners;
- Ensuring a systematic approach taken on nutrient agriculture by Government;
- Agreeing and ensuring success measures for key performance indicators for the Government’s environmental policy outcomes;
- Ensuring the development of consistent and co-ordinated advice for farmers on nutrient management issues.

The NMSG has recently focused on the use of nutrient management plans (NMP) in England with the aim of developing a revised NMP intended to substantially increase their use and effectiveness.

**Catchment Sensitive Farming**

Defra’s Catchment Sensitive Farming programme (previously Diffuse Water Pollution from Agriculture) is a major new initiative to tackle diffuse pollution.

---

46 Nutrient Pollution – an overview of existing evidence and policy, Nutrient Management Steering Group paper, 2005
47 Modelling land-use change: win-win scenarios for agricultural pollution and farmland wildlife, July 2005
48 Use of Nutrient Management Plans in England, NMSG/2 Nutrient Management Unit, Defra, 2005
105 key catchments for SSSI protection have been identified by English Nature to target early action. In these areas new mechanisms will require farmers to move to more sustainable management, including stricter cross compliance and new powers to implement the WFD.

Defra has recently announced £25 million for the provision of catchment advisors in 2006/2008 in order to provide a locally based source of advice and expertise on catchment sensitive farming, including impacts on water from soil, nutrient and manure management. The advisors will have access to a national support structure to ensure consistency, promotion of best practice, effective transfer of information and monitoring of progress.
10 CONCLUSIONS

There is a pressing need to address the growing problem of diffuse pollution from agricultural sources. Current measures are proving to be of limited effectiveness, take-up of initiatives and general understanding is very limited, and the problems for our water quality and water dependent biodiversity continue to increase.

The WFD is expected to provide a mechanism for bringing about significant ecological improvements in the water environment at a catchment scale, as well as more sustainable solutions to land use issues and problems. This opportunity must be taken to ensure that measures designed to deliver Good Ecological Status can deliver a wider range of public goods and benefits - including habitat protection and restoration, sustainable flood management, cleaner water supplies and recreational waters, public health benefits. Such goods must be fully factored into the analysis of cost effectiveness required in the new River Basin Management Planning process.

Implementation of the WFD through appropriate CAP reform and rural development measures offers an opportunity to tackle this problem on a number of levels – on a widespread, as well as highly targeted basis. Measures aimed at achieving the required Good Ecological Status include a combination of incentives, advice and regulation designed to support, engage and ultimately deter farmers and landowners from carrying out damaging farming practices. Priority catchments need to be identified and targeted, with other measures being applied more generally for maximum effect.
11 RECOMMENDATIONS

A number of recommendations are made which focus on the integration of agriculture and water policy with the aim of reducing diffuse pollution and achieving the Good Ecological Status for water bodies throughout Scotland required by the WFD. Recommendations include the need for an overall diffuse pollution strategy for Scotland, measures which develop the new regulatory proposals, and more effective links between agricultural support and water policy.

Some of these measures can be implemented in the short term at no or little cost. In the medium term they should feed into and link with RBMP statutory programmes of measures and sub basin plans as they develop. Effective attempts to control diffuse pollution from agricultural sources are likely to require combinations of measures at the farm and catchment scale.

1 RECOMMENDATIONS FOR BETTER POLICY INTEGRATION

i Responsibility
SEPA should be the regulatory body responsible for diffuse pollution in Scotland.

ii Diffuse Pollution Strategy
A Diffuse Pollution Strategy for Scotland, led by SEPA, should be developed in order to raise the profile of the issue, facilitate integrated policy development and monitor progress.

iii Nutrient Management Steering Group for Scotland
Develop the role of the existing SEERAD led Diffuse Pollution Working Group in order to oversee and inform the implementation of a new Diffuse Pollution Strategy for Scotland. This should include revision of membership of the existing group.

iv Identify priority areas
SEPA should identify those areas affected by, and at risk from diffuse pollution, as priority areas as a matter of urgency. Priority areas should include all sites of international or national importance for wildlife – including SPA, SAC, SSSI – which are affected by, or at risk from diffuse pollution.

Priority areas identified by SEPA should inform RBMP Programmes of Measures as they develop and should be used as a means of targeting rural development funding through the LMC mechanism. National priorities should be part of the national targeting process, and the areas themselves, or the eventual RBMPs, should inform both the boundaries for, and the content of, LMC regional prioritisation statements.
v Duty to ensure policy integration
The WEWS Act requires that Scottish Ministers and every public body and office holder must have regard to RBMPs and sub basin plans. This important responsibility across government departments and agencies should be observed with the aim of integrating key policy areas relevant to diffuse pollution – including agriculture, water, biodiversity and flooding. For example, agricultural delivery mechanisms, particularly LMCs, must link effectively to the objectives of Programmes of Measures as set out in RBMPs as they develop.

2 RECOMMENDATIONS FOR AGRICULTURE POLICY

i Scottish Rural Development Plan - funding
The SRDP must ensure adequate funding for agri-environment measures aiming to tackle diffuse pollution. At the time of publication the SRDP budgets for 2007 and beyond have yet to be decided, due partially to unresolved Member State discussions on the future for EU budgets. However, it is becoming increasingly clear that funding, at least for the first years of the programme period, is likely to be fairly limited. Given existing commitments to agri-environment schemes, there is likely to be limited additional funding derived from the core European rural development pot.

Measures that tackle diffuse pollution must have priority in order that the scale of the problem outlined here is recognised. It is clear that many measures for diffuse pollution also have biodiversity and other environmental benefits, and these multiple objectives make such measures best value for the public funding for rural development. Should the rural development funding pot be unable to adequately finance measures like these, and other sources of funding cannot be identified, there will have to be an increase in additional voluntary modulation to achieve this.

ii Land Management Contracts
There is considerable scope for addressing diffuse pollution through Tiers 1, 2 and 3 of Land Management Contracts and hence delivering WFD objectives of Good Ecological Status in water bodies. Such measures should include payments for the good maintenance of ditches, including the retention of bank-side vegetation, measures promoting low intensity agriculture and diversification. We recommend the following changes and additional measures to align farm support with WFD requirements, for inclusion in LMCs in 2007:
**TIER 1: SFP and cross compliance**

Introduce requirement to prepare and implement a compulsory Nutrient / Soil and Manure Management whole farm Plan as part of GAEC in order to receive SFP.

All farmers applying for the SFP should show they have prepared and are implementing a satisfactory Nutrient / Soil /Manure Management Plan for their farm in order to receive SFP payment.

Whole farm Nutrient / Soil / Manure Management Plans should aim to provide farmers with a structured framework for the planning process and thereby help the consistency and quality of decision making on nutrient management. Plans should consider the restricted spatial and temporal application of crop nutrients and manure to least damaging areas and times, e.g. avoiding watercourses and periods of excessive rainfall. The process can also help farmers save money by assessing accurately the inputs required.

Such Plans should not require intensive advisory input though free advice should be available from the Farm Advisory Service. It is envisaged that they would be self-completion plans with no associated cost implications.

Introduction of this new Tier 1 requirement should also be a requirement of the new national GBRs (see Recommendation 3.1 below)

**TIER 2: Non-competitive incentives**

Provide non-competitive incentives, available to all land managers who apply for them. Tier 2 should be based on the requirement, or failing that, encouragement for land managers to prepare and implement farm environment plans. The following measures should be included in Tier 2:

- **3 - 6m buffer strips**
  Enhanced buffer strips should be targeted in areas identified as being at risk from diffuse pollution by SEPA. Buffer strips must have effective composition to maximise their benefit for diffuse pollution and biodiversity.

- **Management of farm wetlands**
  Naturally functioning wetland areas on farms will absorb excess nutrients and provide valuable habitat. Part of natural management of wetlands is grazing, which is required to maximise biodiversity benefits, delay vegetation succession, and maintain open water and water vegetation interface for the benefit of a range of wetland species.

- **Provision of farm ponds**
Creation and management of farm ponds to help absorb nutrients and allow sediment to settle. Farm ponds should be distinct from farm water reservoirs and provide biodiversity benefits. Management must include minimal water levels and surrounding vegetation.

- **Promote conversion from winter to spring sown cereals**
  Sowing in spring can avoid large amounts of nitrate loss compared to winter sowing, particularly in areas at risk of high erosion and with close proximity to water.

- **Provide vegetative over winter cover**
  Retaining a good vegetative ground cover overwinter, e.g. straw and stubble of the last crop, is highly desirable in controlling leaching and surface runoff.

- **Promote strip cropping**
  Sowing crop in strips 20m wide along slope contours while leaving narrow 4m strips between can be effective in reducing surface erosion.

**TIER 3: Enhancement**

Tier 3 should provide competitive incentives for priority areas\(^{49}\) in order to:

- Encourage catchment level, collaborative applications
- Target major wetland creation, floodplain restoration and management
- Measures for enhanced buffer strips (6-15m)
- Creation and management of coastal wetlands
- Farm wetlands and ponds

Provide significant competitive incentives for priority areas (identified from SEPA’s characterisation process) and linked to Targeted GBRs (see Recommendation 3i below) which:

- **Encourage joint applications at a catchment scale**
  Partnership working in problem areas will deliver greatest benefits.

- **Encourage the natural functioning of major wetland areas including the restoration and management of riverine and coastal floodplains**
  Large scale applications for the restoration, re-creation and proper management of naturally functioning riverine and coastal wetland areas should be actively encouraged. This would provide additional flood storage, slow down water flow during a flood event, reduce agricultural run-off and contribute to the delivery of

\(^{49}\) SEPA is currently identifying “priority catchments” which could form the basis of these areas.
biodiversity commitments. Should cover capital works such as blocking drains and re-connecting rivers and floodplains.

- **Lowering of stock density**
  Lower stock density can significantly reduce the loss of N and P, and removing cattle from pastures in early autumn can lower leaching of N to water courses. Although this is not primarily an enhancement measure, and is in principle suited to Tier 2, the need to target this measure for maximum effectiveness and use of public funding is the rationale for its recommendation under Tier 3. Again, this prescription needs targeting.

- **Fencing off watercourses and riparian vegetation management**
  This is a targeted measure in areas with diffuse pollution problem. Fencing off watercourses avoids damage to soils by poaching from cattle. Riparian zones should be managed as per enhanced riparian buffer strips, or wetlands. There are capital costs associated with fencing and high level of targeting means that it is a suitable Tier 3 measure.

- **Provision of drinking points**
  Where livestock are excluded from watercourses it is necessary to provide alternative drinking supplies. As above, there are capital costs associated with this measure and so there should be a high level of targeting in areas with significant diffuse pollution problem.

- **In field grass areas**
  Reduce run-off, restrict water movement, protect soils, and contribute to flood management.

- **Enhanced riparian buffer strips**
  Enhanced riparian buffer strips and areas (exceeding 3-5m buffer width) – should be promoted in high priority areas, such as intensively managed grasslands (e.g.: dairy farms). 5-20m strips are effective for dealing with pollution, but actively managed wider strips (up to 90m) are of additional value for biodiversity. Enhanced buffer strips should aim to provide additional food resource for birds and insects, located in intensively managed landscapes. This prescription would have primary objective of preventing soil erosion and reducing diffuse pollution/field run-off, but also provide for biodiversity.

- **Constructed Farm wetlands and farm SUDS**
  Need targeting and subsequent management to maintain performance.

- **Restoration and creation of native riparian woodlands**
  Native riparian woodlands should be promoted in high flood risk areas (where appropriate means of delivering flood reduction) and diffuse pollution control. Also very beneficial for biodiversity and reaching BAP targets. Could follow advice from Forestry Grant Scheme guidance on riparian woodland creation and location.
- **Improving moorland management**
  Moorland re-wetting and restoration can reduce flooding downstream, reduce sediment loads and protect peat. Good moorland management is essential for birds such as black grouse, which is a priority BAP species.

iii **NVZs**
Ensure enforceable, better funded and better compliance monitoring in the existing NVZs.

iv **Low input practices**
Promote farming methods which seek to reduce inputs to land and are generally less damaging to the environment than conventional farming systems.

### 3 RECOMMENDATIONS FOR WATER POLICY

i **Basic Measures: New Regulation**
RSPB Scotland welcomes the proposed introduction of new regulatory powers as required by the WFD and supported by the WEWS Act, to regulate diffuse pollution across Scotland with the aim of generally deterring and ultimately enforcing against polluters. National and Targeted GBRs should help create a level playing field and ensure that farmers who do not claim the SFP (and are therefore not subject to compliance with GAEC) are required to comply with measures which reduce diffuse pollution.

**National GBRs** should be based on existing good practice and include the following requirements:
- To prepare and implement whole farm Soil / Nutrient and Manure Management Plans. This should link with our LMC Tier 1 recommendation (see recommendation 2 ii above).
- Improved water margin management
- Establishing no spray zones around water courses
- Retention of vegetative overwinter cover

**Targeted GBRs** applying to priority areas should include the following requirements:
- Provide enhanced buffer strips and wetland areas (link to Tier 2 LMC)
- Partnership working at catchment scale wherever possible (link to Tier 3 LMC)
- Fencing off watercourses and provision of alternative livestock drinking supply (link to Tier 3 LMC)
- In field grass areas
Licences: The GBR system must be backed up by a requirement for licences in areas with persistent problems.

ii Develop effective Supplementary Measures
Supplementary Measures will provide an important route to achieving the environmental objectives required by the WFD, and therefore to tackling diffuse pollution. As Programme of Measures develops, they should include supplementary measures which complement the basic measures. It is difficult to define supplementary measures until we have a clearer idea of what the basic measures in the form of National and Targeted GBRs will comprise. However, where any of the recommendations made above for GBRs are not included in the final regulatory scheme they should be applied as supplementary measures.

iii Integration with River Basin Management Plans
Ensure effective engagement with the WFD River Basin Planning process. RBMP Area Advisory Groups can incorporate measures to tackle diffuse pollution as part of the statutory Programmes of Measures, as well as supplementary measures. There should also be effective integration between the AAGs and fora for setting LMC regional prioritisation statements.

Use the WFD / WEWS Act provision to prepare sub-basin plans to tackle diffuse pollution in priority catchments.

In some instances, as identified through the RBMP process, a change in land use may be desirable and necessary in order to meet GES targets.

iv Promote “remedial or restoration” measures
Scottish Ministers should introduce regulations that make provision for remedial or restoration measures to be required by SEPA, in accordance with s22 of the WEWS Act. Such measures could prove extremely powerful in remedying or mitigating the effects of diffuse pollution.

v Promote sustainable flood management
Opportunities to develop and implement a sustainable approach to flood management should be identified in accordance with the duty in the WEWS Act. This approach will help in tackling diffuse pollution. Flood prevention schemes should be considered on a strategic catchment basis, protecting and using natural wetland systems and soft-engineering techniques.

4 RECOMMENDATIONS FOR ADVISORY

i Provision of advice
Make available good, widespread, free advice on preparation of whole farm Nutrient / Soil Management Plans through the new Farm Advisory Service
ii Employ new Catchment Advisors
SEERAD should employ Catchment Advisors to assist farmers as sources of advice and expertise on catchment sensitive farming in priority areas. The development of this project officer approach could ultimately integrate with LMC delivery, to ensure a joined-up approach.

iii Role of fertiliser companies
Work with fertiliser companies to encourage field staff to promote best practice – quality rather than quantity of applications. At RSPB’s Mersehead nature reserve, fertiliser applications have been reduced by a third over the past two years with the advice of the fertiliser company. RSPB Scotland now has an agreement to run training courses for the company’s field staff.

5 RECOMMENDATIONS FOR NEW TECHNOLOGIES

New technologies, making it easier for farmers to assess the value of manures and slurries, apply them safely and efficiently to the land and to process them in a form that makes them attractive to re-use, should be encouraged. There is potentially a role for adequately processed sewage effluent and for using animal wastes to generate renewable sources of energy. Composting as a soil conditioner for use in gardening needs to be researched and promoted further with the potential additional environmental benefit as a peat alternative. Such technologies require Government support and investment in research and development programmes before they can become commercially attractive and brought to the market.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP</td>
<td>Common Agriculture Policy</td>
</tr>
<tr>
<td>CAR</td>
<td>Controlled Activities Regulation Scheme</td>
</tr>
<tr>
<td>Defra</td>
<td>Department of Food and Rural Affairs</td>
</tr>
<tr>
<td>GAEC</td>
<td>Good Agricultural and Environmental Condition</td>
</tr>
<tr>
<td>GES</td>
<td>Good Ecological Status</td>
</tr>
<tr>
<td>LMC</td>
<td>Land Management Contracts</td>
</tr>
<tr>
<td>LMCMS</td>
<td>Land Management Contract Menu Scheme</td>
</tr>
<tr>
<td>RBD</td>
<td>River Basin District</td>
</tr>
<tr>
<td>RBMP</td>
<td>River Basin Management Plan</td>
</tr>
<tr>
<td>SEERAD</td>
<td>Scottish Executive Environment and Rural Affairs Department</td>
</tr>
<tr>
<td>SEPA</td>
<td>Scottish Environment Protection Agency</td>
</tr>
<tr>
<td>SFP</td>
<td>Single Farm Payment</td>
</tr>
<tr>
<td>SRDP</td>
<td>Scottish Rural Development Plan</td>
</tr>
<tr>
<td>WEWS</td>
<td>Water Environment and Water Services Act (Scotland)</td>
</tr>
<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
</tr>
</tbody>
</table>
Commission of the European Communities, Proposal for a Council decision on Community strategic guidelines for rural development (programming period 2007-2013), 2005

Birnie, R et al. Review of recent UK and European research regarding reduction, regulation and control of the environmental impacts of agriculture; report for Agriculture and Environment Working Group, 2002

D’Arcy B et al, Diffuse Pollution Impacts; the environmental and economic impacts of diffuse pollution in the UK


Defra, Strategic review of diffuse water pollution from agriculture, initial appraisal of policy instruments to control water pollution from agriculture, 2004

Defra, Land use for achieving ‘good ecological status’ of waterbodies in England and Wales: a theoretical exploration for nitrogen and phosphorus, 2003

EC Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the Water Framework Directive)

EC Directive 91/676/EEC, the Nitrates Directive


English Nature, General Committee of Council, full review of the water and wetlands sector analysis, 2005

English Nature research report No. 455, Policy mechanisms for the control of diffuse agricultural pollution, with particular reference to grant aid, 2002

Frost, A et al. The impacts of agricultural environment management: case studies from theory to practice, 2002

Lange, U. Recommendations for a co-ordinated implementation of the European water protection legislation and the Common Agriculture Policy, 2003

Merrilees, D & Duncan, A. Review of attitudes and awareness in the agricultural industry to diffuse pollution issues, 2003


Nutrient management unit. Use of nutrient management plans in England paper NMSG/2

RSPB Scotland, Go with the Flow; the natural approach to sustainable flood management in Scotland, 2004

RSPB, Developing measures to promote catchment sensitive farming; public consultation response, 2005

RSPB, Consultation on the proposed and possible measures for implementation of cross compliance in England

SAC, Farm Soils Plan, 2005

Scottish Executive Environment Group, Diffuse Water Pollution from Rural Land Use: Consultation Paper 2005/35, December 2005

Scottish Executive, Land Management Contract Menu Scheme, Notes for Guidance, 2005

Scottish Executive, Forward Strategy for Scottish Agriculture, 2001

Scottish Executive, PEPFAA Code, Do’s and Don’ts guide, 2004

Scottish Executive, Scotland’s Biodiversity; its in your hands. A strategy for the conservation and enhancement of biodiversity in Scotland, 2004

SEERAD, 4-Point Plan

SEERAD, Challenges in creating local agri-environmental co-operation action amongst farmers and other stakeholders, 2004

Scottish Executive, Guidelines for farmers in Nitrate Vulnerable Zones

Scottish Executive, Water and Water Services (Scotland) Act 2003, Diffuse Pollution, issues and possible measures to control diffuse pollution
SEPA, Scotland River Basin District, Characterisation and impacts analyses required by Article 5 of the WFD, Summary Report, 2005

SEPA & Environment Agency, Solway Tweed River Basin District; Characterisation and impacts analyses required by Article 5 of the WFD, Summary Report, 2005

SEPA, Scotland River Basin District Characterisation, an economic analysis of water use, 2005.

SEPA & Defra, Solway Tweed River Basin District Characterisation, an economic analysis of water use, 2005

SEPA, River Basin Planning Strategy for the Scotland River Basin District, 2005

SEPA, Diffuse Pollution Initiative

SEPA, Impact of diffuse pollution on the aquatic environment in Scotland 2000, DPI report No. 5

SEPA, Corporate Plan 2005-2008


SNIFFER, Appraisal of rural BMPs for controlling diffuse pollution and enhancing biodiversity, Project WFD 13, 2004

Water Environment and Water Services (Scotland) Act 2003