



Our Changing Environment

This chapter sets out the context of this report in terms of the physical environment, and how our landscape has evolved. It also summarises the socio-economic pressures and forces driving change.

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Whilst this report considers the state of the environment in Northern Ireland, many of the factors which have an influence such as climate, geology, species movements and dispersed pollution do not recognise political boundaries. It is important that efforts to identify and address environmental issues recognise the continuity of landscape, landform, river systems and geographical economies across Ireland and the UK.



Physical Context

The land area of Northern Ireland¹ totals 14,160km², one-eighth of the area of the island of Ireland. In spite of its relatively small size, Northern Ireland displays a wide variety of landscapes and natural physical features.

Climate

Northern Ireland is influenced by the warm surface waters of the Gulf Stream resulting in a mild, moist climate. The region maintains a fairly constant year round temperature with an annual mean in lowland areas of around 8.5°C to 9.5°C, and annual rainfall varying from around 800mm to 1,600mm according to altitude².

Climate change is now widely accepted by the scientific community as a major environmental threat and is likely to result in alterations to the current situation in Northern Ireland. Predictions show increases to both annual rainfall and average temperatures, with a principal area of concern being the resultant changes to species and habitats. Research will continue to predict the impacts of climate change, and to direct action to mitigate and adapt to these impacts. This is discussed in [Air and Climate](#).

The Aquatic Environment

Inland and coastal waters are prominent features of Northern Ireland’s physical geography. Lough Neagh, is the largest freshwater lake in the British Isles³ at 412 km² and Lower and Upper Lough Erne are extensive water bodies in Fermanagh. The river systems of the Lower and Upper River Bann, River Foyle and River Blackwater drain agriculturally important fertile lowlands. The valley of the River Lagan is dominated by urbanisation and industrialisation which extend along both shores of Belfast Lough.

With 650km of coastline⁴, Northern Ireland’s coastal and marine environment forms an important natural and historical resource. Strangford Lough, protected by various statutory designations, provides a vital habitat for a wide range of important native species whilst the North Antrim coast supports a high proportion of several of the British Isles’ seabird populations. Numerous coastal towns and villages, built up around natural harbours and traditionally used as fishing and trading ports, still provide an important resource for local industry and tourism. Our maritime heritage is demonstrated by numerous wrecks and other archaeological remains around our coast. The state of the water environment is discussed in [Water](#).

Landscape Structure

For its size, Northern Ireland is amongst the most geologically diverse areas in the world and it is this that determines the wider landscape around us. Local geology reveals a complex history of volcanic activity, inundations by ancient seas and movements of the earth’s crust.

In the northeast is the large area of the basalt lavas of the Antrim Plateau, about 60 million years in age. In the south east is an extensive area of ancient sandstone, siltstone and mudstone, some 400 million years old. Elsewhere in County Down there are substantial areas of igneous rock

which form the Slieve Croob and Mountain of Mourne uplands. In the northwest, and centred on the Sperrin Mountains, is an extensive area of ancient metamorphic rocks, with small areas of similar rocks in northeast Antrim. These sediments date from 600 million years ago but were altered 400 million years ago. In the southwest, covering much of Co. Fermanagh and part of Co. Tyrone, is the outcrop of mainly of limestone, sandstone and mudstone dating from between 400 – 300 million years ago.

Antrim Coast



For a large part of the last ice age, starting around two and a half million years ago, Northern Ireland was covered by an ice sheet, which was part of the ice caps that covered extensive areas of northwest Europe and Ireland. The ice retreated 14,000 years ago leaving many different surface features, including the extensive drumlin belts in Counties Down, Armagh, Fermanagh and Antrim and the glaciated valleys of the Antrim Glens. Wind, waves and water have continued to shape the landscape. The sea and rivers have been responsible for both the erosion and deposition of materials, while extensive peatlands developed in the uplands and in lakes and valleys, creating the landscape we recognise today.

Soil

The soils in Northern Ireland have evolved since the end of the last Ice Age through a range of processes. The raw materials include natural rock, glacially derived sediments, river and lake alluvium and organic matter. Half of the land area comprises gley soils which have been affected by impeded or poor drainage conditions. Peat accounts for some 14%, with the balance comprising a mixture of thin primitive soils known as rankers, free draining brown earths, podzols, and alluvium. These features of geology and soil play a large part in determining local land use and providing raw materials, and in turn influence short and long term environmental change. The land environment is discussed in [Land and Landscape Management](#).

Vegetation and Wildlife

The diverse geology, soils, water and coastal environment in Northern Ireland combined with climate produces a range of grassland, woodland, bog and fen vegetation. This has been altered by man's activities, particularly patterns of agricultural use, to provide rich wildlife and habitats. Northern Ireland is also important for migratory species by virtue of its location and coastline. For further information see [Biodiversity](#).

Settlement and Historic Land Use

The landscape of Northern Ireland is an historical and cultural record of man's activities superimposed on the physical landform.

The initial population of hunter gatherers on the island of Ireland settled in coastal areas approximately 9,000 years ago. People gradually moved inland via the river valleys and by 4,000 BC, the first farming communities cleared and cultivated the lightly wooded landscape. This continued through the Bronze and Iron Ages, as metal implements enabled easier and more effective land cultivation. Archaeological field monuments, hill forts and ritual burial sites are evidence of these early settlers.

The introduction of Christianity brought a new dimension to the landscape as ecclesiastical sites, such as monasteries, churches and sculpted standing stones, appeared from the 6th century onward, further influenced by the parish system of the 11th and 12th centuries. The townland boundary system, still evident today, provides a link to early Christian times. Rath and cashels (fortified settlements in prominent locations) added distinctive manmade features to the landscape.

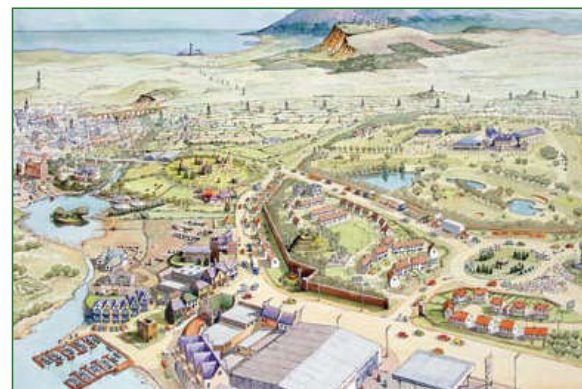
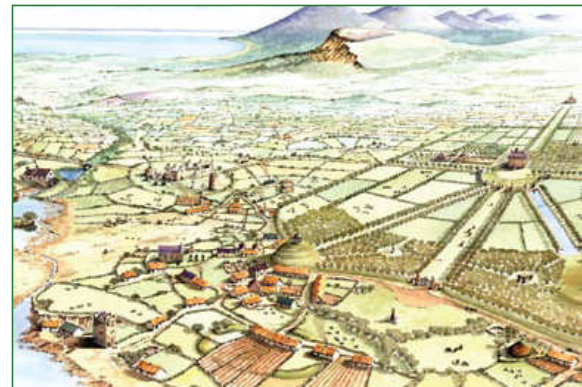
The actions of the new landowners in the Plantation movement in the early 17th century brought significant changes to the landscape and settlement form. A regular pattern of enclosed fields and plantation woodlands replaced scattered farmsteads and small irregular fields of earlier farms. Some medieval town patterns were retained but others were developed with new geometric layouts and broad streets. These are now valued as historic towns and villages. Settlements in coastal areas supported by fishing acted as important ports and harbours servicing the surrounding countryside.

Investment supported an ambitious canal building programme, and mining of iron ore and coal which contributed to economic expansion. The linen industry grew rapidly, using the abundant water in rivers to power mills and supply bleachworks. Cottage industries based on wool and flax supplemented agricultural incomes, supporting a large, dispersed population. This was also a period of country house building and the creation of many designed wooded parks and landscapes sited in attractive natural landscape settings.

With the dramatic population expansion between 1750 and 1820, new fields were extended into upland areas far above the present cultivation limit and land holdings were divided into progressively smaller units. The demand for fuel led to extensive peat cutting and the destruction of hedgerows and trees. Large scale famine and emigration in the mid 19th century led to the amalgamation or abandonment of the tiny landholdings. Many of the remaining woodlands were cut for fuel or sold to sawmills. Land reforms in the late 19th century established the foundation for the present day rural landscape of small, owner-occupied farms.

The industrialisation of the linen mills and the development of ship building industries led to rapid development of the city of Belfast, and other ports, establishing Northern Ireland as a major exporter to the world by the end of the 19th century. In the 20th century, urban areas, especially in the east,

Figure IN1: Historic Land Use Change



expanded during times of economic growth but suffered deterioration and neglect during the decline of major industries. Since the early 1990s, increased prosperity and political stability have led to investment and once again more rapid growth of our towns and cities.

The impact of historic and present land use is discussed in [Land and Landscape Management](#), and [Built Heritage](#).

Forces Driving Change

Our environment is strongly influenced by human activities which are forces for both positive and negative change. The scale and trends of these activities are regularly monitored through Northern Ireland's strategies on sustainable development and regional development.

Northern Ireland's ecological footprint is estimated at over 5.6 global hectares per person (compared with a current global capacity of 1.9 global hectares)⁵, indicating that we are living unsustainably. The Sustainable Development Strategy Implementation Plan – *A Positive Step*⁶ aims to balance the economic and social ambitions of the region, whilst protecting and enhancing the physical environment and health. It is planned that a set of Sustainable Development indicators will be published to allow annual assessment of progress.

The Regional Development Strategy for Northern Ireland 2025 *Shaping our Future*⁷ aims to guide the future development of Northern Ireland. This is monitored through a set of indicators and outcomes, published on an annual basis. These reflect the priorities set out within Strategic Planning Guidelines in areas such as housing, economy and transport.

The indicators presented in this State of the Environment report will complement those used to monitor these two strategies and those under development by the Department, which will measure the condition of the coastal zone⁸. It is anticipated that this report will inform the major review of the Regional Development Strategy programmed for 2010. In future relevant sets of environmental indicators will be taken forward in conjunction with the Northern Ireland Statistics and Research Agency.

Economic Context

Although Northern Ireland has the smallest economy of the UK regions, economic growth has been relatively high in recent years, with considerable investment.

Agriculture, in particular livestock and related products, is relatively more important in Northern Ireland than in the rest of the UK⁹ and has a significant bearing on much of the region's landscape and ecology. The decline in heavy industries and large-scale manufacturing, such as ship building and textiles, has been accompanied by a broadening of the industrial base across the food and drink, manufacturing and services sectors.

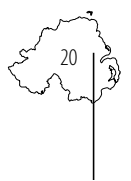
Tourism is an important and growing aspect of Northern Ireland's economy, based largely on the natural resources such as our scenic coastline, and many varied sites of cultural and heritage interest.

1 Pre History

2 Early Christian

3 Early Georgian

4 Modern Day



A recent report '*Valuing Our Environment - the Economic Impact of the Environment in Northern Ireland*' suggested that in total, our natural and historic environments, and the resources that they provide, are estimated to contribute £573 million to Northern Ireland's economy¹⁰. The state of the economy affects all aspects of our environment and achieving a balance is vital.

Housing and Development

The growing economy and population places pressure to provide more housing and infrastructure. There are approximately 700,000 dwellings in Northern Ireland and this is set to increase by over 20% by 2015^{11,12}. Of these, 5,500 are of historic importance and are protected but many more contribute to the character of townscapes and villages.

Around a third of Northern Ireland's population is dispersed in rural areas rather than concentrated in towns and cities. An extensive network of traditional market centres and regional towns are well spread out to service a strong rural community living in villages, small settlements and dispersed dwellings.

The rural community has undergone change over the last 30 years due to the restructuring of agriculture and the desire of more townspeople to live in the countryside¹³. Some small towns and villages have grown substantially, while others are experiencing population decline. Traditional rural houses are becoming derelict and underused at a much higher rate than urban dwellings¹⁴, particularly in marginal farming areas on the fringes of upland moors.

The volume, type and location of housing development have the potential to impact on the Northern Ireland environment. Key issues are the loss of greenfield land, increased development in rural areas, loss of historic buildings and cultural heritage and increased pressure on resources. In recent years, the development of new housing within the urban footprint has declined at the expense of more new housing in greenfield areas¹⁵.

Pressure for housing in the countryside is greatest in areas closer to Greater Belfast and Londonderry, close to good road connections and in areas of scenic quality, such as coastal and loughside situations¹⁶. The cumulative impact of development is particularly acute in the east of the region where there is a high level of demand¹⁷.

Development in the countryside and green field sites not only affects the land taken up in housing project proposals. New developments also require services through new and improved road and transport links and related infrastructure such as flood protection, water treatment and sewerage treatment facilities.

In urban areas, reusing brownfield sites (sites which have previously been developed) is vital in regenerating and conserving areas of historic interest. In the Belfast Metropolitan Area, the development of new homes on brownfield sites within the existing urban footprint will provide over a quarter of new dwellings in Northern Ireland.

Development for housing and mixed uses needs to take into account the historic environment within its locality. In the best-case scenario, this can enable and promote innovative approaches to design, siting and interpretation. However, relative redevelopment costs and investment opportunities may lead to the abandonment and even demolition of buildings of historic interest in favour of new build development.

As economic prosperity has increased, the average household size has fallen¹⁸. As fewer individuals share each home and population increases, pressures on resources, such as raw materials, energy and water, and the amount of waste produced, increase.

Housing and development pressures will affect all indicators, but especially those indicators on land cover and landscape character, listed buildings, and waste arisings.

Industry

The change to less materials-intensive industries accompanied by modern industrial processes, and improved effluent treatment, has positive impacts on environmental quality in Northern Ireland. Industrial activities have also left a legacy of heritage sites and features, such as mills, canals and railways.

Industry has the potential to create pressures on the environment through the use of dangerous substances, production of waste, contamination of land and emissions to air and water. Emissions from major industrial sources are controlled by a variety of measures. The most polluting industries have to comply with integrated pollution prevention and control measures (control of emissions to air, water and land).

The nature and size of some industrial developments have the potential to impact adversely on the existing landscape. This can be minimised by sympathetic design in an urban setting. In more rural locations, careful planning of site, architectural style and use of materials and existing buildings is required to minimise loss of landscape distinctiveness and natural habitats.

Mineral extraction has been an important part of our economy for centuries and continues to provide raw materials for building homes and infrastructure. Past quarrying activities have led to water quality deterioration, loss of habitats and open "scars" in the landscape. Modern practices have moved towards fewer, larger operations with progressive restoration to reduce the visual impact throughout the site's extraction life cycle, regulated by planning controls. Aggregate extraction in coastal areas is also regulated to control environmental impacts.

Peat cutting for use as a domestic heating source and building material has been a traditional activity throughout rural Northern Ireland for centuries. Localised cutting has little long-term environmental impact but commercial extraction removes an irreplaceable resource. Consequently peat reserves, the habitats they support and the landscape are under pressure from this activity.

Industrial activities will affect indicators of air and water quality, especially chemical river quality, and discharge quality, and also earth science sites, landscape character and waste arisings.

Power Generation and Energy

Northern Ireland is largely dependent on gas, oil and coal combustion for power generation, whilst energy supplied by non-fossil fuel sources is relatively small. Renewable energy, such as wind farms, hydropower schemes and tidal or wave driven turbines provided 5.8% of electricity consumed in 2005/2006¹⁹.

Power is generated primarily for the domestic market and general industrial and business sectors and there are few energy intensive industries and no solid fuel, oil or gas processing in Northern Ireland.

Emissions from fossil fuel sources impact on indicators of air quality and greenhouse gas emissions, which affect climate change. Renewable energy sources can also impact on indicators of woodland area, land cover, landscape character, and biodiversity. Hydropower schemes may beneficially lead to regeneration of industrial heritage at old mill sites.

Infrastructure and Transport

The increasing demand for new infrastructure to support population growth impacts directly on our environment through land take and associated effects of raw material and energy provision, emissions and habitat damage.

Northern Ireland's construction industry has been relatively buoyant during the last decade, showing overall growth of more than 18% between 1995 and 2001²⁰. The strong performance of the sector since the mid 1990s has been sustained not only by the increased demand for new housing but also investment in office and commercial property.

Provision of aggregates and other raw materials for infrastructure projects impacts on indicators of landscape character, and this sector generates construction, demolition and excavation wastes.

The demographics of Northern Ireland and a limited public transport system outside the urban areas have led to considerable reliance on road transport. Over 84% of journeys to work are undertaken by private transport in Northern Ireland, compared to just over 70% in UK as a whole²¹.

Emissions from road transport and related infrastructure impact on indicators of water and air quality. Transport and car usage patterns contribute significantly to the overall greenhouse gas emissions. Railways, airports and major roads, as well as large urban areas, can contribute to noise levels.

Agriculture and Forestry

Northern Ireland's soils and climate generate conditions that particularly favour agricultural grassland and tree growth. While livestock farming is a vital element of our rural environment, there are also opportunities for

timber and biomass production. In 2005, approximately 76% of the land area was in agricultural use²², and forests and woodlands (excluding scrub) together made up just over 6% of the land area.

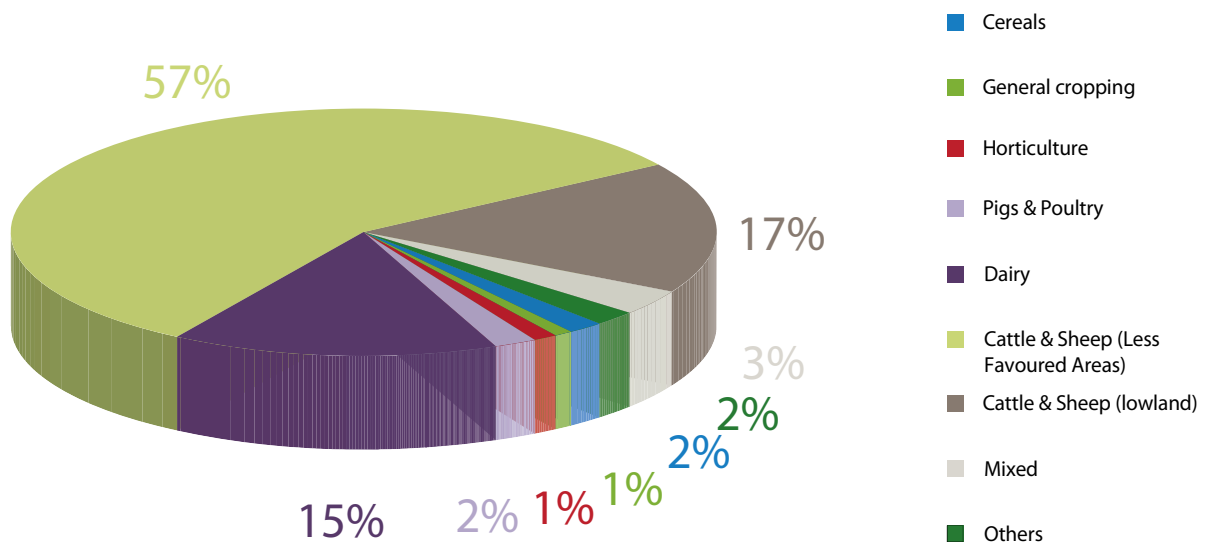
Forests and woodlands, along with single and small copses of large trees, are an important component of land use, local landscape character and cultural heritage. Approximately 72% of these areas are managed by Forest Service.

Over three quarters of Northern Ireland's farms are classed as very small, accounting for 45% of the total farmed area²³. This distribution is important in terms of visual appearance and landscape character. It is easily altered by field enlargement, slurry storage facilities or an increase in the scale and numbers of modern farm buildings²⁴.

Increasing public concern for human health and protection of the environment has led to reform of land use policies at European Union level and to an increase in regulation of the land use sectors. Changes to the Common Agriculture Policy and the long-term restructuring of the agricultural industry in Northern Ireland has reduced farm numbers, increased specialisation and intensified production within sectors such as dairy.

The most significant change has been a decrease in hill or rough land and increase in the area of grass crops associated with dairying and more intensive beef production²⁵. Drainage works have greatly assisted this drive for intensification by increasing the capacity of rivers, thereby providing outfalls for land drainage and reducing flooding.

Figure IN2: Farm Types 2005 (DARD 2007 census)



Intensification has resulted in increase of emissions of many pollutants to the air and water environments. As well as the loss or gain of a range of landscape features, restructuring will also impact on other land uses such as

forestry, and the quality of our wetlands and peatlands. New opportunities such as biofuel and biomass production are likely to increase as agricultural reform and climate change mitigation policies are implemented.

Agriculture and forestry may have both positive and negative effects particularly on land and landscape management, greenhouse gas emissions, water quality, particularly in relation to nutrient levels, biodiversity, and archaeological monuments and sites.

Tourism, Recreation and Access

It is estimated that environment dependent tourism and recreation supports 6,125 full time equivalent jobs, and contributes £130 million Gross Value Added (GVA) per annum²⁶. Attractions include the numerous protected landscapes, heritage sites, Forest and Country Parks throughout the countryside and coastlines, lakes and inland waterways. Our towns and cities, monuments and buildings are attracting visitors on short city breaks and longer holidays. Recreational activities include hill walking and hiking, horse riding, angling and golf, all of which promote, and benefit from, a high quality environment.

Access to the countryside and countryside recreation are issues of increasing significance, offering benefits in terms of health and wellbeing and rural economy. In Northern Ireland there is no general right of access to private land by the public, and the region has fewer public rights of way than other parts of the UK, so many routes rely on permissive paths in agreement with land owners.

Tourism, recreation and access will bring wider appreciation of our environment, but also pressures. They will be affected by and impact on the quality of indicators on climate change, bathing waters, land cover, landscape character, biodiversity, listed buildings, and archaeological monuments and sites.

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