

Northern Ireland Habitat Action Plan
Limestone Pavements
March 2005

1. Current Status

1.1 Geological and Biological Status

- 1.1.1 Limestone pavements are glacial features which have been exposed by the passage of ice sheets over Carboniferous limestone during the last ice age, over 10,000 years ago (Limestone Pavement Action Group (LPAG), 2003). The pavements were exposed by the scouring action of the ice sheets as they moved along the landscape. This landscape and its features have taken thousands of years to develop and is geologically important as a record of the last ice age exhibiting the direction and strength of the scour (LPAG, 2003). A wide range of plant and animal species occur on the bare limestone, grassland or woodland some of which are associated with limestone pavements. Some of these species are restricted to limestone pavements.
- 1.1.2 The weathering of the bare limestone produces 'paving' blocks known as clints, the fractures are grikes and the gutter like features that cut the clints and drain into the grikes are called runnels. These runnels are distinct from grikes and are formed by the dissolution of the rock as the water drains across the clints into the grikes. The dissolving action of acids in rain and ground water and weathering increase the cracks and joints creating the unique features of this landscape. It is likely that deeply developed pavements may have a longer history, their growth possibly being initiated while the limestone was buried under soils during inter-glacial periods. Subsequent glaciation then stripped the overlying soils. Other features that form on the clint surfaces are pits and pans which are formed by water and acids dissolving the limestone. Pans are shallow with an impervious base and hold water while pits are deep and free draining into the subterranean limestone drainage system.
- 1.1.3 In the UK there is less than 3,000 hectares of this rare and endangered landscape and habitat. According to Webb and Ward (1999) the total extent of limestone pavement in the UK is 2916ha of which 220ha occur in Northern Ireland (Northern Ireland Earth Science Conservation Review (Fogg and Kelly, 1995). Larger areas of limestone pavement are found in the Republic of Ireland, with some of the most extensive and best developed examples in Europe occurring in the Burren in County Galway and County Clare.
- 1.1.4 In Northern Ireland limestone pavement is restricted to west County Fermanagh. Where, limestone pavement occurs within 8 main localities. Of these Crossmurrin, Western Marlbank (70-100ha) occurs in Crossmurrin-Killykeegan National Nature Reserve (NNR) and Noon's Hole Knockmore (100ha) occurs within West Fermanagh Scarplands Areas of Special Scientific Interest (ASSIs).

- 1.1.5 Most of the pavement in this area is quite fragmented and occurs as part of a natural habitat mosaic comprising bare pavement, pockets of mineral soils and peat which has subsequently covered some of the limestone. It also generally lacks the deeply developed grikes found on pavements over much of the rest of the UK, possibly due to the intensity of glacial action during the last phase of the ice age. As a consequence, identifying and delimiting areas of limestone pavement can present difficulties.
- 1.1.6 It is considered that some of the pavement may have been lost due to inappropriate management and may in fact now lie buried due to intensive land use and high organic inputs (I. Enlander pers.comm). Historically, limestone from pavement which was possibly removed for land clearance have been used to construct dry stone walls. These stone walls are biologically active and contain some elements of the flora and fauna indicative of limestone pavement. They are a valuable component of this habitat and a distinctive element within limestone landscapes.
- 1.1.7 There are three broad types of limestone pavement described in the UK; open, wooded and scrubby, each with its own characteristics (LPAG, 2000). However, in Northern Ireland wooded limestone pavement is absent.
- 1.1.8 Most limestone pavements in Northern Ireland are open pavements due to the bare appearance of the exposed rock surface and limited tree growth. The lack of good soil, the lack of space for root growth as well as grazing pressure often means that any trees or shrubs that are present are often stunted, dwarfed and bonsai-like. The clint surfaces support typically calcareous grassland species or plants of rocky habitats or can be lacking in vegetation cover. Mosses and liverworts are often prominent including species such as *Tortella tortuosa* and *Homalothecium sericeum*. Grikes offer shelter from wind and grazing animals and often support higher plants more typical of base-rich woodland. These include herb robert *Geranium robertianum*, and wood sorrel *Oxalis acetosella*.
- 1.1.9 On clint surfaces where there is a thin layer of soil, plants typical of limestone grassland may occur e.g. thyme *Thymus polytrichus*, blue-moor grass *Sesleria caerulea*, sheep's fescue *Festuca ovina* and common bent *Agrostis capillaris*. This equates to the blue moor grass-limestone bedstraw, CG9 *Sesleria caerulea-Galium sternerii* vegetation community described in the National Vegetation Classification (Rodwell, 1998). However, some plants, notably limestone bedstraw *Galium sternerii*, are absent from limestone grassland in Northern Ireland. Fen and flush vegetation e.g. rushes *Juncus spp.*, may be found where water collects in the solution features such as pans and where mineral soils have accumulated. Deep grikes can hold a range of woodland plants, most notably occasional shrubs such as Hazel *Corylus avellana* and ferns such as brittle bladder fern *Cystopteris fragilis* and hart's tongue *Phyllitis scolopendrium*. Open pavement grades into other habitats particularly calcareous grassland but also heathland, blanket bog and improved grassland.
- 1.1.10 Scrubby pavement can also occur. This is intermediate between woodland and open pavement. The patchy tree growth is dominated by hazel with only occasional saplings of taller trees such as ash *Fraxinus excelsior* present. Other woody species include blackthorn *Prunus spinosa*, rowan *Sorbus aucuparia* with juniper *Juniperus communis*

occasionally present. Under areas of dense hazel the surfaces of the clints are frequently completely covered with woodland mosses such as *Hylocomium brevirostre* and *Eurynchium striatum* with a range of calcicolous woodland herbs present such as herb robert *Geranium robertianum*, and wood sorrel *Oxalis acetosella*. Where well developed scrubby pavement is present it equates to the W9 *Fraxinus excelsior-Sorbus aucuparia* vegetation community described in the National Vegetation Classification (Rodwell, 1998). Livestock grazing is usually less frequent on scrubby pavements however, rabbits and feral goats may also graze on wooded pavement.

- 1.1.11 As the vegetation occurring on limestone pavement is quite varied, the assessment of favourable condition is based on the continued presence of the geological features found on the limestone pavement and the historic and desired vegetation for an individual site. For open pavement, the cover of bare rock, and presence/cover of indicator plants such as blue-moor grass, wild thyme and characteristic mosses should be maintained and the spread of plants such as rye-grass *Lolium perenne*, bracken *Pteridium aquilinum* and shrubs is undesirable. For scrubby pavement, the height and extent of the canopy cover and the presence/cover of woodland plants should be maintained. The spread of invasive species such as sycamore and excessive grazing damage to trees or ground flora should be avoided.
- 1.1.12 In Northern Ireland the conservation management of designated limestone pavement sites (ASSI and candidate Special Areas of Conservation (cSACs)) is generally for open pavement with only small representative areas being managed as scrubby pavement (I. Enlander pers. comm.).
- 1.1.13 Limestone pavement provides refuge for a wide range of species although none appear to be restricted to limestone pavement in Northern Ireland.
- 1.1.14 Open pavement provides a habitat for upland grassland vertebrate species such as Irish hare *Lepus timidus hibernicus*, skylark *Alauda arvensis* and wheatear *Oenanthe oenanthe* with wooded pavements holding a range of typical woodland birds. Invertebrate species include a range of butterfly species including dingy skipper *Erynnis tages* and grayling *Hipparchia semele*. The hoverfly *Cheilosia ahenea* is restricted to this habitat in the UK and to calcareous grassland on limestone in County Fermanagh.
- 1.1.15 Notable plants occurring on limestone pavement include Irish eyebright *Euphrasia salisburgensis*, which is restricted to this habitat in the UK and to other rocky calcareous grassland on limestone in County Fermanagh. Other notable plant species include blue-moor grass and juniper.

1.2 Links with other action plans

- 1.2.1 This action plan identifies specific targets and actions required to deliver Northern Ireland's contribution to the UK limestone pavement habitat action plan (UK Biodiversity Steering Group, 1998).

- 1.2.2 Limestone pavements may be closely associated with other habitat types mainly depending on the land management. Associated priority habitats include calcareous grassland and upland ashwoods. The requirements of these habitats should be considered during implementation of this plan. Many of the prescriptions for these habitats may be relevant when managing limestone pavements.
- 1.2.3 Limestone pavement is an important habitat for a number of UK priority species identified as part of the UK Biodiversity Action Plan (BAP) programme. With relevance to Northern Ireland, these include skylark and juniper *Juniperus communis*. The requirements of these species should be taken into account when implementing this plan.
- 1.2.4 In addition, limestone pavements are important for a range of Northern Ireland priority species including Irish hare, juniper, dingy skipper *Erynnis tages*, Irish eyebright *Euphrasia salisburgensis*, the hoverfly *Cheilosia ahenea* and the moss *Tortella densa*. The requirements of these species should be taken into account when implementing this plan.
- 1.2.5 An all-Ireland Species Action Plan has been published for the Irish hare.
- 1.2.6 Relevant published Northern Ireland Species Action Plans include Irish hare and marsh fritillary *Eurodryas aurinia*.

2. Current Factors Affecting the Habitat

- 2.1 Removal - in Northern Ireland limestone pavement tends to be damaged and removed as part of land improvement or for farm access and development and not necessarily for the value of the stone.
- 2.2 Quarrying - removal of pavement under extant planning permissions e.g. at some quarry sites, means incidental destruction of limestone pavement by aggregate quarrying is a potential threat to the habitat. Where planning permission exists and limestone pavement is removed it is important that the water worn limestone does not make its way onto the consumer market thus quarries should be advised to treat limestone pavement in the same manner as other aggregate and crush it thus preventing it reaching the consumer market.
- 2.3 Gardening - limestone pavement has suffered greatly in the UK from removal for use as rockery stone. As it has taken thousands of years to form it is not readily replaceable. The introduction of Limestone Pavement Orders (LPOs) in the UK has made removal illegal however an investigation into trade in water worn limestone carried out by TRAFFIC international (Pendry and Allen, 1999) found that some illegal extraction was occurring in the UK. They also discovered that the majority of water-worn limestone making its way onto the consumer market came from the Republic of Ireland. This has resulted in an increased pressure on Irish Limestone and there may be a real need to improve protection of pavements in all of Ireland.

- 2.4** Agricultural improvement - the use of fertilisers, herbicides or pesticides on agricultural land that is near to or on limestone pavements can alter the characteristic assemblage of flora on the limestone pavement and eventually lead to a build up of organic matter which can reduce the area of exposed rock. In addition, the infilling of grikes to reduce risk of injury to grazing animals can also occur (LPAG, 2004).
- 2.5** Grazing - overgrazing is a frequent problem on open pavement and can affect scrubby pavement. Conversely low grazing levels can result in increased scrub growth on open pavement and reduced diversity on wooded and scrubby pavement.
- 2.6** Airborne pollution - acidification and nutrient enrichment from atmospheric deposition may impact the species composition and result in a reduction or loss of the lime-loving species associated with this habitat.
- 2.7** Climate change – this could potentially alter the species composition and biodiversity of limestone pavements in Northern Ireland. Summary predictions for temperature and sea level rise as a result of global warming have been modeled by the MONARCH project (Harrison *et al.* 2001). These models indicate a much smaller impact in Ireland than in Britain.

3. Current Action

3.1 Legal Status

- 3.1.1 Statutory site designation plays an important part in the conservation of limestone pavements. In 1992, the EC adopted the *Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora*, known as the ‘Habitats Directive’. The Habitats Directive requires member states to designate and manage Special Areas of Conservation (SACs) for selected habitats (listed in Annex 1 of the directive) and species (listed in Annex 2). Limestone pavement is listed as a priority habitat type on Annex 1 of this directive. In Northern Ireland one cSAC has limestone pavement as a selection feature - West Fermanagh Scarplands cSAC.
- 3.1.2 The *Conservation (Nature Habitats, etc.) Regulations (Northern Ireland) 1995* and *The Conservation (Natural Habitats, etc.) (Amendment) Regulations (Northern Ireland) 2004* (The Habitat Regulations) require competent authorities, when considering a plan or project not directly connected with the management of a European site e.g. an SAC or SPA, to undertake an Article 6 assessment. This assessment will determine if the plan or project, either alone or in combination with other plans or projects, is likely to have a significant impact on the site. In the case of a negative or undetermined assessment, a competent authority may only agree to the plan or project where it is satisfied that there are no alternative solutions and that the plan or project must be carried out for imperative reasons of overriding public interest, which may be of a social or economic nature. However, if the site hosts a priority habitat or species then the plan or project may only be approved for: a) reasons of human health, public safety, beneficial consequences of primary importance to the environment, or b) other reasons which the Department (DOE),

having considered the opinion of the European Commission (EC), determines are imperative reasons of overriding public interest.

- 3.1.3 Under the terms of the Habitat Regulations, the above Article 6 assessment by the competent authority is required for plans or projects e.g. land reclamation, which are outside European sites but may still have an impact on the site.
- 3.1.4 Guidance to help competent authorities and others to interpret the Habitat Regulations has been published (EHS, 2002).
- 3.1.5 Guidance on the completion of an Article 6 assessment has also been published (European Commission, 2000)
- 3.1.6 Under the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*, Areas of Special Scientific Interest (ASSIs) are identified and declared by the Department of the Environment (DOE) through the Environment and Heritage Service (EHS). Much of the limestone pavement in Fermanagh is included within ASSIs (Cuilcagh ASSI and West Fermanagh Scarplands ASSI) and 70ha of limestone pavement is included within two national nature reserves (NNRs) (Killykeegan and Crossmurrin NNR). *The Environment (Northern Ireland) Order 2002*, strengthened the protection of ASSIs, recognising the importance of working in partnership with owners and occupiers and facilitating the positive management of these sites. All cSACs are designated as ASSIs prior to designation as cSACs.
- 3.1.7 In 2000, the Northern Ireland Biodiversity Group (NIBG) produced its recommendations to Government (NIBG, 2000). These were largely accepted by the Northern Ireland Executive in 2002, with the publication of the *Northern Ireland Biodiversity Strategy* (DOE, 2002). *The Regional Development Strategy 2025* (DRD, 2001) is underpinned by the sustainable approach and includes Strategic Planning Guidelines (SPGs) on the protection of the environment which bring together a comprehensive collection of natural heritage and built heritage strategic guidance that includes sustaining and enhancing biodiversity.
- 3.1.8 Regional Planning and Transportation Division within DRD is responsible for co-ordinating the implementation of the *Regional Development Strategy (RDS) for Northern Ireland 2025* (DRD, 2001). The RDS contains a Spatial Development Strategy and related Strategic Planning Guidelines (SPGs). The emphasis in the SPGs is on competitiveness, sustainable development and tackling social exclusion and division. Operational policies to give effect to the SPGs are contained in Planning Policy Statements (PPSs). Some of these policies have a direct or indirect bearing on the prevention of adverse impacts on The Strategic Planning Guidelines of the *Regional Development Strategy 2025* (DRD, 2001) are translated into policies through Planning Policy Statements (PPSs). Some of these policies have a direct or indirect bearing on the prevention of adverse impacts on mesotrophic lakes/priority habitats and species.
- 3.1.9 PPS2 - *Planning and Nature Conservation* (DOE, 1997) (under review) sets out the planning policies for the protection of the hierarchy of sites of international, national or

local nature conservation importance against damaging development. It also addresses species protection.

- 3.1.10 *PPSI4 Sustainable Development in the Countryside* is due to be published by the end of 2005.
- 3.1.11 Site protection policies are included in Development Plans. These include the identification of Sites of Local Nature Conservation Importance (SLNCI's). Planning Service is currently considering which SLNCI's will be formally identified in Development Plans. Where such sites are confirmed in adopted plans, specific planning policies will be applied to development proposals on those sites.
- 3.1.12 The development of Local Biodiversity Action Plans (LBAP's) based on District Council areas and/or discrete landscape areas, and the appointment of Local Biodiversity Officers will help to build on the SLNCI network and encourage, co-ordinate and inform local biodiversity action.
- 3.1.13 Semi-natural areas, which are likely to be of particular environmental importance, are protected through the *Environmental Impact Assessment (Uncultivated Land and Semi-Natural Areas) Regulations (Northern Ireland) 2001*. These regulations, which came into operation in Northern Ireland in February 2002, are administered by DARD and seek to ensure that agricultural development of uncultivated land or semi-natural areas must first be assessed for environmental significance. This would also include cases where the land-use changes are aimed at restoring or enhancing limestone pavement.
- 3.1.14 The UK Woodland Assurance Standard (UKWAS Steering Group, 2000), a voluntary certification standard, requires that valuable semi-natural habitats are being treated in a manner that does not lead to further loss of biodiversity. Forest Service is certified against this standard and is undertaking a survey of its lands to identify valuable semi-natural habitats.
- 3.1.15 *The Environmental Impact Assessment (Forestry) Regulations (Northern Ireland) 2000* require anyone who wishes to carry out a project including afforestation, deforestation, forest road works or forest quarry works that is likely to have significant effects on the environment to obtain consent for the work from the Department of Agriculture and Rural Development.
- 3.1.16 Forest Service acquisition policy is outlined in *Afforestation – the DANI Statement on Environmental Policy* (DANI, 1993). It states that there should be a presumption against afforestation of botanically rich sites, which have undergone little disturbance for many years.
- 3.1.17 *The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 Regulations* primarily describe an extended range of developments within two Schedules that respectively will require or are likely to require environmental impact assessment including projects located within Northern Ireland that are likely to have significant

environmental effects on the environment of another Member State or where projects in another Member State are likely to affect Northern Ireland.

3.2 Management, research and guidance

- 3.2.1 EHS, as part of the requirements of the Habitats Directive, has prepared conservation objectives for those sites submitted as cSACs. Where limestone pavement occurs on cSACs and ASSIs, it is protected by control of potentially damaging operations and by the application of targeted conservation objectives.
- 3.2.2 Common standards monitoring protocols are also being established across the UK to assess the condition of limestone pavements within designated sites. However, standards for assessing favourable condition of the habitat in the wider countryside have not yet been agreed.
- 3.2.3 Where limestone pavement occurs in ASSI it is protected by control of potentially damaging operations and by application of targeted conservation objectives. Management/rehabilitation plans exist for NNRs. EHS, as part of the requirements of the Habitats Directive, has prepared conservation objectives for those sites submitted as cSACs. Common standards monitoring protocols are being established for limestone pavements in designated sites. Managing a limestone pavement can be financed within an ASSI through a wildlife enhancement scheme or management agreement. Forest Service may play a role in financing the management of wooded limestone pavement through the Woodland Grant Schemes.
- 3.2.4 The Management of Sensitive Sites Scheme (MOSS), launched in 2002 by EHS, is a voluntary scheme designed to ensure the positive management of the site features to maintain their extent and favourable condition within ASSIs. Under the scheme, landowners can receive payment for carrying out conservation work within the framework of a written agreement. MOSS covers issues that have relevance to the conservation of the site features including dumping, grazing and control of invasive species. EHS has negotiated several management agreements on ASSIs to help secure sympathetic ASSI management through the MOSS scheme.
- 3.2.5 DARD, through its Countryside Management Branch (CMB), has developed a series of agri-environment schemes including the Environmentally Sensitive Areas (ESA) Scheme (revised in 2000) and the Countryside Management Scheme (CMS). A further revision to both the ESA and CMS has recently been approved as part of a modification to the current Northern Ireland Rural Development Programme (2000-2006). Their objective is to protect and enhance semi-natural habitats by encouraging more sensitive management practices. Both these schemes have similar management provisions, are voluntary and apply to the whole farm.
- 3.2.6 The designation of ESAs commenced in 1988 and today there are five ESAs in Northern Ireland. DARD has determined a number of priority habitats which, if they occur on the farm, must be brought under agreement and managed according to relevant prescriptions determined by DARD. Although limestone pavements are not listed as priority habitat under the original ESA scheme, over 1,000 ha of 'species-rich grassland on limestone', in

County Fermanagh alone, was managed under agri-environment schemes (DARD, 2001). The revised ESA scheme has identified 'species-rich calcareous grassland' as an important habitat and 37.69 ha were being managed under ESA agreements at 31st March 2004. The West Fermanagh and Erne Lakeland ESA constitutes the most important current initiative to conserve calcareous grassland (UK Biodiversity Steering Group, 1995).

- 3.2.7 The West Fermanagh and Erne Lakeland ESA covers all major Northern Ireland karst units (I. Enlander pers.comm.) and is a valuable tool for management of pavement. Certain general ESA prescriptions such as *'the farmer shall not deposit on or extract from any land any article, material or substance likely to significantly detract from the natural beauty or damage or destroy the flora and fauna or materially alter the geological or physiological features of such land'* also offer some protection to limestone pavements.
- 3.2.8 The Habitat Improvement Scheme (HIS) aims to help farmers protect, enhance and establish habitats which are considered to have major conservation value. This is achieved by taking land out of agricultural production or by entering into a 10 year agreement which involves extensive grazing based on non-application of fertilizers and pesticides to the land. No new applications for the HIS are being accepted as the scheme closed in mid-1999. The scheme has been replaced by the Countryside Management Scheme (CMS).
- 3.2.9 The CMS, launched in 1999, was developed with the primary aim of maintaining and enhancing biodiversity and is open to application from all farmers and landowners outside ESAs. As funding is limited, entry into the scheme is competitive, being based on who can offer the greatest environmental benefits. DARD can provide area-based payments on blocks of > 0.1 ha in area within the farm unit, where it meets clearly defined criteria. The priority habitat must be brought under agreement and managed according to the specific objectives and prescriptions of the agri-environment scheme. A sample of these habitats are under long-term monitoring by QUB's Agri-environment Monitoring Unit (QUB, 2004). CMS and ESA have a voluntary option to protect and enhance grass margins adjoining ASSIs, NNRs, SACs, watercourses, lakes, woodlands or field boundaries. Grass margins are at least 2m wide and of a length which DARD will decide. The option of creating grass margins promotes the protection of sensitive habitats from pesticide drift or nutrient enrichment. No grazing, and usually no mowing is allowed within the grass margin and funds are available for fencing.
- 3.2.10 DARD has developed the Entry Level Countryside Management Scheme (ELCMS) which is due to open mid 2005. ELCMS has been designed to be easily accessible and to deliver a range of basic agri-environment improvements. Participants in the scheme will be required to undertake a field boundary management module, one of 3 possible water quality modules and one of 5 further biodiversity modules. The scheme will complement the existing agri-environment programme.
- 3.2.11 It is estimated by EHS and DARD that some 80-90% of the Northern Ireland limestone pavement resource has some degree of protection under the aforementioned designations and schemes and is receiving some positive management (I. Enlander pers. comm.).

- 3.2.12 The introduction of Good Farming Practice (GFP), which is applicable to farmers receiving Less Favoured Area (LFA) compensatory payments and those who enter any of the agri-environment schemes, provides protection for semi-natural habitats, including Limestone pavements. GFP consists of compliance with all environmental legislation, 8 verifiable standards and retaining copies of the Codes of Good Agricultural Practice for, Soil, Air and Water. Good farming practice prohibits infilling activities unless it has been approved under relevant planning or EIA regulations and should thus protect limestone pavements from infilling on ESA land. These standards and codes apply to the whole farm and are compatible with the need to safeguard the environment and maintain the countryside by sustainable farming. Approximately 70% of Northern Ireland is classified as LFA, this currently includes all limestone pavements.
- 3.2.13 All Farmers who receive the Single Farm Payment are required to comply with cross compliance from 1st January 2005. Part of cross compliance requires the farmer to keep all their land in 'Good Agricultural and Environmental Condition' and these measures are similar to GFP. As such Farmers are not allowed to destroy any semi-natural habitat.
- 3.2.14 DARD has developed a Grassland Fertiliser computer programme which provides farmers with fertiliser recommendations that best match the nutrient requirements for their soil and crop, and in so doing avoid over-supply of nutrients to the detriment of the environment. Adherence to minimum fertiliser prescriptions (and preferably no fertiliser application at all) is important in the vicinity of limestone pavement, where nutrient drift may result in changes in species composition and habitat status.
- 3.2.15 The *Environmental Impact Assessment (Forestry) Regulations (Northern Ireland) 2000* require anyone who wishes to carry out a relevant project, i.e. afforestation, deforestation, forest road works or forest quarry works, that is likely to have significant effects on the environment, to obtain consent for the work from Forest Service. The Regulations define thresholds above which the opinion of Forest Service is required. These thresholds take into consideration sensitive areas, which include Areas of Outstanding Natural Beauty (AONBs), ASSIs, National Parks, Nature Reserves, World Heritage Sites, Scheduled Historic Monuments and European sites. If consent for work is required, the applicant must provide an Environmental Statement in support of the application and where consent is granted, Forest Service may stipulate conditions to which the work is subject.
- 3.2.16 The Rivers Agency, as the statutory Drainage and Flood Protection Authority for Northern Ireland are responsible for maintaining the effective drainage function of designated watercourses under the *Drainage (Northern Ireland) Order 1973*. All drainage and flood defence proposals are subject to the *Drainage (Environmental Assessment) Regulations (Northern Ireland) 1991*, as amended, which require an assessment at planning stage of the environmental impact of the proposed works. Rivers Agency also consults with EHS on their annual programme of drainage maintenance, where this may have an impact on designated sites of nature conservation importance. This includes both localised operations such as maintenance of outfalls for field drains and more significant river maintenance work.

- 3.2.17 Roads Service has produced a booklet entitled *Road Service Environmental Handbook* (DOE, 1998), which provides guidance on the maintenance of roadside verges. While recognising the importance of herb-rich verges, it does not prescribe specific management measures.
- 3.2.18 Other relevant information is gathered through specialist biological recording groups, Non-Governmental Organisations (NGOs), universities and other government bodies. Biological records are currently stored in the Museum and Galleries of Northern Ireland (MAGNI) at the Centre for Environmental Data and Recording (CEDaR). CEDaR was established in 1995 in partnership with EHS, MAGNI and the biological recording community. There are currently over 1.4 million records held by CEDaR and there are developments underway to make these records more accessible through the Internet. This will be achieved through the National Biodiversity Network, a union of organisations throughout the UK working together to create an information network of accessible biological data for biodiversity information.
- 3.2.19 The Limestone Pavement Action Group (LPAG) was formed in the UK by voluntary sector organizations in 1994 due to growing concern for limestone pavement as a continued pattern of damage occurred despite some legislative protection. The aim of this group is to raise awareness about the damage to this non-renewable habitat and campaign for better protection for pavements. This group have their own website (www.limestone-pavement.org.uk).

4. Action plan targets

- 4.1 Maintain the extent of limestone pavement in Northern Ireland at 220 ha.
- 4.2 Where favourable, maintain the area of limestone pavement in favourable condition.
- 4.3 Achieve 200ha of limestone pavement in favourable condition by 2015.
- 4.4 Achieve 220 ha of limestone pavement in favourable condition by 2020.

5 Proposed Actions with lead agencies

5.1 Policy and legislation

- 5.1.1 By 2006, initiate discussions with other government departments to ensure appropriate consultation mechanisms exist for proposed changes in land use.
(ACTION: DOE, DARD, Planning Service, EHS)
- 5.1.2 By 2006, review *Planning Policy Statement 2 (PPS2) – Planning and Nature Conservation*, to include policies relating to the conservation of priority habitat and species.
(ACTION: Planning Service, EHS)

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- 5.1.3 By 2005, produce *Planning Policy Statement (PPS14) on Sustainable Development in the Countryside* which includes objectives to minimise the impact of housing development on the environmental resources of habitat, water quality and biodiversity of the rural area, thereby contributing to the conservation of biodiversity in Northern Ireland.
(ACTION: DRD, EHS, Planning Service)
- 5.1.4 If appropriate, identify further examples of limestone pavements as SLNCIs for consideration for adoption into appropriate Development Plans.
(ACTION: EHS, Planning Service)
- 5.1.5 Consider a review of Countryside Management Scheme and Environmentally Sensitive Areas Scheme to include streamlining of habitats/options to 'fit' with Biodiversity Action Plan habitat definitions if there is to be a review of agri-environment schemes under the new Rural Development Programme (2007 – 2013)
(ACTION: DARD)
- 5.1.6 By 2007, monitor and review the effectiveness of agri-environment schemes, GFP and woodland initiatives to ensure that limestone pavements are being maintained and enhanced across Northern Ireland.
(ACTION: DARD, Forest Service, EHS)
- 5.1.7 By 2006, ensure that all farmers receiving agri-environment scheme payments and LFA Compensatory Allowance Payments are complying with GFP.
(ACTION: DARD, EHS)
- 5.1.8 Consider the potential of using a landscaping condition in planning permissions relating to the 'no use' of limestone pavement as rockery stone.
(ACTION: Planning Service, EHS)
- 5.1.9 Continue to establish appropriate management and stocking levels on limestone pavement by promoting agri-environment schemes and implementing environmental cross-compliance conditions including GFP.
(ACTION: DARD, EHS)
- 5.1.10 Ensure that important limestone pavements and their conservation management requirements are recognised and site protection policies are included in statutory and non-statutory plans e.g. Development Plans, Local Biodiversity Action Plans (LBAP's) and appropriate management strategies.
(ACTION: Planning Service, EHS, DARD, DCAL, DRD)
- 5.1.11 By 2006, seek to encourage positive environmental change through the reformed Common Agricultural Policy (CAP), for example, by promoting sustainable agricultural management of limestone pavement.
(ACTION: DARD, EHS)
- 5.1.12 By 2007, ensure limestone pavements are adequately protected through the CAP.
(ACTION: DARD, EHS)

5.2 Site Safeguard and Management

- 5.2.1 By 2006, determine the extent and quality of the limestone pavement resource which falls within protected areas and notify further sites, if required, to fill significant gaps.
(ACTION: EHS)
- 5.2.2 By 2006, produce conservation objectives for all statutory sites with limestone pavement including cSACs, ASSIs and NNRs.
(ACTION: EHS)
- 5.2.3 By 2006, develop agreed methods for describing and assessing favorable condition for limestone pavement.
(ACTION: EHS)
- 5.2.4 By 2006, initiate measures intended to achieve favourable condition of all significant stands of Limestone pavement within ASSIs.
(ACTION: EHS)
- 5.2.5 By 2007, promote the uptake of long-term management agreements with landowners and occupiers on statutory designated sites aimed at creating or maintaining favorable condition.
(ACTION: EHS, DARD, Forest Service)
- 5.2.6 By 2006, prioritise areas, timescales and targets, based on designation status and restoration potential, for the conservation and improvement of limestone pavement.
(ACTION: EHS, DARD, Forest Service)
- 5.2.7 By 2007, target positive management through MOSS, agri-environment schemes, the LBAP process and grant aid for biodiversity to secure favourable management on limestone pavement prioritised in 5.2.5, according to agreed timescales.
(ACTION: EHS, DARD, Forest Service)
- 5.2.8 By 2006, promote and implement the management and restoration of areas of limestone pavement owned or part-funded by government.
(ACTION: EHS, DARD, Forest Service, District Councils)

5.3 Advisory

- 5.3.1 Promote awareness amongst the public, garden centre owners and landscape architects about the effects of removal of limestone pavement for rockery stone.
(ACTION: EHS)
- 5.3.2 By 2006, provide information to land owners and occupiers on the status and conservation importance of limestone pavements through the production, promotion and dissemination of literature.
(ACTION: EHS, DARD)

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- 5.3.3 By 2006, review relevant guidelines and advisory material to promote the use of good agricultural practices that minimize the impact of fertilisers, herbicides and pesticides on and near to limestone pavement.
(ACTION: DARD, EHS)
- 5.3.4 By 2006, provide advice to land owners about suitable management, including grazing regimes appropriate to the geographical distribution and ecological variation found on limestone pavement.
(ACTION: EHS, DARD, Forest Service)
- 5.3.5 By 2006, encourage applications from potential partners to obtain funding to bring areas of limestone pavement into favorable management.
(ACTION: EHS, DARD, Forest service, Water Service, District Councils)
- 5.3.6 By 2006, develop guidelines that identify those circumstances under which degraded limestone pavement restoration and management should be actively encouraged.
(ACTION: EHS, DARD)
- 5.3.7 By 2006, develop guidance on management and restoration practices for limestone pavements.
(ACTION: EHS, DARD)
- 5.3.8 By 2007, develop and promote awareness and training programmes on the conservation, management and restoration of limestone pavements through key organisations/ individuals involved in the delivery of advice to farmers and land managers.
(ACTION: EHS, DARD)
- 5.3.9 By 2010, develop demonstration sites to reflect the range of ecological variation and applied management techniques throughout Northern Ireland's limestone pavement resource.
(ACTION: EHS, DARD)

5.4 International

- 5.4.1 Further develop links with the Republic of Ireland and other European and international organisations and programmes such as the European Environment Agency and the European Centre for Nature Conservation, to promote the exchange of information and experience in research, management techniques, education and conservation strategies.
(ACTION: EHS)
- 5.4.2 By 2005, seek to encourage change in the European policy framework through reform of Common Agricultural Policy (CAP), for example by promoting sustainable agricultural management of habitat mosaics.
(ACTION: DARD, EHS)

5.5 Monitoring and research

- 5.5.1 By 2005, set standards for assessing favourable condition of limestone pavement throughout Northern Ireland.
(ACTION: EHS, DARD)
- 5.5.2 By 2005, establish surveillance and monitoring programmes to assess the condition of limestone pavement habitats within designated sites to aid site management.
(ACTION: EHS)
- 5.5.3 By 2007, initiate monitoring programmes to establish the effectiveness of government funded schemes and management methods in achieving the targets of this plan.
(ACTION: DARD, EHS, Forest Service)
- 5.5.4 By 2008, initiate a programme to monitor the total extent and condition of the limestone pavement resource.
(ACTION: EHS)
- 5.5.5 By 2008, produce an inventory of limestone pavement restoration and re-establishment projects in Northern Ireland.
(ACTION: EHS)
- 5.5.6 By 2006, review the requirement for and if necessary, commission applied research to help develop beneficial and practical management techniques (including appropriate stocking levels) for the enhancement and restoration of limestone pavement and populations of associated characteristic species.
(ACTION: DARD, EHS)
- 5.5.7 Encourage access throughout Britain and Ireland to the records held at CeDAR by contributing to the National Biodiversity Network www-based catalogue of survey information.
(ACTION: EHS)
- 5.5.8 By 2010, monitor limestone pavement restoration sites so that management resources can be focused on areas most likely to show a positive response.
(ACTION: EHS)
- 5.5.9 By 2015, review the requirement for further research on the effects of pollution and climate changes on limestone pavement, and promote research needs accordingly.
(ACTION: EHS)

5.6 Communications and publicity

- 5.6.1 Publish leaflets and booklets to raise public awareness on Limestone pavement destruction and supply these to garden centers and the general public.
(ACTION: EHS)

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- 5.6.2 Publish information for farming community on management on limestone pavement.
(ACTION: EHS, DARD)
- 5.6.3 By 2005, devise a strategy for ensuring effective distribution of existing and any new advisory material to land owners, farmers, garden centres and the general public and if gaps are identified, produce and disseminate appropriate material to fill these.
(ACTION: EHS, DARD)
- 5.6.4 By 2006, promote the conservation of limestone pavement through the scientific press and popular media.
(ACTION: EHS, DARD)
- 5.6.5 By 2008, facilitate the production of for example, a simple web-site, an attractive booklet or CD-ROM for the public and schools which explains the conservation importance of limestone pavement in Northern Ireland.
(ACTION: EHS, Department of Education, DARD)
- 5.6.6 By 2008, aim to achieve a minimum of 200 school groups attending limestone pavement education programmes each academic year.
(ACTION: EHS, DARD)
- 5.6.7 By 2008, encourage appropriate access as well as interpretative and educational provisions on key limestone pavement sites to increase enjoyment and public awareness of the biodiversity of limestone pavements.
(ACTION: EHS, DARD, Forest service, Water Service, District Councils)
- 5.6.8 Encourage local authorities not to use limestone pavement in landscaping or to use alternatives and encourage them to raise awareness in their areas.
(ACTION: EHS, District Councils)

6. Costings

- 6.1** A table showing the global costs for this and other HAPs is available on the EHS/Biodiversity web page.

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List of Useful Acronyms

ASSI	Area of Special Scientific Interest
BAP	Biodiversity Action Plan
CEDaR	Centre for Environmental Data and Recording
CMD	Country side Management Division
CMS	Country side Management Scheme
DARD	Department of Agricultural and Rural Development
DCAL	Department of Culture, Arts and Leisure
DETI	Department of Enterprise, Trade and Industry
DOE	Department of the Environment
DRD	Department for Regional Development
EHS	Environment and Heritage Service
ESA	Environmentally Sensitive Area
ESCRs	Earth Science Conservation Review Site
HAP	Habitat Action Plan
JNCC	Joint Nature Conservation Committee
MAGNI	The National Museums and Galleries of Northern Ireland
NIBG	Northern Ireland Biodiversity Group
NICS	Northern Ireland Countryside Survey
NNR	National Nature Reserve
PPG	Planning Policy Guideline
PPS	Planning Policy Statement
RA	Rivers Agency
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAP	Species Action Plan
SLNCI	Sites of Local Nature Conservation Importance
SoCC	Species of Conservation Concern
SPA	Special Protection Area
WFD	Water Framework Directive
WWT	Wildfowl and Wetlands Trust