LOCAL BIODIVERSITY ACTION PLAN

LOUTH

Louth County Council

March 2014

TABLE OF CONTENTS

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The Action for Biodiversity project is part financed by the European Union's European Regional Development Fund through the INTERREG IVA Cross Border Programme managed by the Special EU Programmes Body.

1. General Introduction

1.1. Louth and the LBAP

The main function of the Louth LBAP is to provide a framework and series of actions, to achieve the following aim: to conserve, enhance and raise awareness of Louth's rich biodiversity and to maximise the contribution that it makes to the social, economic and environmental well being of the county, taking into account local, national and international, including European, priorities.

It covers the area within the County of Louth, including the inshore waters and seabed around the Louth coast.

Further to the publication of the County Louth Biodiversity Action Plan (2008-2012), the National Biodiversity Plan (2011-2016) and the County Louth Heritage Plan (2007-2011) outline the need for a full review of the Louth LBAP to reflect latest policy and legislative changes in the area of natural heritage protection. It is also part of the program of the Action for Biodiversity project.

Action for Biodiversity is a three year project, funded through INTERREG IVA, co-ordinated by East Border Region Ltd and ten local authorities, which commenced in September 2010. The project will deliver a coordinated approach to biodiversity conservation and promotion on a cross border regional basis through the development of a regional framework.

The main aims of Action for Biodiversity are:

- Building capacity
- Raising awareness
- Biodiversity conservation and enhancement

In 2002 the first National Biodiversity Plan was published. Since the protection of biodiversity is best carried out at the local level, action number 10 in this plan required all local authorities in Ireland to develop local Biodiversity Action Plans. According to the National Biodiversity Plan, in 2010, twenty six Local Biodiversity Action Plans had either been finalised or drafted and local authorities had appointed 28 heritage officers -one for county Louth- and 4 biodiversity officers.

The vision for this second Biodiversity Action Plan for Louth is to consolidate the framework for addressing threats so that Louth's habitats and species can be conserved for generations to come. The Plan will continue doing this through raising awareness of the value of biodiversity as well as gathering important information on the ecology of species and habitats, which is essential for their protection and conservation. As the National Biodiversity Plan states, this must happen with the involvement of several key players from central Government Departments, State agencies and local authorities, the research community, national and local NGOs and also local communities and individuals.

1.2. Local Biodiversity Action Plan

A biodiversity action plan provides a framework for the conservation of biodiversity and natural heritage at a local level. These plans are designed to ensure that national and international targets for the conservation of biodiversity can be achieved while at the same time addressing local priorities. The production of biodiversity plans by local authorities is an action of the first National Biodiversity Plan published in 2002, which recognised the key role of local authorities in protecting our natural heritage.

This is the second County Louth Biodiversity Action Plan. The production of a Biodiversity Action Plan is an action of the County Louth Heritage Plan 2007- 2011 and an objective of the Louth County Development Plan 2009- 2015.

The principle functions of a biodiversity action plan are:

- To translate national and international policies and legislation into action on the ground.
- To conserve biodiversity of national and local importance.
- To provide a framework for the conservation of biodiversity and to coordinate existing and new initiatives.
- To assist sustainable planning and development.
- To raise public awareness of and involvement in the conservation of biodiversity.
- To collect and collate information on the biodiversity of an area.
- To provide a basis for monitoring the success of conservation of biodiversity at a local, regional and national level.

1.3 Implementing the Plan

The County Louth Biodiversity Action Plan represents an ambitious body of work to be achieved over the coming 5 years. While led by the Louth Heritage Office, successful implementation of the plan will depend on the full participation of a number of key partners that have been identified alongside each action.

Each year the Local Authority Heritage Officer will, in consultation with the Natural Heritage and Biodiversity Working Group of the County Heritage Forum, draw up an annual work plan of projects to be undertaken in that year. A detailed implementation plan for each project will then be drawn up. This will seek to maximize co-operation and co-ordination of effort between partners. Each action will be costed and a timeframe set for the completion of each action. The individual or individuals responsible for delivery of each action will be clearly identified.

Monitoring the implementation of the County Louth Biodiversity Action Plan will be overseen by the Natural Heritage and Biodiversity Working Group of the Heritage Forum, co-ordinated by the Heritage Officer.

Each action identified in the plan will have specific targets listed in its implementation plan. These targets will be reviewed and evaluated once the action has been completed. The findings of the evaluation will be documented and will inform any further relevant actions. The role of the Natural Heritage and Biodiversity Working Group is particularly key to the plan. Their expertise will provide on-going direction for the plan, setting priorities and evaluating outcomes.

It is hoped that this plan represents not an end, but a beginning of a process that will deliver major benefits for the people and biodiversity of Louth.

1.4. How the Plan was Drawn up

Louth County Council, in partnership with the Heritage Council and Action for Biodiversity commissioned a consultant ecologist to commence the revision of the County Louth Biodiversity Action Plan in 2014. Reviewing the Louth Biodiversity Action Plan has involved a process of research, consultation and analysis. This first phase of the process involved consultation with the relevant bodies and individuals, an information review and the production of a pre-consultation draft plan.

The work of the consultant ecologists was overseen by the Natural Heritage and Biodiversity Working Group of the County Louth Heritage Forum and the Heritage Officer.

The County Louth Biodiversity Action Plan was prepared following the guidelines produced by the Heritage Council and with regard to the National Biodiversity Plan, the County Louth Heritage Plan 2007- 2011 and the County Louth Development Plan 2009-2015.

The following data sources and publications were used in the review of the Louth Biodiversity Action Plan including the compilation of and prioritisation of biodiversity objectives and actions based on an analysis of issues, weaknesses, opportunities and threats to be completed over the life of the plan.

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Additionally, outcomes of discussions at Heritage Forum meetings were taken into account.

Web Resources

Bat Conservation Ireland www.batconservationireland.ie
Birdwatch Ireland www.birdwatchireland.ie
Crann www.crann.ie
Irish Seed Savers www.irishseedsavers.ie
The Tree Council www.treecouncil.ie
Woodlands of Ireland www.woodlandsofireland.com
ENFO www.enfo.ie
National Parks and Wildlife Service www.npws.ie
www.biology.ie
National Biodiversity Data Centre www.nbdc.ie
Central Statistics Office (CSO) www.cso.ie

In addition the following individuals and organisations were consulted:

- An Taisce
- Louth Nature Trust
- Dr Tina Aughney Bat Conservation Ireland
- Birdwatch Ireland Louth Branch
- Coillte Teoranta
- Inland Waterways Association of Ireland
- Irish Peatland Conservation Council
- National Biodiversity Data Centre
- National Parks and Wildlife Service
- Royal Society for the Protection of Birds Northern Ireland

2. Definition of Biodiversity and its Importance

'Biodiversity' is a contraction of the words 'biological diversity' and describes the variety of life on Earth. It includes the species that make up the natural world, the habitats in which they live and the genetic variability within organisms. It includes familiar species such as birds, mammals and plants, as well as fungi, viruses and micro-organisms. It is the result of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans.

All of these components are knitted together into the intricate web of life upon which every single organism, including human beings, depends for survival. In fact, this web is so large that scientists are still far from determining how many species actually exist today. While 1.75 million species have been described so far, estimates of the total number of species vary from 10 to 100 million.

Biodiversity is important because all of life depends on biodiversity for survival and humans in particular rely on it for food, clean air and water, clothing and building materials, as well as for medicines and places in which to unwind and reconnect with nature. These are key ecological services, provided to us, free of charge, and upon which human development and, indeed, survival, rely.

Biodiversity fulfils these functions in Louth just as it does across the world. The protection and wise use of the county's natural resources is therefore a vital goal in achieving sustainable development.

In recent times however the increase in human numbers and, especially, in our rates of consumption of material resources have developed into a major threat to biodiversity. This threat is so great that it is widely believed that the Earth is currently in the middle of a sixth 'mass extinction event' – on a par with that which wiped out the dinosaurs. The loss of species threatens the ability of ecosystems to continue to provide the services that are essential to human survival. The effect of this loss of biodiversity is manifest in polluted water and air, diminished human health, collapse of food supplies, such as fish stocks, and loss of amenity value. Harder to evaluate and to quantify is the loss to the Earth's heritage that occurs when a species dies out.

Species cannot be brought back from extinction but taking action now can restore much of the damage that has occurred.

There are also however, significant opportunities for biodiversity today. Changes in European Union policy and agri-environmental schemes (e.g. REPS) mean that land need not be farmed as intensively as before, while a new approach to forestry in Ireland through the FEPS scheme is integrating biodiversity and amenity value into its plans. These developments will provide greater space and ease of movement through the countryside for our plants and animals and allow them to adapt more easily to future changes in the environment.

Meanwhile there is a growing realisation that our economy can continue to grow for the benefit of all, in a sensitive way, so that rivers can run with clean water, visitors and locals alike can enjoy beautiful landscapes and wildlife can flourish. This is known as Sustainable Development and communities, businesses and politicians now recognise it as essential for the continued growth of our country. This revision of the first Biodiversity Action Plan for Louth will help make sustainable development a reality.

2.1. Health, Economic and Cultural Relevance of Biodiversity at Local Level

Health benefits

Tree roots and canopies filter out pollutants providing clean air and water. Vegetation also helps to prevent flooding by trapping rainwater and releasing it slowly into watercourses rather in the form of fast-moving flood waters that would wreck havoc on homes and businesses. The use of constructed wetlands (including attenuation ponds) or Sustainable Urban Drainage Systems (SUDS) is increasingly important in developments to manage floodwaters reducing risk to property and health.

Restoring degraded landscapes and ex industrial sites can make them feel safe and welcoming creating a positive sense of place, provide environmental protection for local communities and enhance the quality of life for residents and workers in the area. Contact with nature also improves children's behaviour and self-discipline, enhances emotional development in schoolchildren, reduces crime and aggression and improves community integration.

World Health Organisation estimates that depression and depression-related illnesses will become the greatest source of ill-health by 2020 (see www.who.int/mental_heath/management/depression/definition/en/). Nature by stimulating and encouraging physical activity and through the direct impact it has on our emotional state, can help to alleviate a range of psychological problems. Green space in an urban environment can improve life expectancy and decrease health complaints in a cheap and sustainable way. Finally a wide range of medicines have been derived from the components of biodiversity (e.g. the heart drug digitalin is derived from foxglove *Digitalis purpurea* a plant that is native to Ireland.

Economic benefits

There are also sound economic reasons to conserve biodiversity. A study in Northern Ireland (DoENI, 2007) revealed that environment-related activities broadly defined as those that directly or indirectly depend on the quality of the natural environment are estimated to support 32,750 full-time equivalent jobs in NI and contribute £573 million to the regional economy. A similar study in the Irish Republic claims that the economic value of biodiversity to Ireland has been calculated at €2.6 billion per annum (IEN 2012). Revenue is created by spending from visitors to nature reserves, visitor centres etc., often in areas that previously supported little economic activity. Biodiversity also sustains direct and indirect jobs in consultancy services, agriculture, forestry, countryside management (e.g. wildlife rangers, habitat restoration on designated sites etc.), and in environmental education. Semi-natural vegetation is one component of scenic landscapes that is an integral part of the tourism product. Properties adjacent to parks attract a premium and on the whole inward investment as they are perceived to be more pleasant places to work.

Biodiversity is the source of all food, fuel, and raw materials for industry. The forestry and agricultural sectors depend directly and indirectly on biodiversity. For example most of our fruit and vegetable crops rely on insect pollinators such as bees and wasps. The decomposition of vegetation contributes to soil formation and adds nutrients to the soil thereby sustaining soil fertility. Trees around fields also moderate extremes of temperature and wind thus increasing crop yields.

Genetic diversity provides the raw material of evolution, enabling change and adaptation in organisms. It is also critically important for the continuing ability of human society to derive social and economic benefits from biodiversity. For example maintaining old varieties of agricultural crops provide the genetic diversity to

breed new disease resistant crops in the future. Plant Genetic Resources are the raw material that farmers and plant breeders use to improve the quality and productivity of crops. The range of indigenous plant genetic resources is relatively narrow but the collection and preservation of these resources could make an important contribution to future crop research both at home and overseas. The Teagasc Herbage Breeding Programme based at Oakpark Research Centre, Carlow contains an important collection of Irish bred grasses, and potato varieties used as a basis for the breeding program. Old indigenous varieties of Rye, Bristle Oats, Wheat and Barley were once commonly cultivated in Ireland. Some of these are still to be found in the wild and on the islands off the west coast of Ireland and are also stored in a genebank in Trinity College Botanic Gardens, Dublin. The Department of Agriculture, Fisheries & Food had a successful Malting Barley breeding program for many years at Ballinacurra, Co. Cork. A small but important collection of Malting Barley lines from that program is maintained at the Department's genebank at Backweston Farm, Leixlip, Co. Kildare. Work is continuing at the genebank on collection of samples of old cultivars of all the major crops of agricultural importance in Ireland. A database listing these accessions is available to all crop research and conservation institutions. An important collection of apple germplasm is maintained at University College Dublin and by the Irish Seed Savers Association in County Clare.

Cultural heritage

Biodiversity is also intricately linked with the cultural heritage of Co. Louth.

Many wild plants found in Louth have also been used as folk cures **(Table 1).**

Table 1 - Traditional Medicinal Uses of Plants in Co. Louth

Species	Uses
Bramble	Treatment of cuts
Buttercups	Curing warts
Centaury	Indigestion
Lesser burdock	Curing convulsions

Source: Niall Mac Coitir (2006) Irish Wild Plants Myths, legends & Folklore.

Many place names in the county are associated with flora and fauna, e.g. Lugbriscan (Log Brioscán) means hollow of the silverweed (*Potentilla anserina*).

3. Classification of Habitats in Ireland

According to the Guide to habitats in Ireland (2000), a habitat is described as the area in which an organism or group of organisms lives, and is defined by the living (biotic) and non-living (abiotic) components of the environment. The latter includes physical, chemical and geographical factors, in addition to human impact or management.

Remarkably, the same guides states also that "Habitats of particular conservation importance include those that are listed in Annex I of the Habitats Directive and habitats that support populations of rare or notable species such as those listed in Annex I of the Birds Directive, Annex II and IV of the Habitats Directive, and in the Irish Red Data Books for vascular plants (Curtis and McGough, 1988), stoneworts (Stewart and Church, 1992) and vertebrates (Whilde, 1993)"

Finally, it has to be said that the classification scheme covered natural, semi-natural and artificial habitats of terrestrial, freshwater and marine environments, and of rural and urban areas. Habitat categories were arranged within a series of ordered groupings to produce a hierarchical framework that operates on three levels. The scheme identifies 11 broad habitat groups at level 1, 30 habitat subgroups at level 2, and 117 separate habitats at level 3. Categories were given identifying codes at each level and, where possible, these reflect the names of habitat groups or subgroups. **Table 2** shows the two first levels of classification.

Table 2. Habitat Groups and Subgroups Classification.

Habitat Group	Habitat Subgroups
Freshwater	Lakes, watercourses, springs, swamps
Grassland and marsh	Improved grassland, semi-natural grassland and freshwater marsh
Heath and dense bracken	Heath, dense bracken
Peatlands	Bogs, fens and flushes
Woodland and scrub	Semi-natural woodland, highly modified woodland/non-native woodland, Scrub/ transitional woodland, linear woodland/ scrub
Exposed rock and disturbed land	Exposed rock, underground rock and caves, disturbed ground
Cultivated and built land	Cultivated land, built land
Coastland	Sea cliffs and islets, brackish waters, salt marshes, shingle and gravel banks, sand dune systems, coastal constructions
Littoral	Littoral rock, littoral sediment
Sublittoral	Sublittoral rock, sublittoral sediment
Marine water body	-

Source: Adapted from Fossitt (2000). A Guide to Habitats in Ireland. The Heritage Council, Ireland.

The reports NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland.*
Habitat Assessments Volume 2. Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, and NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland* and Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland provide a synopsis for each of the listed habitats and species listed in the EU Directive on the Conservation of Habitats, Flora and Fauna (92/43/EEC). In addition, it includes maps of the known distribution for each habitat and species, lists of pressures on the habitat or species concerned and priorities for the next five years and beyond.

It identifies a total of 58 habitat types (listed in the Annex 1 of the EU Habitats Directive) in Ireland “whose conservation requires the designation of Special Areas of Conservation”. Theses habitats will be referred as Priority habitats, corresponding to those which the EU considers require particular protection because their global distribution largely falls within the EU and they are in danger of disappearance.

In Co Louth a total of 15 priority habitats have been identified **(Appendix 1)** some of which will be the focus of conservation actions during the life of this plan. In addition, these habitats support a diverse range of flora and fauna species that are a priority for conservation at local level. These species are presented in **Appendix 2.**

4. Relevant Legislation and Plans

4.1. National, European and International Legislation

A complete list of national and international legislation pertaining to biodiversity conservation is presented in **Appendix 3.**The principal pieces of National and European legislation that afford protection to Ireland's natural heritage are the Wildlife Act 1976, the Wildlife (Amendment) Act 2000 complemented by the Flora Protection Order (1999), the European Union Habitats and Birds Directives, the European Union Water Framework Directive and the Planning and Development Act 2000.

The main mechanism for protecting important habitats, species and sites in Ireland is nature conservation designation. The main designations in Louth are Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Another existing designation is the Natural Heritage Areas; in Louth there are a series of sites (24) listed as proposed NHAs but none of them has been fully designated yet.

The conservation of biodiversity is also an integral component of some other important pieces of European legislation that have broader goals. The Water Framework Directive seeks to establish 'good ecological status' of all waters in Ireland by 2015; the Environmental Impact Assessment (EIA) Directive includes 'flora and fauna' as a separate chapter when assessing the impacts of a proposed development; and the recent Environmental Liability Directive which came into force in Ireland in 2009, with its corresponding regulations, has established a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage.

Another designation is that of Salmonid Water, under the European Communities (Quality of Salmonid Waters) Regulations 1988. The main channel of the Boyne is designated in Louth as it is home to important populations of salmonid fish (e.g. salmon and trout)

Ireland is also a signatory to the international treaty, the Convention on Biological Diversity (CBD). As a result, since 1992 the central theme of the CBD has been integrated into a variety of plans and policies in Ireland.

The CBD set a goal of 'significantly reducing' the loss of biodiversity across the world by 2010. The European Union (EU) has gone beyond this ambitious target by calling, in 2001, for a total halt to the loss of biodiversity by 2010. This target was reaffirmed in the European Council's 'Malahide Message' of 2004.

4.2. National and Regional Plans

National Biodiversity Action Plan (2011 – 2016)

Three mainstreaming actions in this plan urge to implement legislation changes or innovations to conserve biodiversity:

1.4 Include in legislation a biodiversity duty to ensure that conservation and sustainable use of biodiversity are taken into account in all relevant plans and programmes and all new legislation.

1.5 Review key existing legislation to determine the need for further provisions to conserve biological diversity.

1.6 Ensure that all development plans comply with environmental legislation and in particular with the nature directives so as to prevent and minimise any potential damages to biodiversity.

In addition two biodiversity actions under this plan refer to each local authority:

1.7 Each local authority to publish a Local Biodiversity Action Plan or review existing plans.

1.8 Each local authority to designate a suitably qualified officer for natural heritage conservation matters in its area.

Louth County Development Plan (2009 – 2015)

Chapter 2 of this plan refers to Conservation and Heritage where biodiversity appears to be a crucial concept. This chapter lists several objectives and policies for the life of the plan. Sections 2.3, 2.5 and 2.6 of this plan consider biodiversity.

Section 2.3 Natural Heritage and Biodiversity

This section outlines policies to promote the implementation of the Louth Heritage Plan, promote landowner involvement in the conservation of SACs, pNHAs and SPAs, to raise awareness amongst all stakeholders of the value of biodiversity and gather information on the ecology of species and habitats, and the designation of sites of geological and landscape interest.

CON 1 To promote the implementation of the Louth Heritage Plan.

CON 2 To promote greater involvement by landowners in the conservation of Special Areas of Conservation (SACs), proposed Natural Heritage Areas (pNHAs) and Special Protection Areas (SPAs).

CON 3 To raise awareness of the value of biodiversity and gather important information on the ecology of species and habitats.

CON 4 To promote the designation of sites of geological interest as Natural Heritage Areas.

CON 5 To promote the protection of the landscape through the implementation of the Louth Landscape Character Assessment.

CON 6 To consider the designation of Landscape Conservation Areas to protect specific important landscapes.

CON 7 To co-operate with the Regional Planning Authority and adjoining local authorities, public agencies and community interests to protect regionally significant heritage assets, environmental quality and to identify threats to existing environmental quality in a transboundary context throughout the region.

Section 2.5 Biodiversity

This section sets out a policy to promote and develop the objectives of the Biodiversity Action Plan for Louth 2008 - 2012.

CON 10 To promote and develop the objectives of the Biodiversity Action Plan for Louth 2008 - 2012.

Section 2.6 The Natural Environment

This section sets out policies to protect habitiats and the disturbance of species, to create awareness and protect sites of geological and natural history interest (e.g. SACs and SPAs), and protect trees, woodlands, hedgerows and streams from inappropriate development including the making of Tree Protection Orders.

CON 11 To resist any development that would be harmful to or that would result in a significant deterioration of habitats or disturbance of species.

CON 12 To promote awareness and protect, where appropriate, areas of geological interest.

CON 13 To ensure that an appropriate assessment* of the implications of any proposed development on a SAC or development likely to impact on a SAC that is outside the designated area or any other SAC identified during the period of this plan is undertaken in view of the site's conservation objectives.

CON 14 To resist any development that would be harmful or that would result in a significant deterioration of habitats or disturbance of species in a SAC.

CON 15 To ensure that an appropriate assessment* of the implications of any proposed development on a SPA or development likely to impact on a SPA that is outside the designated area or any other SPA identified during the period of this plan is undertaken in view of the sites conservation objectives.

CON 16 To protect trees and woodlands of special amenity value and where appropriate put in place tree preservation orders for this purpose.

CON 17 To investigate the feasibility of carrying out a survey of all trees of special amenity value within the county.

CON 18 To require an assessment of the implications of any proposed development on significant trees and hedgerows and streams located on lands that are being considered for development. Survey and protection procedures detailed in the appendix 10 will be required by the council.

CON 19 To increase deciduous native tree coverage in the county by promoting the planting of suitable trees along public roads, residential streets, parks and other areas of open space.

CON 20 To promote such initiatives as private and community driven tree planting schemes.

Louth Heritage Plan (2007 – 2011)

Flora, fauna and wildlife habitats are identified as integral components of Louth's heritage and actions for their conservation are identified under each Key Performance Area of the Heritage Plan. The following key performance areas (KPA) and associated actions in the Louth Heritage Plan (2007-2011) refer to biodiversity. Many of these actions were integrated into the first Louth Biodiversity Action Plan 2008-2012.

KPA 1 - Primary data acquisition and management

1 The county's valuable ecosystems, most of which have never been fully, properly surveyed. Identify all ancient trees; landmark trees; those associated with folklore and traditions; ancient woodland sites; long-established woods (since first Ordnance Survey in 1835); all biodiverse, semi-natural woods; all historic, named plantations; Demesnes; Arboreta.

KPA 2: Interpretation and increased public involvement and awareness

9 Provide clear and easily-accessible information and advice on the various heritage designations, targeted particularly at developers, who need and want this information.

12 Provide heritage training induction courses for all new (and, eventually, existing) staff and councillors. Tell new staff (including planners) what is most important and let them know how they can find out more for themselves, when they need it.

21 Develop a voluntary Beach Warden/CoastWatch programme for schools. Involve school children in monitoring the condition of our coastlines/shorelines – get them to take part in a carefully planned and managed clean-up and to report problems to the Council's Environment Section. Ensure that it's attractive and meaningful for participants. Include groups working on these projects under the Council's insurance cover.

22 Promote the value of our hedgerows and 'Louth Banks' and raise awareness of the need to conserve these. Provide applicants for Planning Permission with a leaflet/flier on hedgerows and 'Louth Banks'.

23 Develop a natural heritage/wildlife/geology interpretation strategy for the county. Promote biodiversity in general and protected sites in particular to the public and school children.

Objective KPA 3: Improving current practice

24 Communication should be made more systematic, so that people who need to know what is going on are told automatically, rather than finding things out 'by accident' –ie "design a better loop". This would involve better sharing of information – e.g. archaeological licences, discoveries, annual reminders re 'days' and close of hedgerow trimming season.

25 Provide on-going, specialist in-house expertise/back-up, for planners and engineers, in natural and architectural heritage and in archaeology, where necessary and requested. Monitor development applications that might damage important heritage sites.

37 Produce a Louth biodiversity plan and associated species/habitats action plans. Pay special attention to biodiversity/habitats in urban areas. Assess, monitor condition of these. Protect and promote existing major protected areas, such as SPAs and SACs.

38 Produce a Coastal Zone/Floodplain Management Plan, to promote a strategic approach to coastal zone management, sea level rise, coastal protection, retreat.

40 Develop a Marine Conservation Plan for Louth.

41 Develop a scheme to protect minor biodiversity sites i.e. wildlife and habitats which will never be designated at a National or International level, involving purchase, management agreements and a protective designation for county level sites.

42 Promote the retention of existing roadside boundary hedgerows and replacement planting, where these have been degraded or lost. Promote anticipative replanting where roadside hedges are identified for removal in future, planned road works. Strengthen enforcement of conditions in relation to hedgerows. Ensure that contradictory conditions are not imposed, through better communication between the Councils' planning and roads sections.

43 Investigate and remedy the decline in the condition of our rivers – especially the Castletown River. Continue the development of river basin district conservation plans (ERFB & Loughs Agency). *(NB ERFB has been incorporated into Inland Fisheries Ireland since the Heritage Plan was published).*

5. What are Biodiversity Audits and why are they Necessary?

A biodiversity audit is a desk-based study that gathers together the most up-to-date accessible information on the main priority habitats and species that are found in a specific area (both of national and local importance) to guide research and education and awareness actions within the context of a LBAP. It also highlights where there are gaps in information, which through the LBAP process can stimulate new data collection and research.

This LBAP will ensure that the biodiversity of Louth will be maintained and enhanced through the preparation and implementation of individual action plans, covering a range of habitats and species, which reflect both national and local priorities. The Louth LBAP will be based largely on the targets set out in the National Biodiversity Plan, the County Development Plan and the Heritage Plan.

The National Biodiversity Plan, which was published in 2011, builds upon the achievements of the first plan and focuses on actions that were not fully completed and addresses emerging issues. The plan identifies a distinct role for local and regional councils in conserving biodiversity through the production of LBAPs. Both the County Development Plan and the Heritage Plan subscribe as well the role of local agent and regional agents in biodiversity conservation through the elaboration of LBAPs.

6. Description of Study Area

6.1. Geography

Louth is a small county (821 km^2) in the north-east of Ireland with a rapidly expanding human population. In terms of understanding its important wildlife habitats it can be divided into several main areas: the broad central plain, with its network of hedgerows and winding rivers; to the south of this, the steep-sided Boyne Valley, separated from the central plain by the low Oriel hills; to the north, the mountainous uplands of the Cooley peninsula; an extensive coastline stretching from Carlingford Lough to the Boyne estuary; and the open sea that lies off-shore. Together, these areas sustain the biodiversity of Louth.

County Louth is one of the most populated and urbanised outside of Dublin. This is due to the presence within its borders of two of the largest provincial towns in the country, Dundalk and Drogheda. The population of County Louth has steadily increased in recent years. Census figures show that the population of the county was 91,810 in 1986 and 110,896 in 2006, an increase of 20.7%. In the last census from 2011, the recorded population was of 122,897 inhabitants.

6.2. Landscape

Ireland ratified the European landscape Convention in 2002 and must adopt national measures to promote landscape planning, protection and management. In 2002, a landscape character assessment was completed for the entire county outside the major towns. This assessment was prepared in accordance with the Government's Draft Guidelines for Landscape and Landscape Assessment (2000). Nine landscape character areas were identified in County Louth. They represent geographical areas with a particular landscape type or types, and are listed in **Table 3.**

Table 3. Landscape Area Classification

Scale / level	Landscape Area
Internacional	Carlingford Lough and Mountains including West Feede Uplands
National	Boyne and Mattock Valleys
Regional	Dundalk Bay Coast, Dunany to Boyne Estuary Coast, Uplands of Collon and Monasterboice
Local	Cooley Lowlands and Coastal Area, Lower Faughart, Castletown and Flurry River Basins, Louth Drumlin and Lake Areas, Muirhevna Plain

Source: Louth County Council (2010). Louth County Development Plan 2009-2015. Louth County Council.

The nine areas were established based on a matrix of several factors such as: landscape and scenic quality, rarity, conservation interests, wildness, recreational opportunity, cultural association, tranquillity and stakeholder representative.

It is noteworthy that the Landscape Character Assessment (2002) considers biodiversity when dealing with landscape development.

6.3. Soils

The soils of County Louth are surprisingly varied for such a relatively small area (LCC 2009). In the Cooley Lowlands and Coastal Areas the underlying limestone and glacial deposits have resulted in a rich soil cover of acid brown earths with some gleys and brown podzolics. In the nearby Carlingford Lough and Mountains area, including West Feede Uplands, quite a variety of soils is found. In the higher areas of the peninsula

there are Lithosols with blanket peat and peaty podzols. Lower down there is a variety of brown podzolics with gleys and peats. To the west there are acid brown earths with some gleys and podzols.

North and West of Dundalk lie the Lower Faughart, Castletown & Flurry River Basins. Here the soils are acid brown earths with a mix of gleys and brown podzolics. There are a few small areas of lowland peat bog. This mixture of soils is reflected in farming patterns through the county with a predominance of small holdings in the vicinity of the Cooley Peninsula characterized by animal husbandry whilst farms are generally much larger towards the mid and south of the County and tending towards arable farming, except in a few higher pockets north of Drogheda.

The EPA's Biodiversity Action Plan (2011-2013) states that “Soil provides the foundation for life in terrestrial ecosystems and is a repository of biodiversity” and also that “Our knowledge and understanding of soil quality and functions is limited”. Two ongoing actions in Ireland for soil protection outlined in this plan were:

- Improve the monitoring and mapping of soils, quantify and prioritise threats and develop a national framework for their management.
- Continue to monitor the impact of soil erosion on aquatic macro-invertebrates and other biological elements, particularly in the case of water bodies of high status.

6.4. Geology

In geological terms Louth is a county of dramatic contrasts within short distances.
The underlying geology of Louth is mainly comprises sandy and shaley rocks (Figure 5.3). These were deposited during the Silurian Period and are part of the Longford-Down massif.

The bedrock of other areas of Louth consists of Carboniferous limestone, which continues to extend into the midlands (Fahy 1972). Almost the entire area between Dundalk Bay and Carlingford Lough is covered with mountains.

The Cooley Peninsula acts as a de facto extension of the Mourne Mountains to the northeast in County Down and of the Ring of Gullion in south Armagh and is composed primarily, though not exclusively of granitic rocks. The highest mountain in the range is Carlingford Mountain at 589 m, followed by Clermont Carn at 510 m. Tens of millions of years of erosion, including several Ice Ages, have worn away the originally-overlying sedimentary rocks, exposing these bones of the landscape at the surface.
In southern Louth a low-lying ridge of hills, known as the Oriel Hills, stretch from the coastal village of Clogherhead west to Collon and across the county border into the heart of County Meath. The area of Louth that lies between the Oriel Hills to the south and the Cooley Peninsula to the north is very flat and is traditionally known as the Plain of Muirthemhne. This low-lying land is mainly used intensively for agriculture.

The rest of the county is predominantly low lying and flat chiefly characterized by shales and greywackes with the exception of the low lying hills north of Drogheda at in the Fieldstown area and in the vicinity of Collon.

The other noticeable geological and topographical features of the county occur north and west of Dundalk with the emergence of clay based Drumlin landscapes which are more characteristic of counties Monaghan and Down to the north and west. The drumlin belt forms much of the southern borderland of Ulster. These rounded hills and the wetlands between them made travel, especially in winter, extremely difficutl well into the modern period.

The interaction between the glacial deposits and the Irish sea has also given rise to several sites of regional, national and even international scientific importance along our coast. Almost all of Louth's coast is low-lying, soft and at risk of erosion but also of great importance for wildlife. Most of the coast is designated as European (Natura 2000) sites (SACs and SPAs).
Between the Cooley Mountains and the southern hills, which separate the Boyne valley from the rest of the county, most of Louth is rolling farmland on a broad, well-watered coastal plain. In contrast, in the north-west of the county, the Drumlin Belt of southern Ulster, another result of the Ice Age, is compounded by not high rounded hills of clay. Crucial for biodiversity, they shelter lakes, bogs and swamps. A list of sites of geological importance is presented in **Appendix 4.**

6.5. Agriculture

Agriculture is an important source of employment and income in rural areas. The county's agricultural land bank is not only a source of value in terms of food production, but also a vital ingredient in the county's character.
The 2006 census illustrates that 2.4% of the population of County Louth is employed directly in the agricultural sector. This is equivalent to 1,182 persons. This is a significant a drop from 6% of the population as recorded in the 2002 census of population. Farming is the traditional form of economic activity in rural areas. However, traditional farming methods have undergone significant changes, through increased mechanisation and the emergence of larger commercial farm units. County Louth
According to the CSO (2010), almost 78% of Louth area (63,862 ha) is farmed. The average farm size in the county is 35.1 hectares which is an increase from the average size of 28 hectares in 2001.
Farm practises are experiencing a shift away from traditional agriculture activities such as dairying and livestock farms. Specialist beef production is now the main enterprise on some 36% of farms in County Louth which reflects a national shift to this type of farming.
The changing pattern of employment in agriculture in recent years necessitates a new approach to the sustainable use of our countryside. Farm diversification is promoted in both national and regional policy as a means of expanding the rural economy. Teagasc has identified a number of alternative schemes that are considered suitable for farmers to enter into for the purposes of diversification. These include wind farms, production of dairy products (such as cheese and yoghurt), soft fruit production, forestry, horse livery and adventure tourism. Others would include micro enterprises, rural tourism, biomass production, organic food production, horticulture, specialist farming practices such as poultry, mushroom growing, and specialised animal breeding.

6.6. Biodiversity

6.6.1 Current Status

Louth contains some of the most important places in Ireland for biodiversity, including a variety of protected habitats, such as estuaries and tidal mud flats, and important species such as the otter. Effective nature conservation depends on good data. If species and habitats are to be protected in Louth it is essential to know what is located where. It is also crucial to be familiar with these species' ecology, i.e. how they interact with their surroundings, and whether their numbers or extent are rising, stable or declining. The collection and analysis of these data will be a huge task but if the Biodiversity Action Plan is to succeed, it is vital that gathering data be a key element of it.

There are more than two dozen sites in Louth which are recognised as being of national or greater importance for biodiversity and they are situated throughout the county. However, there is a great deal of important biodiversity outside of these areas so-called Local Biodiversity Areas. Conducting an audit of existing biological data will be an important action under this plan. It is envisaged that such a database will be maintained as new information comes to light, and provide a vital resource with which to manage the conservation of biodiversity. Much of the information currently available on the county comes from national surveys carried out by the National Parks and Wildlife Service (NPWS).

A national survey of Red Squirrels in 2007 (Carey et al. 2007) for instance showed that its range in Louth is much contracted with only one record of its presence made. It is therefore essential to establish a more accurate picture of the squirrel's population in the county and to participate fully in national programmes for its conservation. In recent times, some species have become extinct in Louth, such as the red grouse and the corncrake, while, on the other hand, Louth remains one of the most important counties for wintering waders, with Dundalk Bay being the most important site in the country. Implementation of this plan will lead to greater knowledge and understanding of this invaluable resource.

6.6.2. Habitats

Wetlands

The Louth Wetland Identification Survey was carried out in 2011 (Foss et. al., 2011) and 2012 (Fosse et al., 2012. The total area covered by the 108 sites surveyed in 2011 was 966 ha. Ninety potential wetland sites were surveyed in 2012 covering 1204 ha.

The sites were reviewed and given a site conservation rating. Of the 108 sites surveyed in detail in 2011, thirty are deemed to be of county importance or greater. Just seven of these sites had previously been recognised as being of conservation interest being listed as proposed Natural Heritage Areas or Special Areas of Conservation (e.g. Corrakit (Windy Gap) - Carlingford Mountain SAC and Shilties Lough - Carlingford Shore SAC) by the National Parks and Wildlife Service (i.e. Corrakit (Windy Gap) - Carlingford Mountain SAC**,** Shelties Lough - Carlingford Shore SAC, Ardee Cutaway Bog pNHA, Drumcah, Toprass and Cortial Loughs pNHA, Liscarragh Marsh pNHA). The remaining 23 sites identified as being of county importance of greater, represent a significant, previously unrecognised, conservation resource which should be listed for protection.

The internationally important rated sites have been identified as containing habitats of conservation value that correspond to those listed on Annex I of the EU Habitats Directive. These include the following Annex I habitat types: (7140) Transition mires and quaking bogs (1150) *Coastal lagoons (EU Priority Habitat).

Eight sites were deemed to be of national importance (i.e. Ardee Cutaway Bog NHA; Carraghcloghan; Cortial Lough - Drumcah, Toprass and Cortial Loughs NHA; Drumcah Lough - Drumcah, Toprass and Cortial Lough NHA; Hoarstone; Liscarragh Marsh NHA; Mullatee; Toprass Lough - Drumcah, Toprass and Cortial Lough NHA). These nationally important sites have been identified as containing habitats of conservation value that may correspond to those listed on Annex I of the EU Habitats Directive. These include the following Annex I habitat types: (7150) Depressions on peat substrates of the Rhynchosporion, (7210) *Calcareous fens with Cladium mariscus and species of the Caricion davallianae (EU Priority Habitat), (7230) Alkaline fens and (7140) Transition mires and quaking bogs.

The nineteen sites of County importance were Artoney; Ballagan and Whitestown; oycetown; Castlecarragh South; Corradoran; Lough; Drumgoolan; Edentober; Lurgankeel; Maghareagh; Millgrange; Muchgrange; Rassan Bog; Rathcor Lough; Redbog; Rootate; Ross Lough; Stormanstown Bog; Tullakeel; and Wottonstown). These sites have been identified as containing habitats of conservation value that may correspond to those listed on Annex I of the EU Habitats Directive. These include the following Annex I habitat types: (7140) Transition mires and quaking bogs, (7230) Alkaline fens, (7210) *Calcareous fens with Cladium mariscus and species of the Caricion davallianae (EU Priority Habitat) and (7150) Depressions on peat substrates of the Rhynchosporion.

Twenty seven sites were rated as being of Local conservation value (high value). These sites have been identified as containing habitats of conservation value that may correspond to those listed on Annex I of the EU Habitats Directive. These include the following Annex I habitat types: (7140) Transition mires and quaking bogs, (7230) Alkaline fens, (7210) *Calcareous fens with Cladium mariscus and species of the Caricion davallianae (EU Priority Habitat).

Seventeen sites of county importance or greater were identified during the Louth Wetland Identification Survey 2012 field surveys and these also should be given protection. The information collected from the 2011 and 2012 surveys were used to populate the Louth Wetland Survey site database and associated GIS which now hold information on 307 potential freshwater wetland sites (and sub-sites) in the county.Note that the information gathered during the wetland surveys is only representative of a limited selection of the wetland resource of County Louth – many additional sites, which may be of international, national or county interest undoubtedly occur and therefore for this reason the Louth Wetland Survey will be continued in 2014. In addition actions in this revised biodiversity plan will focus on measures to raise awareness of wetlands.

Functional wetlands are among the world’s most productive environments. They are cradles of biological diversity, providing the water and primary productivity upon which countless species of plants and animals

depend for survival. They support high concentrations and diversity of birds, mammals, reptiles, amphibians, fish and especially invertebrates. Wetlands are also important storehouses of plant genetic material diversity. Wetland habitats occur infrequently in Louth compared to other Irish counties, but where they are found, they are home to a rich array of plants and animals, from frogs and newts to dragonflies and unique wetland flora.

Wetlands are frequently a mosaic of diverse habitats that grade from swamp to marsh to open water. Examples in the county include Liscarragh Marsh near Carlingford, and Stephenstown Pond, 6 km south-west of Dundalk. Many of the county's small ponds and wetlands are not protected by any particular designation however, such as those at Begrath and Ravanny, but this does not diminish their biodiversity value. This underscores the importance of developing a system for protecting these local biodiversity areas. Wetlands, (bog, fen and marsh areas in particular) have historically been regarded as less productive than adjacent agricultural land and measures have been taken to 'improve' their quality for agriculture. The principal method of land improvement usually involved some form of drainage, infill or soil redistribution, burning or the addition of nutrients so as to facilitate the removal of peat, the planting of trees, or the creation of new grazing areas, pasture or arable farmland.

Data held within the Louth Wetland Survey database indicate that just a single site of the 108 surveyed in 2011 in Louth was not or did not appear to be affected by human activity. The remaining 107 wetland sites surveyed were being influenced by human impacts and activities such as past and present drainage of wetlands, enrichment from surrounding farmland (especially silage production and arable crops) infilling of wetlands with building waste, construction of buildings, peat cutting of bog areas and inappropriate grazing. If those sites identified as being of ecological importance during the LWS are to be conserved, management measures will be required to prevent further damaging activities and in some cases to restore damaged habitats.

Threats and damage to the surveyed sites were recorded and an estimate of the severity of damage was made. The 2013 NPWS report on the conservation status of EU Habitat Directive sites in Ireland (NPWS 2013), many of which are wetlands, found that the conservation status of these habitats is far from satisfactory **(see Appendix 1).**

Lakes and Ponds

Louth has one of the lowest proportion of water habitats of all the counties within the State. The number of lakes present in the County as represented on the Discovery series maps (scale 1:50,000) including cross-border lakes is 101 covering only 0,13% of the County. Lakes and ponds supporting a diverse biodiversity include Keenan's Cross Pond (near Togher), Cartonstown Lough, Shilties Lough, Cortial Lough (pNHA), and Drumshallon Lough.

Drainage Ditches

Drainage ditches are linear water bodies or wet channels that are entirely artificial in origin, and some sections of natural watercourses that have been excavated or modified to enhance drainage and control the flow of water (Foss et al. 2011). They are frequent in the county being used for controlling the flow of water

on farmland. Ditches are often not of high habitat quality by themselves but when they occur as part of a habitat complex of wet grassland, marsh, bog and fen, their conservation value increases. In addition, the EU and nationally protected otter *Lutra lutra* may utilise drainage ditches connecting lakes to travel between wetland sites as well as providing suitable habitat for a diverse range of invertebrates such as water beetles, dragonflies and damselflies.

Rivers

County Louth straddles two River Basin Districts; the Neagh Bann and the Eastern River Basin District. However the bulk of County Louth lies within the Neagh Bann River Basin district and is administered as part of the NS Share River Basin District Project.

Rivers play key roles in the hydrological cycle, gathering, storing and purifying water and transporting it from source to sea. People benefit greatly from this free, natural process which contributes massively to the provision of a clean and reliable supply of water for homes, businesses and recreation. In the past, removal of habitats and pollution of waterways has resulted in a deterioration of water quality across Louth. However the delivery of 'good ecological status' for all water bodies in Europe by 2015 is the key objective of the EU's Water Framework Directive.

Together, the Dee, the Fane, the Glyde and the Boyne drain the lowlands of Louth and provide a rich habitat for protected species such as salmon, otter and kingfisher. The Boyne is a designated salmonid river for its important populations of salmon and trout. Other rivers in Louth include Kenny's River, Kilcurry River and the Newry River. Many of Louth's rivers also support good stocks of coarse fish such as Bream *Abramis brama,* Roach *Rutilus rutilus,* Rudd *Scardinius erythrophthalmus*, Perch *Perca fluviatilis* and Pike *Esox lucius*. The European Eel *Anguilla anguilla* in decline throughout Europe is also present in many waters in the county.

Together, the rivers and the hedgerows form the basis of Louth's lowland habitats, act as vital ecological corridors along which species can forage and exchange their genes. This ability to move through the countryside is of particular importance if species are going to adapt to the changes brought about by changes in climate.

Peatlands

In Ireland, peatlands have accumulated 1,200 million tons of carbon that would otherwise be released and contribute to global warming. Peatlands contain about 90% water and act as vast water stores safeguarding ecosystems downstream. They also have a vital role in the supply of drinking water in catchments that are largely covered by peatlands.

Ireland contains over 50% of all raised bog habitat remaining in Europe. Internationally the blanket bogs of Ireland and the UK form the largest single contribution (10 -15%) of this habitat in the world. 44% of NHAs and 50% of SACs in Ireland contain peatland habitat (IPCC, pers. comm.). 49% of all endangered birds in Ireland occur on peatlands, most as breeding species. 23% of all endangered plants are peatland species and 26% of our mammals depend on peatlands in some phase of their life cycle.

Peatlands originally covered 16% (1,346,882 ha) of the land surface of the island of Ireland. Today peatlands of conservation worth cover 269,267ha in the Republic and 27,000ha in Northern Ireland. These globally important peatlands continue to be lost at a rapid rate worldwide and this must be halted.

The integrity of all peatland sites in the country is threatened by a number of various factors and Co. Louth is no different. The Louth Wetland Identification Survey 2011 and 2012 for example found that many of these sites were affected by dumping and infilling.

The National Parks & Wildlife Service report on the Status of EU Protected Habitats and Species in Ireland (Anon 2013) details the status of all Annex I habitats under the EU Habitats Directive (94/43/EEC) including peatlands. In the case of peatlands all habitats of this type are classified as being unfavourable inadequate, unfavourable bad or bad condition. There are also a number of species which utilize peatlands with the same classification; notably the Annex II, IV and V species 'Sphagnum genus', ranked inadequate, which is essential to the active growth of peatlands. This highlights the need for detailed management plans to be put in place if we are to properly conserve Ireland's peatland biodiversity.

As of February 2014, there are 12 peatland sites in County Louth on the IPCC Peatland Sites Database (IPCC, pers. comm). In addition, in 2012 a Wetland Inventory for the county was carried out (Foss e*t al.* 2012) for Louth County Council and the Heritage Council as an action of the County Louth Heritage Plan, a following an initial Louth Wetland Identification Survey carried out in 2011 (Foss *et al.* 2011). The reports detail 307 freshwater wetland sites (and sub-sites) in the county. Of these 37 are listed as supporting peatland habitat.

Most peatland sites of conservation interest in County Louth do not however have a conservation management plan to ensure their ecological features of interest are maintained. guide conservation actions. Many sites require restoration techniques to be put in place and this needs to be done in conjunction with local communities and landowners if it is to be successful. It is also essential that a scheme for monitoring of management actions and restoration activities be put in place with regular reviews to assess and change management criteria where required. The IPCC have created a DIY peatland management advice document which is available online at www.ipcc.ie/advice/peatland-management-diy-tool-kit5/

The BOGLAND project undertaken by the Environmental Protection Agency (EPA) and University College Dublin (UCD) aims to develop a protocol for the sustainable management of peatlands for both conservationists and developers alike. Further information and an online copy of the final document of the BOGLAND project is available from www.ucd.ie/bogland/.

The Peatlands Council, was set up by the Dept of Arts, Heritage and Local Government. One of the key objectives of this group is to devise a Peatland Strategy to guide policy in terms of peatland management over the coming years. The final Peatland Strategy is due out in 2014.

Blanket Bog

Blanket Bog deposition started 4,000 years ago as the climate warmed and where poor drainage caused the build up of oxygen starved biomass. There are extensive areas of relatively intact Upland Blanket Bog in the Cooley Peninsula. Active Blanket Bog is a priority habitat for conservation and is listed under Annex I of the EU Habitats Directive on account of its threatened status. The extensive blanket bog within the Cooley Peninsula exhibits a wide range of characteristic blanket bog vegetation and structural features, with well developed pool/hummock and lawn complexes, drier peat, acid flushes and cutover bog. It is a nutrient-poor landscape that is characterised by fluffy heads of cotton-grass *Eriophorum vaginatum* and the black bog-rush *Schoenus nigricans*. Unique plant life found here includes the insect-eating butterworts *Pinguicula* spp., which make up for the mineral-poor bog environment by trapping and digesting unsuspecting flies that land on their sticky leaves.The presence of a large number of mountain streams (or river sources) supporting wild Brown Trout adds to the biological interest. Natural transitions from blanket bog to heath and acidic grassland are evident. Small ravines and small woodland blocks add to the diversity of the site.

Heaths

Carlingford Mountain SAC supports fragments of alpine and sub-alpine heath – a habitat listed under Annex I of the Habitats Directive. The extensive cover of heather once supported a population of red grouse, a species now extinct in the county. It is hoped that under this plan, the feasibility of reintroducing the grouse will be examined, restoring this important part of Louth's natural heritage.

Raised Bogs/Fens

There are few raised bogs in the county most if not all already damaged by past peat-cutting and associated drainage. Damage has resulted in a general absence of characteristic raised bog features such as the classic dome shape created by Sphagnum growth or a lagg zone around the perimeter of the bog. A lagg is a fringing wetland area around raised bogs where groundwater mixes with bog water, and where vegetation communities are transitional between bog and fen.

Ardee bog represents a rare remnant of raised bog in county Louth, a feature that is more usually associated with the midland counties. This unique habitat is formed over thousands of years when dying vegetation fringing a lake slowly builds up until the bog rises like bread in a baking tin – giving this type of bog its name. Specialised *Sphagnum* mosses release acidity into the peat, famously allowing the peat to preserve everything from butter to human bodies and the trunks of pine trees that died five thousand years ago. Ardee bog is home to specialised plants and animals, including the insect-eating sundew flower and the hand-sized emperor moth. Unfortunately, the bog has been reduced in size and is currently under threat from drainage, scrub encroachment and development.

A detailed report on raised bogs was produced by Cross (1990) following a survey of more than 25,000ha on over 200 raised bogs. At the time of publication it was the most detailed survey of its kind undertaken in Ireland. It has provided a considerable amount of new information on the ecology of our raised bogs and

provides a clear picture of the state of this extensive ecosystem which has played such an important role in the history, culture and economy of Irish society.

Raised bogs develop from fen communities in interdrumlin hollows or along floodplains when progressive vegetation growth results in a change from fen communities that rely on groundwater to acid-loving vegetation that is sustained by precipitation. Raised bogs that have been extensively cut for fuel can reverse the succession from fen to raised bog back to secondary fen communities if the bog communities are cut away to below the surrounding groundwater level. Other habitats such as improved grassland, wet grassland and woodland have also replaced the original intact raised bogs.

County Louth is an important county for lakes and wetlands with a large concentration of fens. Hammond (1979) put the total original area of fens in Louth at 352 ha. The number and area (ha) classified as fens in Louth from a study by An Foras Forbartha in 1981 was 126 ha spread over 3 sites (Anonymous 1981). The information collected was published in a series of reports on Areas of Scientific Interest (ASIs) in each county. This data was subsequently collated in a report published in 1981 titled “Areas of Scientific Interest in Ireland. The conservation worthy fen area (ha) and number of sites recognised by IPCC in 2001 in County Louth was 437 ha at 19 sites. This report covered the condition and management of existing fen habitat, the effects of damaging management activities and an evaluation of the existing statutory framework in protecting fen habitat in Ireland, and recommendations concerning the future management of this habitat in Ireland.

Foss (2007) studied the extent and conservation status of the springs, fens, and flushes in Ireland on behalf of the National Parks and Wildlife Service. During this study, Annex 1 fens totalled 65 ha. There were 3 ha of * Cladium fens 7210 (PF1) spread over 2 sites, 61 ha of Alkaline fens 7230 (PF1) at 6 sites, 100 ha of poor fens (PF2) at 2 sites and 1 ha of Transition Mires 7140 (PF3) 1 at 3 sites. In addition one * Tufa springs 7220 (FP1) site was identified.

The County Louth Wetland Identification Survey surveyed the wetland habitats in County Louth in 2011 and 2012. This survey revealed a number of small fen sites of national or local conservation importance that are presently unprotected. Many of the fens were observed to be threatened by land reclamation and drainage works which affects the hydrological integrity of the fens and other adjacent wetlands. Other threats included pollution of the waters that feed fens, widespread dumping and invasive species.

The Louth Wetland Identification Survey 2011 covered all the significant fen types in Louth. During this survey, rich fen and flush (PF1) was found at seven of the 108 sites surveyed. The habitats on these sites all correspond to the Annex I habitat “7230 Alkaline fens” or “*Calcareous fens with Cladium mariscus and species of the Caricion davallianae 7210” (an EU Priority Habitat). Six sites were found to have examples of poor fen and flush (PF2). Examples of transition mire (PF3) corresponding to the Annex 1 habitat "7140 Transition mires and quaking bogs" have developed at 31 of the 108 sites surveyed (total area of 120 hectares). Transition mire have sometimes developed on areas of old cutover bog, whereas on other sites

large areas of former lakes are naturally infilling with a quaking mat of vegetation.

A number of sites contain examples of habitats which correspond to those listed under Annex I of the EU Habitats Directive were also surveyed during the Louth Wetland Identification Survey 2012 (Foss et al. 2012) including areas of transition mire, alkaline fen, Cladium fen, tufa springs, dystrophic lakes and pools, bog woodland, and coastal lagoons. However many are small in extent.

Many of the important sites identified in these surveys are unprotected and may merit designation if they are shown after more detailed field surveys to support good quality priority and non-priority habitats and species listed on the EU Habitats Directive or contain nationally or locally rare species. These sites for example are likely to provide optimum conditions for rare freshwater invertebrates such as water beetles and molluscs as well as important bryophyte communities.

Marsh

This habitat is found on level ground near river banks, lakeshores, and in other places where mineral or shallow peaty soils are waterlogged, and where the water table is close to ground level for most of the year. Marsh occurs in scattered fragments throughout the county often in complex mosaic with a range of other wetland habitat types such as wet grassland, fen and swamp. It can be ideal habitat for breeding waders such as Snipe *Gallinago gallinago.* Important sites for marsh identified during the Louth Wetland Identification Survey 2011 include locally important sites at Ballynamagher, Knockattin and Drumgowna, the county important site at Rootate and the nationally important Liscarragh Marsh pNHA.

Swamp

Swamp occurs around many of the lakes in the county consisting of tall perennials such as Bulrush *Typha latifolia*, Common Reed *Phragmites australis* and Reed Canary-grass *Phalaris arundinacea.* Swamp is typically species-poor but species diversity tends to vary from one location to another depending on levels of water pollutants and its proximity to other wetland habitat types often forming a complex mosaic with wet woodland, wet grassland and fen around lakes. Swamp is typically left unmanaged. Swamp in Ireland supports a number of notable species including breeding Reed Warbler *Acrocephalus scirpaceus*, Water Rail *Rallus aquaticus*, and other waterfowl. It also the prime habitat for a number of freshwater molluscs and water beetles and provides cover for the EU and nationally protected Otter. Reed stems are also the food plant for a number of species of Wainscot moth.

Woodland

The natural ‘climax’ vegetation in Ireland and north-western Europe is, generally speaking, broadleaved woodland; ancient Louth would have been one great wood, broken only by rivers, lakes and the highest mountain tops. Species now long gone called this vast forest home, such as the wolf and the wild boar. Over the centuries conversion of this woodland to agricultural farmland has resulted in the near total removal of this habitat in Louth – today only 0.18% (less than one five hundredth) of the land cover is considered *native* woodland (i.e. forest that is predominantly composed of species native to Ireland). These tiny pockets were

often preserved as part of hunting grounds in estates and demesnes, such as that at Darver Castle Woods pNHA and Louth Hall pNHA. Such woodlands are often home to specialist woodland flora and fauna, such as the long-eared owl and the pine marten.

Since the 1960's commercial afforestation programmes have mainly resulted in stands of non-native conifers such as Sitka Spruce – monocultures that are hostile to most wild species and can be harmful to local water quality. More recently however, more sustainable models of forestry are being employed, with greater room for biodiversity. Important programmes from the Forest Service are the Native Woodland Scheme (for land owners) and the NeighbourWood Scheme (for Local Authorities) that aim to increase the coverage of native woodland across the country. Woodlands have enormous cultural and amenity value as well as being a unique habitat for wildlife. It is therefore hoped that opportunities will be availed of to expand this wonderful resource. The FEPS scheme is a forestry grant scheme for REPS farmers. It encourages farmers to establish and maintain high nature value forestry through measures such as increasing biodiversity and protecting water quality.

A national survey of native woodland has been carried out. This survey found that 77,047 ha of native woodland are present in the state. This amounts to approximately 1% of the land area. Counties Cork, Clare and Kerry contain the largest area of this woodland, and the lowest area is contained within Counties Carlow, Dublin and Louth. It was reported that only 0.18% or 1258.2 ha of County Louth is covered with native forest thus making the conservation of any native woodland fragments that much more valuable.

Twenty-six woodland sites in the county were surveyed during the survey. 3.5% of the total native woodland cover in the county occurs in SACs amounting to 44.2 ha. Some sites surveyed were coastal including Cornamucklagh in Louth on the Newry River**.** Some form of amenity use (e.g. shooting, fishing, walking or horse-riding) was recorded in over one-third of woodlands surveyed in Meath, Waterford, Louth and Wicklow. Over 70% of sites had man-made features of potential historical interest, such as ditches associated with them. Many woodlands are threatened by soil erosion due to recreational pressures (e.g. at King Williams Glen NHA/SAC), dumping, overgrazing by deer and horses (e.g. at Cornamuckagh) and invasive species such as rhododendron *Rhododendron ponticum,* snowberry *Symphoricarpos albus*, red-osier dogwood *Cornus sericea* and cherry laurel *Prunus laurocerasus.* Restoration management, typically focused on the removal of non-native shrubs and conifers, needs to seriously address the impact of these tree species.

A number of different woodland types have been identified in the county. Species-poor stands of well-drained, base-rich mineral soils with a high component of beech *Fagus sylvatica* with sometimes frequent ash *Fraxinus excelsior* and oak *Quercus robur* sometimes frequent in the canopy or sub-canopy occur at Ravensdale Park and Rathscar Lake. This woodland type is often associated with old demesnes and estates. The understorey is rather sparse being comprised of a few scattered holly and hawthorn, and the occasional hazel. The dense shade and heavy beech litter mean that the field layer is often also rather scanty. However stands (e.g. at Philipstown) can support a richer herb flora including sanicle *Sanicula*

europaea, primrose *Primula vulgaris*, violet *Viola* sp., false brome *Brachypodium sylvaticum* and wood melick *Melica uniflora*.

Downy Birch *Betula pubescens*-dominated woodland with frequent ash *Fraxinus excelsior* and rusty willow *Salix cinerea* ssp. *oleifolia* and occasional oak *Quercus* spp. and sycamore *Acer pseudoplatanus*, occur on relatively well-drained mineral soils in addition to degraded basin peats (e.g. at Collon North). Understorey shrubs include frequent hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, holly *Ilex aquifolium* and rowan *Sorbus aucuparia.* The field layer comprises ivy *Hedera helix* that carpets large areas of the woodland floor. Violets *Viola riviniana /reichenbachiana,* herb-robert *Geranium robertianum,* wood avens *Geum urbanum* and enchanter's nightshade *Circaea lutetiana* as well as several fern species male-fern *Dryopteris filix-mas,* scaly male-fern *D. affinis,* soft shield-fern *Polystichum setiferum* are all also frequent with bluebell *Hyacinthoides non-scripta* sometimes occuring in large patches.

An area of woodland of the ash Fraxinus excelsior and hazel Corylus avellana type woodland with alder *Alnus glutinosa*, pedunculate oak *Quercus robur*, birch *Betula pubescens* and grey willow *Salix cinerea* occurs within the Collon North NHA, on a hillside 2.5 km northeast of Collon.

Anaverna is a small area of oak woodland on well-drained acid brown earth soils occurs on a lower hillside 6 km northwest of Dundalk. The canopy is dominated by sessile oak *Quercus petraea*, with a few very large trees (30m+) and a large number of smaller trees (10-20m) planted circa 1940s. The field layer consists of bramble *Rubus fruticosus* agg., with some great wood-rush *Luzula sylvatica*, wood sorrel *Oxalis acetosella* and honeysuckle *Lonicera periclymenum*.

Two wet woodland types described in the Fossitt habitat classification system were recorded during the Louth Wetland Identification Survey 2011 (Foss et al. 2011). WN6 - Wet willow-alder-ash woodland occupies permanently waterlogged sites such as lake shores, stagnant waters and fens, known as carr, in addition to woodlands of spring-fed or flushed sites. This woodland type is dominated by willows *Salix* spp., Alder *Alnus glutinosa* or Ash *Fraxinus excelsior* alone or in combination in the canopy and shrub layers. The field layer includes wetland herbs such as yellow iris *Iris pseudacorus*, meadowsweet *Filipendula ulmaria,* creeping buttercup *Ranunculus repens*, soft rush *Juncus effusus,* angelica *Angelica sylvestris* and marsh marigold *Caltha palustris.* WN6 - Wet willow-alder-ash woodland is likely to be the most common wet woodland type in county Louth, examples of the habitat can be seen at Stephenstown Pond, Louth Hall NHA, Newtowndarver and Redbog.

Another wet woodland type recorded during the Louth Wetland Identification Survey 2011 is WN7 - Bog woodland, some stands conforming to the priority habitat *bog woodland (91D0), under the EU Habitats Directive. This woodland type is typically found on deep relatively well-drained acid peat. It is commonly associated with former turf cutting activity or drainage or where internal raised bog drainage patterns allow the development of woodland stands (i.e. soak systems on bogs). Downy Birch *Betula pubescens* in often pure stands is the dominant canopy tree together with willows *Salix* spp. The field layer comprises bramble

Rubus fruticosus agg., purple moor-grass *Molinia caerulea* and broad buckler-fern *Dryopteris dilatata.* This woodland type is characterised by a ground cover of *Sphagnum* moss species which often form deep carpets, usually with *Polytrichum* mosses and occasional lichens. Bog woodlands are closely associated with raised bogs, occurring either on intact bogs, on cutaway or on transition mires (transition between fen and bog). It is a relatively common habitat in county Louth, on cutover bog sites such as Redbog, Ardee Bog, Coole Bog and Stormanstown Bog.

These wet woodlands often are associated with fens and are threatened by peat cutting and mining, conifer afforestation, invasive species (e.g. red-osier dogwood *Cornus sericea* and giant hogweed *Heracleum mantegazzianum*) agricultural drainage and reclamation, infilling, and fertiliser pollution from adjacent farmland.

WS1 - Scrub is another habitat that is widespread in Louth. It is found on a variety of habitat types, and includes areas that are dominated by at least 50% cover of shrubs (e.g. Gorse), stunted trees or brambles with the canopy height is generally less than 5 m, or 4 m in the case of wetland areas. Scrub frequently develops as a precursor to woodland and is often found in inaccessible locations, or on abandoned farmland. In the absence of grazing and mowing, scrub can expand to replace species-rich grassland or heath vegetation of high ecological value. Examples of this habitat type were seen on the edges / or invading the center of many of the wetland sites surveyed in the Louth Wetland Identification survey in 2011.

Trees

Mature decaying hollow trees are important for roosting bats as well as sustaining rare invertebrates that rely on the deadwood habitat, so-called saproxylic invertebrates. They are also important visual features in the landscape in their own right. Champion specimen native and non-native trees are recorded on the Tree Register of Ireland database housed at the National Botanic Gardens, Dublin. These are the tallest, widest or oldest trees in the country and have been identified and measured by the Tree Council of Ireland. Significant trees along roadsides (e.g. the tree-lined road at Bellurgan) of amenity value have been listed in the County Louth Development Plan 2009-2015. Trees can also provide important nesting sites for birds such as rookeries, heronries, sparrowhawk and buzzard.

Hedgerows

A distinctive feature of the lowland landscape of the county are the dense network of hedgerows on the better drained drumlin slopes giving the impression of a well wooded landscape. Hedgerows generally have no legal protection per se in the sense that they have not been listed as designated sites. Hedgerows have significant ecological importance as wildlife habitats and historical importance as town land and field boundaries as well as providing visual screening for developments. They play an important ecological role in allowing the free movement of fauna throughout the wider countryside as well as forming ecological networks between designated sites. Traditionally laid hedgerows offer more nest sites for birds and concealed hibernating places for invertebrates. The larger the hedgerow volume, the better it is for birds as it provides more food and concealment from predators. The more species of trees, shrubs and ground flora in

a hedgerow, the more wildlife it will contain. A varied composition provides continuity of food supply for birds and small mammals, with seeds, fruits and berries ripening at different times.

In many areas hedgerows provide the closest ecological substitute for the woods that were cleared to make way for agricultural grassland. Hedgerows provide an invaluable refuge for many woodland species such as badger, fox, and numerous birds that we know today as garden visitors (blackbirds, robins, wood pigeons and finches for instance). The hedgerows are also home to a variety of plants and insects, and at night any of the eight recorded bat species in Louth, all of which are protected under the Wildlife Act, may use them as highways for foraging. In this role hedgerows are crucial 'ecological corridors' – pathways that allow the interaction and dispersal of plants and animals through the countryside. They are also vital components in maintaining landscape integrity and play an important role in moderating the flow of water off land. Hedgerow surveys have been carried out in several counties in Ireland. No hedgerow survey has however been carried out to date in Louth and this will be a key action in this latest biodiversity action plan.

Grasslands

For centuries low-intensity agriculture was practised in harmony with nature. Pastures and arable crops were rich in wild flowers while fallen seeds provided food for a variety of farmland birds such as linnets and yellowhammers. Intensification of agriculture after the Second World War (The Emergency), further promoted by the Common Agricultural Policy (CAP) following Ireland's entry to the (then) European Economic Community in 1973, resulted in great advances in food production in Ireland and has made Ireland a leading exporter of agricultural products. However, an unintended result of this has been the loss of much wildlife from our farms. The widespread use of fertiliser results in nutrient-rich but species-poor grasslands. Some traditionally farmed, or 'unimproved', grasslands may still exist in Louth but the current status of this habitat is unknown. In some cases, disused or abandoned quarries are transformed into orchid-rich grasslands due to their nutrient-poor status – such as the one at Boycetown (a site with no legal designation). The birds and flowers that once depended on low intensity farming are now rare. Current signs of reform of the CAP, the widespread uptake of REPS in Louth and the growing popularity of organic food may signal a welcome reverse of this loss. One initiative under the latest REPS 4 scheme is to give farmers the option of either using less fertiliser, or establishing what are known as 'LINNET' plots – areas that are planted with seed-producing crops that provide food for farmland birds.

Between 2011 and 2012, 71 sites and 237 relevés in the eight Leinster counties Carlow, Kilkenny, Laois, Louth, Meath, Westmeath, Wexford, and Wicklow were surveyed as part of the Irish Seminatural Grasslands Survey (ISGS) (Martin et al. 2013). The median area of the semi-natural grassland sites in Carlow, Kilkenny, Laois, Louth, Meath, Westmeath, Wexford, and Wicklow was 7.0 ha and the county medians ranged from 3.4 ha in Wicklow to 16.2 ha in Laois, with individual sites ranging in size from 0.3 ha to 39.5 ha. The eight counties within the survey area are located in the eastern half of Ireland (Fig. 1.1), ranging from the smallest (821 km^2) and most northerly county of the eight surveyed, Louth, In sections of Meath, Westmeath, Kilkenny and Laois limestone tills are the most frequent, while in Carlow, Wexford, Wicklow, and Louth more acid soils derived from sandstone, shale and granite tills are commoner.

During the Irish Survey of Semi-natural Grasslands (ISGS) from April 2011 to September 2012, 41.4 ha of grasslands in Louth were surveyed. In total, 71 sites were surveyed including 5 in Louth. The Fossitt grassland types identified were: GS1 - Dry calcareous and neutral grassland (4.7 ha), GS2 - Dry meadows and grassy verges (5.0 ha), GS3 - Dry-humid acid grassland (27 ha), GS4 - Wet grassland (4.7 ha). Although Generally GS3 was uncommon within the eight counties surveyed with the exception being in Louth where the habitat represented 65.2% of the area surveyed due to one relatively large site in the Carlingford Mountains. Of the area of grassland surveyed in each county, Louth had the lowest with no semi-improved grassland recorded within the five sites surveyed.

Of the eight counties Louth had the greatest proportion of surveyed grassland within SACs and pNHAs, at 64.7% in both, but the joint lowest at 0% in SPAs along with Carlow and Wicklow. Louth had a large area of GS3 within SACs and NHAs/pNHAs.

For Louth and Wicklow the fact that the survey was restricted to lowland areas meant that the vast majority of the Carlingford and Wicklow Mountains and potential areas of Annex I grassland habitat within these were not surveyed. Scrub was present at 64.8% of sites and was the most frequently occurring non-grassland internal habitat at sites across Kilkenny, Louth and Westmeath. This is significant as scrub can outcompete ther valuable species-rich grassland if not controlled by mowing and/or grazing.

Urban Areas and Gardens

Built-up urban areas are not always associated with wildlife but they can be home to many more species of wildlife than might be expected. Large towns such as Dundalk and Drogheda can be surprisingly rich in habitats. Gardens provide a rich resource for birds like the robin and blackbird, while small animals such as the hedgehog can forage through them at night. Even animals as large as badgers are known to regularly frequent people's gardens looking for food. Important biodiversity areas that are close to our towns have a very important role to play in raising awareness and education. For instance, the River Boyne SAC runs through the heart of Drogheda while Dundalk Bay SAC and SPA is within a few minutes' walk of Dundalk town centre.

Coastal Habitats

The coastline of Louth is surely the county's greatest natural asset. Nearly the entire coast, from Carlingford Lough to the Boyne estuary, is of international importance for its habitats (including estuaries, tidal mudflats and saltmarsh) and species – in particular its population of wintering waterfowl. These birds occur in internationally significant numbers on Carlingford Lough, Dundalk Bay and the Boyne Estuary. Beyond the coast lies the deeper water of the marine zone. The Irish Whale and Dolphin Group carries out on-going survey work based on sightings of cetaceans off the Louth coast (see www.iwdg.ie). This important work has revealed numerous sightings of bottle-nosed dolphins and harbour porpoises, both species listed under Annex II of the Habitats Directive. Basking sharks as well as the grey and common seals have also been sighted off the Louth Coast.

Coastwatch Europe in its 2013 coastwatch survey covered a total of 21 units in Louth. The National Parks and Wildlife Service has undertaken monitoring of coastal habitats in the county (McCorry & Ryle, 2009). The Saltmarsh Monitoring Project (SMP) was designed to meet the monitoring obligations of the EU Habitats Directive with regard to Annex I saltmarsh habitats in Ireland. The monitoring protocol involved vegetation surveys, and assessments of threats and management practices. Habitiats monitored included S*alicornia* and other annuals colonising mud and sand (1310), Atlantic salt meadows (ASM) (Glauco-Puccinellietalia maritimae) (1330), Mediterranean salt meadows (MSM) (Juncetalia maritimae) (1410), Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) (1420).

Achieving Favourable Conservation Status is the overall objective for all Annex I habitat types of European Community interest listed in the Habitats Directive (Commission of the European Communities 2006). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so. Monitoring of habitats involves establishing a series of targets that define the desired condition of a habitat attribute, e.g. it is considered desirable that saltmarsh habitats were not overgrazed. Two sites were monitored during the project Dundalk Bay 000455 and Boyne Coast & Estuary 001957. During the survey a major threat to the favourable conservation status of saltmarsh was a large area of Spartina grass (Spartina townsendii) in Dundalk Bay. This invasive species outcompetes the native saltmarsh vegetation as well as reducing the area of mudflats that overwintering wildfowl can feed on.

Dundalk Bay is one of the most important sites for overwintering wildfowl in Ireland that feed on several of the largest saltmarshes in Ireland which is grazed in places. Much of the saltmarsh has only developed in the past 100 years with significant accretion and the spread of *Spartina* swards. The Boyne Estuary also supports saltmarsh vegetation. Some of this saltmarsh is associated with the sand dune system at Baltray. Much of the saltmarsh has developed recently on the intertidal mudflats behind the Boyne navigation channel. A range of saltmarsh habitats are represented at this site and the intricate habitat mosaic is influenced by the condition of the old sea walls and the degree of tidal inundation.

A Survey of Intertidal Sandflats and Mudflats across seven intertidal candidate Special Areas of Conservation including the Boyne Coast and Estuary at Baltray has also been carried out (Aquafact, 2007) on behalf of the National Parks and Wildlife Service. The project was notable in that it represents the first comprehensive assessments of sand dune systems and their habitats in Ireland. Over the course of the three field seasons (2004-2006), all known sites for sand dunes in Ireland were assessed (only 4 sites were not visited owing to access problems). The original inventory of sand dune systems by Curtis (1991a) listed 168 sites for the Republic of Ireland. During the current survey, analysis of aerial orthophotographs and additional information supplied by NPWS staff increased the site list to 181 sites. Dunes at Cruisetown and Baltray were surveyed during the course of this survey. The condition of Embryonic Dunes (Annex I habitat 2110), Shifting Dunes along the shoreline with *Ammophila arenaria* (Annex I habitat 2120) and Fixed dune (Annex I priority habitat 2130) were assessed during the survey. Threats to the dune systems were recreational pressure and the associated activities of the golf course notably at Baltray. In addition, the fixed

dune at Cruisetown is experiencing 'coastal retreat' and natural erosion is compounded by recreational activities.

Other Habitats

There are many sites throughout the county that support a diverse suite of semi-natural habitats of local nature conservation importance that are locally rare or are common but of high ecological value. Sites of Local Nature Conservation Importance (SLNCIs) have been identified for most of Northern Ireland and are listed in area plans by Planning Service. An action to identify sites of local nature conservation importance is a priority during the lifetime of this plan. Many of these locally important sites are under threat from housing developments, dumping, nutrient enrichment from septic tanks and intensive agriculture etc. Public parks, graveyards, golf courses, abandoned railway lines (e.g. the Great Northern Railway) can provide suitable habitat for some of our commoner flora and fauna or even rare species if properly managed.

The Geological Survey of Ireland maintains a register of active and abandoned quarries, pits, and mines in Ireland. Old abandoned quarries can also rare flora and fauna (e.g. breeding Peregrine Falcon *Falco peregrinus,* a species listed for protection on Annex I of the EU Birds Directive). Many of these quarries can be reworked or dumped with waste thereby losing their biodiversity value. A comprehensive survey of the conservation value of all old quarries in the county is urgently needed. Abandoned quarries occur at Anaglog, Ardee, Boycetown, Carlingford, Collon, Commons, Curston, Kilpatrick, Kilcurly, Knockatober, Lurgankeel, Moneymore, Sheepgrange, and Townley Hall.

6.6.3. Species

The diverse range of wetland, peatland, coastland and grassland habitats inside and outside the protected area network in Louth support an equally diverse flora and fauna including rare internationally and nationally protected species. Along our coastline, protected mammals such as the grey seal, harbour porpoise and bottle-nosed dolphin can be found, while further inland, otters and kingfishers inhabit our rivers. A full list of protected species known to occur in Louth is presented in **Appendix 2.**

Mammals

Many of the old walled estates of the landed gentry in Louth, sustain old woodlands within designed landscapes. These estates can however support protected species such as the Red Data Book species Pine Marten *Martes martes* and Red Squirrel *Sciurus vulgaris* if properly managed. There have been recent surveys of these two mammals in 2005 and 2007 respectively. The Pine Marten was recorded in many areas of the country but not in Louth, but appears to be spreading in its core population areas (probably due to legislative protection and an increase in tree planting) (O'Mahony et al. 2005).

The Red Squirrel Survey 2007 (Carey et al. 2007) showed that this species is declining in Louth with only one sighting reported during the survey. In contrast there were 13 sightings of the introduced grey squirrel which outcompetes the red squirrel for food resources. There may however be a link between the presence

of Pine marten and the absence of Grey Squirrel due to predation of the former on the latter. However further research on this possible link is required.

Otter is protected under the Wildlife (Amendment) Act, 2000, and is listed in Annex II of the EU Habitats Directive. It is also listed as internationally important in the Red Data Book (Whilde 1993). A recent NPWS report has been prepared on the distribution of otter in Ireland based on survey work carried out in 2004 and 2005 (Bailey and Rochford, 2006). An updated survey was carried out in 2010-2012 (Reid et al. 2013). The otter was shown to be present at many of the monitoring stations for example in the Boyne catchment. Evidence of Otter was recorded at a site at Gilbertstown during the Louth Wetland Identification Survey 2012 (Foss et al. 2012). Suitable habitat for this species was found in many of the wetland survey squares and it is likely to be widespread throughout the county.

The Landscape Conservation for Irish Bats project run by the Northern Ireland Environment Agency, the Centre for Irish Bat Research and Bat Conservation Ireland, This project aims to provide a landscape conservation guide for Irish bat species. Using an existing database of species records the habitat and landscape associations of all bat species that commonly occur in Ireland.
Bats are the only flying mammals in Ireland. Irish bats feed solely on insects. There are thirteen species of bat found in Ireland; the most common in urban areas are the Common and Soprano Pipistrelles. Common Pipistrelle roost in older and modern buildings. Soprano Pipistrelle is very similar in appearance to the Common Pipistrelle, but has a higher echo location frequency, hence the name. It tends to form large more stable colonies than its common cousin and is also widely distributed and may have a preference for foraging near water. A Whiskered Bat was recorded recently in a bat survey of the nearby Clarke's Forest. Other species that have been recorded in Ireland, which occur in the county are Nathusius Pipistrelle, Brown Long-Eared bat, and Natterer's Bat.

A Daubenton's Bat Waterway Survey (DBWS) was carried out throughout the Republic of Ireland and Northern Ireland between 2006 and 2011 (Aughney et al. 2006, Aughney et. al. 2012). From 2006-2011, the scheme was managed by Bat Conservation Ireland and was jointly funded by the National Parks and Wildlife Service (NPWS) (RoI) and the Northern Ireland Environment Agency (NIEA). Daubenton's bats were monitored in Louth in the following locations: Stephenstown Bridge (River Fane), Toberona/St John's Bridge (Castletown River), Bridge near Lurgankeel (Kilcurry River), River Dee Bridge (Ardee), Drumcar Bridge (Dee River), Oldbridge (Boyne Canal), Castlebellingham (River Glyde), Beaulieu Bridge (River Boyne), Obelisk Bridge (River Boyne), New Bridge, Drogheda (River Boyne) and Cort Road Bridge (Castletown River).

Ireland is a European stronghold for Leisler's bat where it is the third most common bat. It may be a migratory species in Ireland. The species is very mobile which makes it difficult to gauge their numbers. Being blocked out of house roosting sites by inappropriate methods of building restoration works is probably one of the biggest threats to its population levels.

Bats are very reluctant to cross open spaces or even gaps in hedges; they need continuous vegetation. Lines of trees and mature well managed hedgerows provide both feeding areas and wildlife corridors, which allow bats to navigate around the countryside to different roosting and feeding sites. Old trees with holes and dead wood are valuable roosting sites. Roost sites: Decline of bats across Ireland may be related to the loss of suitable roost sites in buildings, trees and other structures such as bridges. Retaining old trees with cracks or holes and ivy cover is most important. Bat boxes can provide an alternative site, especially for the Common and Soprano Pipistrelles.

Bats colonies may have several roosts that they move between. Summer roosts contain the females and their young; winter roosts are often cool, isolated sites, sometimes caves, where the bats hibernate. Bat roosts have also been found in the stonework of bridges along many of Louth's rivers including the Fane, Glyde, Dee, Boyne and Kilcurry. In addition the council has a 'bat house' at Carrickcarnon.

All bats are protected under the Wildlife Act. Bats roost naturally in the hollows of old trees, which are now very rare but they have adapted well to manmade substitutes and now routinely nest in old buildings and bridges. These roosts are, however, under threat due to redevelopment or demolition of old buildings and re-pointing (filling in the gaps between stones) under bridges. Gathering data on the presence of these roosts is therefore a key action in protecting this group of mammals.

Louth is thought to have the second highest density of badger social groups per Km² in the country, at one per square kilometre (> 0.7 social groups per km') . This is due in large part to the extent of hedgerow habitat that exists in the lowlands of Louth. A hare survey, published in 2007, showed that this species is widespread throughout the county for example on the Louth Estate.

Marine mammals are present along Louth's coast, with populations of both grey and common seals. Records of cetaceans are maintained by the Irish Whale and Dolphin Group and indicate the regular presence of both bottle-nosed dolphins and the harbour porpoise along the Louth coast – species listed in Annex II of the Habitats Directive. Between 1970 and 2014, species of cetacean including bottlenose dolphin, common dolphin, harbour porpoise, humpback whale, killer whale and minke whale have been recorded along the Louth Coast at such locations as Annagassan, Ballagan, Baltray Beach, Carlingford Lough, Clogher Head, Cooley Pt., Dunany Point, Greenore, Carlingford Lough, Dundalk Bay, and Port Oriel. Basking sharks have also been spotted off Clogher Head and in Dundalk Bay (see Irish Whale and Dolphin Group database www.iwdg.ie). Seals also occur off the Louth Coast.

Birds

The most up-to-date data on bird distribution in the County is the latest bird distribution Atlas covering the years 2007-2011 has just been published (Balmer et. al., 2013) based on the voluntary recording efforts of hundreds of volunteers. Species in Louth that require protection under Annex I of the EU Birds Directive 79/409 include: reed warbler *Acrocephalus arundinaceus*, wigeon *Anas penelope*, kingfisher Alcedo atthis, shoveler *Anas clypeata*, goldeneye *Bucephala clangula*, tufted duck *Aythya fuligula*, coot *Fulica atra,* black-

headed gull *Larus ridibundus*, curlew *Numenius arquata*, whinchat *Saxicola rubetra*, sand marten *Riparia riparia*, whooper swan *Cygnus cygnus,* Greenland white-fronted goose *Anser albifrons flavirostris,* merlin *Falco columbarius*, peregrine falcon *Falco peregrinus*, and red-throated diver *Gavia stellata*. Rare breeding species include curlew *Numenius arquata*, lapwing *Vanellus vanellus*, and barn owl *Tyto alba*. Bewick's swan *Cygnus columbianus* has not been recorded in recent times and in fact is very rare in Ireland now. Bird species that formerly bred in Louth include corncrake *Crex crex*, and grey partridge *Perdix perdix*.

Due to the work of BirdWatch Ireland over nearly forty years, birds are the best recorded group of species not only in Louth, but across the country. Some studies are carried out every year, such as the Countryside Birds Survey and the Irish Wetland Bird Survey (I-WeBS). Birdwatch Ireland have also produced action plans for the birds of different habitats including raised bogs, woodlands and scrub.

A traffic light system whereby the status of bird species is reviewed against a set of quantitative criteria and allocated to Red, Amber and Green provides a transparent and readily understandable way of identifying bird conservation priorities. Red-listed species are of highest conservation priority, amber-listed birds of lesser priority and green-listed species of least conservation priority (Colhoun & Cummins, 2013). Red-listed species in Louth include Bewick's swan *Cygnus columbianus*, yellowhammer *Emberiza citrinella,* black-headed gull *Larus ridibundus*, curlew *Numenius arquata*, whinchat *Saxicola rubetra,* barn owl *Tyto alba,* golden plover *Pluvialis apricaria* and lapwing *Vanellus vanellus*. Amber-listed species include little tern, swallow, merlin and stonechat. In 2007 a group of volunteers, with the help of BirdWatch Ireland and the NPWS, commenced a wardening project for nesting little terns along the beach at Baltray. These birds nest on a shingle beach and so it is important to protect their eggs from predators such as foxes and gulls. Members of this group have now formed the Louth Nature Trust http://www.louthnaturetrust.org/.

Several sites in Louth are internationally important for wintering wetland birds. Stabannon-Braganstown SPA comprising 491 ha between Ardee and Castlebellingham in County Louth, consists of drained wetlands on the River Glyde flood-plain which are now predominantly improved grassland and tillage. The site supports significant numbers of greylag goose *Anser anser,* whooper swan *Cygnus cygnus* and Bewick's swan *Cygnus columbianus*. The Carlingford Lough SPA, a cross-border site with Northern Ireland supports notable numbers of scaup *Aythya marila* and brent goose *Branta bernicla.* Most of the birds occur along the northern shoreline, within Northern Ireland. The southern (Republic) shoreline is used only occasionally by large numbers of some waterbird species. Dundalk Bay SPA is a a very large, open, shallow sea bay on the east coast, extending east from Dundalk town in County Louth. This site encompasses extensive sand- and mudflats, which at low tide are up to 3 km wide, as well as saltmarshes, shingle-beaches and tidal rivers. The estuaries of the rivers Dee, Glyde, Fane and Castletown are all included in the site. The site is notable for greylag goose *Anser anser*, brent goose *Branta bernicla,* redshank *Tringa totanus,* Bar-tailed Godwit *Limosa lapponica,* curlew *Numenius arquata*, knot Cali*dris canuta* and dunlin *Calidris alpina.*

Carlingford Mountain supports the peregrine falcon *Falco peregrinus*, an Annex I species under the Birds Directive and the fastest bird in the world. Many of the birds of prey that once patrolled the skies over Louth

are now no longer to be found breeding here, such as the red kite *Milvus milvus,* the golden eagle *Aquila chrysaetos* and the white-tailed (or sea) eagle *Haliaeetus albicilla.* All of these species have been reintroduced to other parts of Ireland in recent years however, and so it is hoped that one day they will once again become a part of Louth's natural heritage.

Reptiles and Amphibians

Three species are known from Louth: the common lizard, the common frog and the smooth newt. The presence of lizards and frogs in Louth is recorded from popular surveys carried out by the Irish Wildlife Trust and the Irish Peatland Protection Council respectively. Common frog *Rana temporaria* is a species listed as being internationally important in the Red Data Book for Vertebrates (Whilde, 1993) and is legally protected through the Wildlife (Amendment) Act, 2000. It is considered widespread and common in Ireland but vulnerable in the rest of Europe. A recent survey by the IPCC in 2003 presented the distribution records for the Common Frog on a 10km grid square basis. Of the twenty-four 10km squares in which at least part of Co. Louth occurs there are eleven records of common frog. This distribution is likely to be a reflection of recording effort rather than a clear indication of the distribution of the species. Suitable habitat for this species is likely to occur throughout Co. Louth due to the numerous lakes and associated wetlands in the county. The distribution of another Irish native amphibian the smooth newt *Triturus vulgaris* is poorly understood. The Irish Wildlife Trust has also carried out a newt survey in Ireland (Buckley, 2012). In order to train members of the public to carry out the newt survey, eight training days were held during March and April 2012 in a number of counties including Louth. However, the status of the newt is still poorly understood in the county but due to the occurrence of suitable habitat is thought to be widespread.

Fish

Most of the fish species found in Louth are not native to Ireland but nevertheless provide a vital angling resource to tourist and local alike. Notable native fish species have however been recorded in the county. Lamprey is a species of fish with an eel-like body and a round sucker-like mouth. There are three types of Lamprey found in Ireland, all of which are listed 1on Annex II of the Habitats Directive. These are the brook lamprey Lampetra planeri, river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*. Each species has a similar life-cycle involving an adult parasitic feeding phase, an upstream spawning migration and a gradual downstream movement during the juvenile stage. Kurz and Costello (1999) referenced a record for Lamprey in the upper and lower reaches of the River Fane that crosses the border with Northern Ireland. The species of Lamprey was not determined. This is the only known Lamprey record from Louth. Further survey work on the Lamprey population in the River Fane and in Louth as a whole is required to obtain baseline data for future monitoring.

Freshwater fish are generally well recorded in Louth thanks to the work of Inland Fisheries Ireland and the Loughs Agency, including extensive data on Annex II species (Atlantic salmon *Salmo salar* and lamprey) as well as trout. The Marine Institute gathers data on commercially-exploited fish in the Irish Sea.

Other fish species that can be found in Louth rivers include the non-native roach *Rutilus rutilus*, perch *Perca fluviatilis*, stone loach *Barbatula barbatula*, minnow *Phoxinus phoxinus* and gudgeon *Gobio gobio*.

Invertebrates

In general, invertebrates are less recorded than the more charismatic species such as mammals and birds. The numerous small isolated wetland habitats such as ponds and small lakes, fens, small flushes, spring-fed seepages and even pools on cutover bogs support invertebrate species listed for protection on Annex II of the EU Habitats Directive for example white-clawed crayfish *Austropotamobius pallipes*. This species is also protected under the Wildlife (Amendment) Act, 2000. Although widespread in Ireland, Ireland has a special responsibility to protect its stocks as they have affected by crayfish plague in Europe. White-clawed crayfish is the only freshwater crayfish species in Ireland, inhabiting lakes, canals and rivers in predominantly limestone areas (Demers et al. 2005). Crayfish are generally found in unpolluted or slightly polluted water but can tolerate lower water quality. The distribution of white-clawed crayfish, in Co. Louth is fairly widespread.

Lakes, marsh, swamp and fen habitats are also very important for freshwater molluscs in Co. Louth. Many wetland transition zones containing these habitats have been destroyed through intensification of agriculture and land drainage right to the edges of lakes. Key molluscan species of conservation priority in Louth are *Vertigo lilljeborgi, Anodonta cygnea*, and *Spermodea lamellata*. The first species has been found in Lough Ballybony and is threatened with extinction in Ireland, and the last found at Flurry Bridge Ravensdale is declining in its Irish range (Evelyn Moorkens, pers. comm., 2007).

Small wetlands also support a diverse range of the brightly coloured odonates (dragonflies and damselflies) but on account of their size can be easily damaged. There are 32 species of dragonfly and damselfly in Ireland. 24 (11 damselflies and 13 dragonflies) have been confirmed as breeding and resident in Ireland. The Irish Bluet *Coenagrion lunulatum* is a species which though found on the Continent and a wide area of northern and central Ireland has not been found in Britain. This species has been recorded at Cortial Lough 4.5km W of Dundalk. Without active management of these sites the open pools will decrease in area resulting in a reduction and species richness of the odonates.

Recent monitoring projects for butterflies have added much to the store of knowledge on these charismatic insects. The Irish Butterfly Monitoring Scheme was established by the National Biodiversity Data Centre in 2007 with the support of Butterfly Conservation in the UK and Butterfly Conservation Europe. Monitoring butterflies in this scheme involves walking a fixed route each week from April to September and recording the numbers and different species of butterflies seen. These data are used for analyses and distribution trend projection.

Small wetlands are also important for threatened water beetles. Water beetles, as a group are also good indicators of water quality and by extension the conservation status of wetlands in general. There are around 300 water beetle species in Ireland. The species recognised as water beetles are drawn from several beetle families, some of which contain terrestrial species whilst others are exclusively aquatic. Beetle species such

as the riffle beetles (*Elmidae*) are sensitive to pollution but some species of diving beetle (*Dytiscidae*) tolerate intensely polluted habitats. Many relict species confined to undisturbed sites but beetles are the first animals to colonise newly created habitats. Beetle adults are mostly long-lived and can be found in many habitats throughout the year, thus permitting evaluation of some wetlands over much of the year. The distribution of Irish water beetles is relatively well-known compared to other insect groups. The Water beetles of Ireland initiative has made beetle distribution record data available through the National Biodiversity Data Centre website http://waterbeetlesofireland.biodiversityireland.ie/). A red list of Irish water beetles was published in 2009 (Foster *et al.* 2009). There are many small wetland sites in the county that support a diverse range of water beetles including notable species.

There are 101 bee species in Ireland of which 19 are bumble bees and more than half of these bumblebees are in decline. Most of the other 81 bee species have solitary lifestyles. Nearly half of these are in decline. A regional red data list of bees has been produced and tells us which bee species are most endangered in Ireland. Six are critically endangered, 7 endangered, 16 vulnerable and 13 near threatened. Three bee species have become extinct in the last 80 years (e.g. the Tawny Mining Bee *Andrena fulva* last seen in Kilkenny in 1925). Bees are important as pollinators of much of our native flora. A pollinator list from the County is accessible from the National Biodiversity Data Centre website www.biodiversityireland.ie. This list as of February 2014 included 19 pollinator species. Seventy-one pollinator species have been identified in the county under the pollinator initiative including mining bees, cuckoo bees, carder bees and hoverflies.

Recent years have seen the publication of a Red List for Bees in Ireland and an Atlas of Water Beetles. These are important steps in collating data for all invertebrates in Ireland.

Vascular Plants

A vascular plant is one which possesses tubes for transporting liquid and nutrients. This group includes the trees, flowering plants and grasses. The publication in 2002 of *The New Atlas of the British & Irish Flora*[1] provides a wealth of information on the hundreds of native and alien species found in the country. This project was possible due to the extensive research of county recorders of the Botanical Society of Britain and Ireland (BSBI), including one for county Louth. Many rare and protected species of plant are to be found in Louth, frequently in designated sites.

A survey of the rare/threatened and scarce vascular plants in County Louth was carried out in 2006 (BEC, 2006). Six of the target plant species searched for in the field at their old haunts was found to have no remaining suitable habitat for the rare/threatened species. Three species small cudweed *Filago minima*, heath cudweed *Gnaphalium sylvaticum* and small-white orchid *Pseudorchis albida* previously recorded in the county were deemed extinct after completion of the survey.

Carlingford mountain is home to the rare parsley fern *Cryptogramma crispa*. The scarce bearded couch

[1] **Preston C.D., Pearman D.A., & Dines T.D.,** 2002. *The New Atlas of the British & Irish Flora*, Oxford University Press.

Elymus caninus has been recorded at Knockagh, 3km northwest of Dundalk, a streamside woodland largely occupying steeply sloping banks. Bird cherry *Prunus padus* is a rare tree listed for protection on the Flora Protection Order, 1999. that has been recorded in the Collon Wood (NHA) and also at Mellifont Abbey. Other significant plants in the County are early-purple orchid *Orchis mascula*, and cranberry *Vaccinium oxycoccos*.

There are many undesignated sites that support plant species that are rare at county and national levels. These are held by NPWS in a centralised rare plant database. During the Louth Wetland Identification Survey 2011, a number of rare species were found in the county. At Burren, round-leaved wintergreen *Pyrola rotundifolia* was recorded on an area of open bog woodland with transition mire. This is only the second record for the plant in County Louth which has its headquarters in the midlands (Westmeath in particular). Marsh Helleborine *Epipactis palustris*, was recorded in an area of *Schoenus nigricans* fen, which is only the second county record for the species in Louth.

The flora of Co. Louth is relatively poorly recorded for plants and it is likely that many significant plants remain to be discovered by the dedicated naturalist. In 2006 a survey carried out to re-locate 17 rare plants, previously recorded from the county, found only two (Martin, 2006). Searches could not even be carried out for a further eight due to the poor information on their location. While none of these plants is considered extinct, it does highlight the lack of knowledge that exists regarding these important species. It is impossible to protect a plant threatened by a proposal to develop the site where it occurs if we don't know that it occurs there, especially one which grows outside a designated area. Better data would help to secure the status of many species.

Bryophytes

Bryophytes differ from vascular plants in that they do not have tubes for transporting water. Instead they absorb moisture directly from rain or water vapour in the air around them. This group includes mosses, liverworts and stoneworts.

The bryophyte flora of Ireland is one of the richest in Europe with a wealth of so-called Atlantic species whose distribution is shared only with western Scotland. It comprises 227 liverworts, 3 hornworts and 454 mosses (Holyoak, 2006). The all-Ireland bryophyte survey (ongoing since 2000) on a county by county basis aims to re-locate records for rare and threatened bryophytes, examine potentially suitable new sites and gain a better understanding of the distribution, population biology and management requirements of Irelands bryophytes. Results will allow identification of bryophyte species of conservation concern, production of a red data book, review of the flora protection order and will contribute to a forthcoming revision of the bryophyte atlas. A rare bryophyte survey of Louth was carried out in 2007. A number of rare bryophytes have been recorded in the county namely Drumsticks *Aulacomnium androgynum* recorded at Ardee Bog, stiff apple-moss *Bartramia ithyphylla* on Carlingford Mountain and tufted thread-moss *Bryum caespiticium* recorded on Clogher Head.

New habitats such as coniferous plantations generally have less interest for bryophytes than the open habitats they replace. Infestations of Irish woodlands with Rhododendron *Rhododendron ponticum* is generally damaging to the bryophyte interest due to shading effects of its dense canopy.

Fungi and Lichens

Old estate woodlands support a diverse range of fungi (mushrooms and toadstools), and lichens as well as being stepped in social history. Fungi and lichens are poorly studied in Co. Louth and indeed in Ireland as a whole and further inventory work is urgently needed. There is also a need for increased awareness of the role these groups play in the proper functioning of ecosystems. Fungi for example by decomposing deadwood aid the recycling of nutrients in woodlands. Mycorrhizal fungi colonise the roots of green plants. They assist green plants by increasing water and mineral nutrient uptake from the soil. Tiny fungal strands called mycelia can grow through soil much faster and more easily than plant roots and can therefore exploit a much larger soil volume in search of these resources. In return, the plant provides carbohydrates (sugars) to the mycorrhizal fungus.

Lichens are found in a diverse range of substrates including peat, wood and acid and calcareous rocks and stones including gravestones and drystone walls. Lichens play a vital role in soil formation. Soil takes thousands of years to develop from parent rock - 10 mm of soil takes between 100 and 1000 years to form. The exact amount of time taken depends upon the speed at which the parent rock weathers, i.e. is broken down into small particles. Weathering occurs through chemical, physical and biological processes. Chemical weathering is caused by the chemical action of water, oxygen, carbon dioxide and organic acids secreted by lichens.

A lichen is a unique entity in that it is an intimate combination of two very different organisms: a fungus and an alga. Some are extremely common and can be used as accurate indicators of air quality. Fungi are notoriously difficult to identify and survey since what is commonly identified as a mushroom is in fact only the fruiting body, a tiny portion of the organism that is visible above ground. It is believed that the largest and heaviest organism on Earth may in fact be a fungus, so vast is its network of root-like *hyphae* in the soil.

Algae

Some algae, such as sea weeds, are quite well known as they are readily visible and easy to recognise. Many others are single-celled organisms that produce slimes or are suspended in water. This means that identification techniques are much more specialised.

Micro-organisms

The number and variety of micro-organisms in existence is currently impossible to estimate but may stretch into millions. Very little research has taken place into what may be the largest group of organisms on the planet.

6.6.4. Protected Areas

Sites of European Importance – SPAs + SACs = Natura 2000

Some of the habitats and species considered a priority for conservation in County Louth are listed under Annex I and II of the EU Habitats Directive (92/43/EEC) respectively and also Annex 1 of the EU Birds Directive and therefore given special protection within Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) respectively.

Together, SPAs and SACs make up a European network of sites known as the Natura 2000 network. They are protected in Irish legislation through the European Communities (Natural Habitats) Regulations 1997. These regulations lay out rigorous tests that are designed to ensure that SACs and SPAs are not impacted on by any proposals, excepting those with the highest levels of justification. Even if such a proposal is allowed, it is necessary to ensure that compensation is required to maintain the coherence of the Natura 2000 network. This would usually require habitat creation and / or designation. Ireland is required to take appropriate steps to avoid the deterioration of these areas and Management Plans are being drawn up for them by the National Parks and Wildlife Service (NPWS). Some have already been completed.

SPAs

Sites of European importance include Special Protection Areas (SPAs) and Special Areas of Conservation (SACs). Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. The five SPAs in Louth were created to protect the Annex I Birds Directive species recorded in Louth such as the little tern *Sterna albifrons*, the golden plover *Pluvialis apricaria* and the black-tailed godwit *Limosa lapponica*. Conservation objectives have been produced for all the designated SPAs in Louth.

SACs

Special Areas of Conservation (SACs) are areas that are of European Importance for important habitats, plants and animals other than birds. These are designated under the 1992 EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, otherwise known as the Habitats Directive. Again, they are selected on a specific set of criteria that relate to habitats and species that are considered to be particularly important, rare or vulnerable in Europe. Animals listed for protection by the designation of SACs include white-clawed crayfish *Austropotamobius pallipes*, otter *Lutra lutra*, salmon *Salmo salar* and river lamprey *Lampetra fluviatilis*.

NPWS are currently producing conservation management plans for all SACs and SPAs. Conservation objectives and a conservation statement have been produced for all six designated SACs in Louth. Landowners with land within an SAC must notify NPWS if they wish to carry out any activity on a notice of notifiable actions relating to the habitats and species within the site. There is also a program of favourable

condition monitoring (conservation assessments) of all SACs in order to fulfil the 6-yearly reporting requirements of the EU Habitats Directive. Each designated area has been attributed the objective of maintaining the Annex I habitats for which the cSAC has been selected at favourable conservation status and, if applicable, the objective of maintaining the corresponding Annex species for which the site was designated.

Sites of National Importance (NHAs and pNHAs)

Apart from the Natura 2000 sites, there are a range of other sites of importance for nature conservation. The main vehicle for the conservation of sites holding significant areas of threatened habitats and species is the network of Natural Heritage Areas (NHAs). This is an area considered important in a national context for the habitats present or which holds species of plants and animals whose habitat needs protection. Some of these sites are small, such as roosting areas for rare bats; others can be large, such as a blanket bog complex or a sand dune system. To date in Ireland, only raised bogs (75 sites) and blanket bogs (73 sites) have been formally designated as Natural Heritage Areas covering an area of ca 60,000 ha (www.NPWS.ie). Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. The protection afforded to Natural Heritage Areas is similar to that afforded to Special Areas of Conservation as described above. There are currently no designated Natural Heritage Areas in county Louth.

Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats. Some of the pNHAs in Ireland are tiny, such as a roosting place for rare bats. Others are large - a woodland or a lake, for example Nationally pNHAs cover approximately 65,000 ha and NPWS has indicated that designation will proceed on a phased basis over the coming years (www.NPWS.ie). Prior to statutory designation, pNHAs are subject to limited protection being considered in afforestation grants, REPS and recognition by planning authorities. Policy CON 11 in the Louth County Development Plan 2009 – 2015 commits the council “To resist and development that would be harmful to [any pNHA] or that would result in a significant deterioration or habitats or disturbance of species”. There are currently 24 sites designated as pNHAs in County Louth (LCC 2010) listed in **Appendix 5.**

cNHA – candidate Natural Heritage Area

Candidate Natural Heritage Area (cNHA) is the name given to wildlife sites that are proposed by NPWS and by third parties for consideration as NHAs. Included within this category are the pNHAs described above, together with newly discovered sites recommended for conservation by a variety of third parties but which have not been objectively surveyed by NPWS. These sites are of significance for wildlife and habitats.

Prior to designation these sites may require further detailed survey and evaluation for their conservation value. If they are considered of national conservation value they may then enter the formal NHA designation process. The cNHA sites have no legal protection until they are taken up into the formal NHA designation process, unless they are also former pNHA.

Following the completion of the Louth Wetland Survey in 2011 it was recommended that 23 sites which were not previously included on sites of conservation value within the county, should be submitted as cNHA to the National Parks and Wildlife Service for conservation designation. These include sites ranked as C+ Rating: County conservation value or above.

In addition, there are 34 areas deemed to be candidate sites of geological interest of which at least 18 are of national or higher importance.. In 2013, all the Geological Conservation Sites were assessed, so that there now exists a robust database of sites of these, some of which should, ultimately, be designated as geological NHAs. Important geological sites are presented in **Appendix 4.**

A full list of internationally designated conservation sites together with their conservation interest are presented in **Table 4.**

Table 4: Designated Sites in County Lough

Site	SAC	SPA	Site Synopsis Available	Conservation Objectives Available	Conservation Interest
0453 Carlingford Mountain	*		*	*	Alpine and Boreal heaths; Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani); Calcareous rocky slopes with chasmophytic vegetation; Siliceous rocky slopes with chasmophytic vegetation
0455 Dundalk Bay	*		*	*	Estuaries; Mudflats and sandflats not covered by seawater at low tide; Perennial vegetation of stony banks; Salicornia and other annuals colonizing mud and sand; Atlantic salt meadows; Mediterranean salt meadows
1459 Clogher Head	*		*	*	Vegetated sea cliffs of the Atlantic and Baltic coasts; European dry heaths
1957 Boyne coast and Estuary	*		*	*	Estuaries; Mudflats and sandflats not covered by seawater at low tide; Salicornia and other annuals colonizing mud and sand; Spartina swards; Atlantic salt meadows; Mediterranean salt meadows; Embryonic shifting dunes; Shifting dunes along the shoreline with Ammophila arenaria; Fixed coastal dunes with herbaceous vegetation
2299 River Boyne and river Blackwater	*		*	*	River lamprey; Salmon; Otter; Alkaline fens; Alluvial forests with Alnus glutinosa and Fraxinus excelsior
2306 Carlingford shore	*		*	*	Mudflats and sandflats not covered by seawater at low tide; Annual vegetation of drift lines; Perennial vegetation of stony banks; Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
4026 Dundalk Bay		*	*	*	Great Crested Grebe (Podiceps cristatus); Greylag Goose (Anser anser); Light-bellied Brent Goose (Branta bernicla hrota); Shelduck (Tadorna tadorna); Teal (Anas crecca); Mallard

Site	SAC	SPA	Site Synopsis Available	Conservation Objectives Available	Conservation Interest
					(Anas platyrhynchos); Pintail (Anas acuta); Common Scoter (Melanitta nigra); Red-breasted Merganser (Mergus serrator); Oystercatcher (Haematopus ostralegus); Ringed Plover (Charadrius hiaticula); Golden Plover (Pluvialis apricaria); Grey Plover (Pluvialis squatarola); Lapwing (Vanellus vanellus); Knot (Calidris canutus); Dunlin (Calidris alpina); Black-tailed Godwit (Limosa limosa); Bar-tailed Godwit (Limosa lapponica); Curlew (Numenius arquata); Redshank (Tringa totanus); Black-headed Gull (Chroicocephalus ridibundus); Common Gull (Larus canus); Herring Gull (Larus argentatus); Wetlands & Waterbirds
Carlingford Lough 4078		*	*	*	Light-bellied Brent Goose (*Branta bernicla hrota*); Wetlands
Boyne Estuary 4080		*	*	*	Shelduck (*Tadorna tadorna*); Oystercatcher (*Haematopus ostralegus*); Golden Plover (*Pluvialis apricaria*); Grey Plover (*Pluvialis squatarola*); Lapwing (*Vanellus vanellus*); Knot (*Calidris canutus*); Sanderling (*Calidris alba*); Black-tailed Godwit (*Limosa limosa*); Redshank (*Tringa totanus*); Turnstone (*Arenaria interpres*); Little Tern (*Sterna albifrons*); Wetlands & Waterbirds
Stabannan-Braganstown 4091		*	*	*	Greylag Goose (*Anser anser*)
River Boyne and river Blackwater 4232		*	*	*	Kingfisher (*Alcedo atthis*)

Source: www.npws.ie

Local Biodiversity Areas

In light of the EU's commitment to halt the loss of biodiversity by 2012, a mechanism to prevent the destruction of biodiversity which is important to us locally or at a county level, but which will never qualify for protection under national or international nature conservation designations is required. Many of these locally important sites are under threat from housing developments, dumping, nutrient enrichment from septic tanks and intensive agriculture etc. Public parks, graveyards, golf courses, abandoned railway lines (e.g. the Great Northern Railway) can provide suitable habitat for some of our commoner flora and fauna or even rare species if properly managed.

In this light Louth County Council is considering the drawing up of a list of Local Biodiversity Areas (LBAs) within he limitation of the need to provide for necessary development. In Northern Ireland, a similar system of designating Sites of Local Nature Conservation Importance (so-called SLNCIs) occurs and these are listed in

local area plans. These sites would include heathlands, boglands, grasslands, woodlands, wetlands and coastal habitats.

They include places in Louth, which support wildlife of local importance but which are not big enough to warrant protective designation at national level. In addition, there are 'point sites' which support biodiversity which needs to be protected. These would include: nest sites of rare breeding birds, such as the peregrine falcon, sites for rare plants listed under the Flora Protection Order 1999, bat roosts in trees, buildings and bridges, frog and newt breeding ponds, sites where birds breed colonially (heronries in woods, black guillemots in piers, sand martins in sandy cliffs along rivers, at the coast or in quarries, terns on shingle beaches), important specimen trees, groups of trees and important species-rich hedgerows.

It is proposed that the level of protection envisaged under the LBA scheme would not prevent development on a site but would flag up with the planner that the site supports biodiversity (wildlife) of local or county importance that should not be damaged or destroyed by the proposed development. If the biodiversity interest of the site must be destroyed in order to allow the development proceed, it would be appropriate to require mitigation measures, including the creation of compensatory habitat. **Table 5** presents suggested LBAs in County Lough. Some of these LBAs were identified during the Louth Wetland Identification Survey 2011-2012 (Foss et al. 2011, Foss et al. 2012)

Table 5: List of Proposed LBAs in County Louth

Wetlands (ponds, lakes, rivers and streams, bogs, fens and marshes)
Annaghvacky, Hackballscross
Ardee Bog, Townparks (pNHA)
Arthurstown
Artoney (GR. 295510, 300820)
Balmer's Bog, Dundalk
Beaulieu woods and pond
Begrath wetland, Tullyallen
Bellurgan
Birches Lane wetland, Blackrock
Bolies Quarry
Boyne Fields
Carrickcarnon (GR. 307400, 319300)
Cartonstown Lough
Castletown estuary (between the Big and Táin Bridges)
Clonaleenaghan, Hackballscross
Cortial Lough (pNHA)
Dowdallshill (GR. 305800, 308500)
Drogheda (Mell) Quarries
Drumshallon Lough
Ferrard's Cross wetland
Hamilton's Cove (Blackrock)
Keenan's Cross pond (near Togher)
Kenny's River
Kilcurry River
Knockagh
Lannat
Louth Village (GR. 295660, 300740)
Lowrath North (GR. 300400, 295410)

Millgrange, Greenore Rathescar Game Reserve (near Dunleer) Ravanny wetland Richard Taaffes holding (GR. 300350, 295600) Shilties Lough Stephenstown Pond Tinure
Uplands Slievenaglogh
Bat roosts Beaulieu, River Boyne Bridge in Ardee, River Dee Castlebellingham, River Glyde Council 'bat house', Carrickcarnon Lurgankeel Bridge, Kilcurry river Oldbridge, Boyne Canal (border with County Meath) St John's Bridge, Castletown river Stephenstown, River Fane bridge
Important colonial nesting bird sites Heronry in woods at Mullatee, Carlingford
Rare plant sites (Flora Protection Order 1999) Embankment of south side of the castle (?) for *Hyoscyamus niger* Mellifont Abbey for *Prunus padus*
Trees/woods Ravensdale Townley Hall Treelined road at Bellurgan Tree-lined road from Termonfeckin Wood at Ferry Hill, Cornamucklagh on the border and edge of Carlingford Lough
Abandoned quarries Anaglog Ardee Boycetown Quarry Carlingford limestone quarry Collon Commons Curston Kilcurly Kilpatrick Knockatober Lurgankeel Moneymore Sheepgrange Townley Hall
Coastal habitats Baltray dunes
Other (habitat category unknown) Angelsey Clermont Mount Hamilton, Dundalk Lurgangreen farms

Protection of Biodiversity Outside Designated Sites

It is important to remember that most of our biodiversity occurs outside designated areas. There are a number of mechanisms for protecting wildlife and their habitats outside special sites. **The Wildlife Acts (The**

Wildlife Act 1976 and Wildlife (Amendment) Act 2000), for example, protect wild birds, animals and plants from wilful damage and disturbance.

6.6.5. Threats and Opportunities for Biodiversity

Species, habitats and ecosystems and genetic diversity, is under an ever increasing threat in Ireland as elsewhere. Many species and habitats are in decline and in some cases their future is endangered. Many species have already become extinct and it is considered that impending extinction rates are many times greater than those of the past. The extinction of one species results in the irreversible loss of a unique suite of genetic adaptations that have been acquired typically over very long time scales of hundreds of thousands of years.

Human actions are directly and indirectly, responsible for much of the loss of biological diversity. The specific threats to biodiversity in Co. Louth mirror those in other parts of Ireland and indeed at the international scale. Species have always become extinct with those more able to survive changes in their environment persisting and less adaptable ones. It is however the scale of human-induced extinctions that is of concern worldwide.

The relative effect of individual threats varies in time and location. Although there is a raft of legislation, and mandatory and voluntary guidelines and policies in existence to protect biodiversity, poor enforcement (i.e. policing and application of penalties) due to limited resources coupled with a lack of awareness on the importance of biodiversity remain a problem in the county. It is hoped that this plan will focus minds on what needs to be done to safeguard the biodiversity in the county for future generations to appreciate and enjoy.
The main threats are follows:

Lack of Knowledge of Particular Habitats and Species – The more well-studied plant and animal groups tend to be the most charismatic groups of popular appeal (e.g. birds, mammals and flowering plants) with relatively few species that are often more easily identified. In addition the extent and distribution of a number of key habitats remain under surveyed including wet and dry heaths, and screes. In addition the survey of lakes in the county has been piecemeal in extent and level of detail depending on the survey objectives. The focus of particular surveys may only have measured certain physical or chemical parameters or concentrated on particular plant or animal groups. Other neglected habitats include hedgerow, upland grassland and parkland with veteran trees. There is likely to be continued loss of habitats of high conservation value in the county until such time as a comprehensive survey of all habitats and species is carried out in the county. Many of the actions in this plan aim to address knowledge gaps relating to Louth's biodiversity.

Burning – the practice of burning to improve vegetation for sheep grazing has caused damage to the blanket bog communities at some sites leading to drying out of the peat and altered vegetation structure. Fires have also occurred during the bird nesting season.

Pollution of Surface Water – Agricultural intensification under the Common Agricultural Policy resulted in drainage of wetlands and loss of the species diversity of semi-natural grasslands by over application of

fertilizers especially phosphorous. Nutrient runoff from farmland and slurry from intensive poultry farming enterprises into wetlands (e.g. swamps, fens and interdrumlin lakes) can potentially result in changes in plant species composition and abundance with the species with the most exacting habitat requirements often the most easily affected. The decline in the fish stocks on some of Louth's lakes is attributable to nutrient enrichment that results in excessive growth of 'weeds' leading to oxygen depletion in the water and resultant fish kills.

There are signs however that lake water quality in at least some lakes is improving with increased investment in new wastewater treatment plants, schemes to export animal slurry outside sensitive catchments and the introduction of farm nutrient management planning. Nutrient management planning is recognized as a key tool in curtailing nutrient (Phosphorous and Nitrogen) losses from agriculture involving a planned approach to the control and safe use of nutrients from all sources on the farm. Crop nutrient application levels are brought into line with crop requirements so that losses to the environment are minimized. In 2005, the department opted for full decoupling of agricultural support production under Europe's Single Farm Payment Scheme. This should have beneficial effects on Louth's habitats and species in the future by removing the incentive for the intensification of agriculture. All these measures help to ensure that all Louth's waters reach good ecological status by 2015 in line with Water Framework Directive requirements. The county council seeks to advise and publicise on good farming practices which harmonise modern agricultural methods with care for the environment. Measures that address the problem of water pollution include:

- River Catchment Surveys involving inspection of all business and farming premises with a view to identifying sources of water pollution
- Stakeholder Involvement-Information Sharing
- Survey work to identify problem septic tanks that are causing pollution
- Production and distribution of advisory leaflets on pollution prevention, silage effluent, septic tank and treatment systems and phosphorus in agriculture

In addition, under the Waste Facility Registration and Permit regulations 2008, a waste permit applicant is required to undertake a survey of the biodiversity of the land and make an assessment on the potential impact on it. This process if rigorously applied also plays a vital role in maintaining water quality in lake types sensitive to pollution notably mesotrophic lakes. The survey and assessment are required to identify habitats to level 3 using the habitat classification scheme of Fossitt, and have regard for proposed and designated NHAs, wetlands and policies set out in County Development Plans / Local Area Plans.

Pollution and Over-abstraction of Groundwater - Poorly sited and designed septic tanks can release effluent into groundwater aquifers. Runoff of agricultural fertilizers, manure and slurry can also pollute groundwater. The ecological integrity of groundwater fed habitats such as fens and springs depends on the supply of water of sufficient quality and quantity. Groundwater aquifers are also an important source of drinking water in rural areas. The Geological Survey of Ireland (GSI) has prepared groundwater protection

plans for a number of counties. These plans classify aquifers and aquifer vulnerability on a county basis, and some counties have incorporated this information into their county development plans. There is increasing use of groundwater in some areas of the county by group water schemes licensed by the local authority and this can result in impacts on water-dependent habitats and species if not carefully monitored and controlled. Increasing attention to this issue will be required in the future.

Forestry - Traditionally managed dense mature conifer plantations of more densely canopied species like Sitka Spruce and Western Hemlock support little in the way of a diverse herb flora as the closely planted trees do not allow the passage of adequate light through the canopy. Lighter canopied conifers such as larch however allow more light to the forest floor allowing a more diverse herb layer to persist on sites where the conifers have been planted on sites formerly supporting long-established woodland. The BIOFOREST research project aimed to determine how commercial conifer plantations could be managed to enhance biodiversity and the implementation of the research findings would go a long way in increasing the wildlife and visual appeal of these forests.

Poorly planned forestry developments can result in sedimentation of watercourses and smothering of fish spawning beds. Forest Service guidelines on forestry and water quality (Forest Service, 2000), forestry and harvesting (Forest Service, 2000a), and forestry and biodiversity (Forest Service, 2000b) have been drawn up to ensure that forestry developments do not adversely impact on the environment. Established forests can still threaten adjacent intact bog through negative impacts of drainage, fertilisation and self-seeding of conifers onto the bog surface. Small-scale forestry developments can potentially result in loss of habitats of local conservation value outside designated areas especially in the light of the fact that some habitats and species have not been adequately inventoried. Planting of trees on wetland soil is generally accompanied by drainage. Conifer plantations have been established on the immediate margins or on a number of wetlands in the county while broad-leaved tree planting has been undertaken on the margin of Coravilla-Rakeen. However a welcome development is the Forest Environment Protection Scheme (FEPS) with its greater emphasis in establishing plantations that are more environmentally friendly.

Development - More recently, poorly-designed and localised one-off housing development, have resulted in deterioration in the quality and quantity of such habitats as wetlands and the loss of hedgerows, especially during the period of the ‘Celtic Tiger’ economy. Poorly designed and planned roads, quarries and landfill sites can also result in loss of habitat as well as cause a lowering of the water table in adjacent aquifers upon which wetlands such as fens and their associated species depend.

Physical modifications of waterways can impact on biodiversity either through direct loss of habitat or indirectly by affect the flow regimes of the waterway itself with a knock-on effect on wetland habitats and species. Examples of modifications include drainage of land or culverting of streams to facilitate development. Arterial drainage affects wetland sites away from the main river.

Invasive species – Invasive species can directly prey on our diversity of native flora and fauna, out-compete them for habitat or food, alter habitat or introduce pathogens or parasites. It is important that invasive species are controlled and eradicated early as they can be very costly and difficult to remove once they become established. The National Biodiversity Data Centre has produced a leaflet on the 39 most problematic plant species available for download at http://invasives.biodiversityireland.ie/wordpress/wp-content/uploads/NBDC-Invasive-Species-Booklet-Final.pdf.

Typical species affecting wetlands include rhododendron *Rhododendron ponticum,* Japanese knotweed *Fallopia japonica* and Indian balsam *Impatiens glandulifera*. A black list of unwanted species is set out in the 2011 Natural Habitat Regulations. It is an offence to release or allow escaping, to breed, propagate, import, transport, sell or advertise such species. Transitional provisions will allow a reasonable period for people holding such animals or plants to dispose of them appropriately.

Shrubs such as rhododendron and cherry laurel *Prunus laurocerasus* have dense canopies that can shade out the native herb flora in semi-natural woodlands. These species are found in the woodlands of many of the oldest estates in Louth. Japanese knotweed *Fallopia japonica* is another aggressive invasive non-native plant that is now commonly seen along roadside verges in Louth forming dense stands of bamboo-like stems that shade out the native flora wherever it occurs. Some of these species can have severe impacts on human health such as giant hogweed *Heracleum mantegazzianum* or have devastating impacts on built structures such as Japanese knotweed. During the Louth Wetland Identification Survey 2012, the survey located the first site record in Louth for the invasive species *Nymphoides peltatus* near Greenore on the Carlingford Peninsula.

Common cordgrass *Spartina anglica* is a highly invasive species that is spreading over sandflats in Dundalk Bay. It grows in areas that are important feeding and roosting grounds for large flocks of wildfowl and wading birds which migrate here to overwinter. It is a major concern due to the loss of habitat for feeding and roosting. The birds spend the winter feeding on Eel-grass (*Zostera* beds) and on the rich supply of worms, shellfish and other invertebrates in the sediment. This food supply is lost as the common cordgrass spreads and smothers out the Eelgrass beds resulting in knock on effects such as the death of invertebrates. Waders are also likely to be affected by invasion as dense stands physically prevent their access to feeding areas. There are also problems with invasive species such as Pacific oyster *Crassostrea gigas* with the potential spread of slipper limpet *Crepidula fornicata* also requiring monitoring.

Dumping – wetlands in the county are still considered a convenient place to discard unwanted construction rubble, topsoil, white goods and general household waste smothering the native vegetation communities or resulting in nutrient enrichment resulting in shifts in species composition and abundance. Municipal waste has also been used to raise the height of land as part of reclamation of wet ground. Contaminants can leach from such waste into wetlands potentially having short and long-term effects on the characteristic wetland communities. The monitoring of this dumping to ensure there are no contaminants escaping into the aquatic system is expensive and therefore prevention is always better than cure.

Recreation – certain recreational activities are incompatible with the conservation of biodiversity. For example excessive access to some sites can lead to soil erosion and the loss of habitat. Breeding and overwintering birds can aklso be disturbed by Jet skis on lakes. Upland breeding birds for example in the Carlingford Mountains can be disturbed by quads and motorbikes and, possibly, cycling and walking on this discrete, small upland area. Loose dogs are believed to constitute a problem as well.

Climate change – summary predictions for temperature and sea level rise as a result of global warming have been modelled by the MONARCH project (Harrison et al., 2001; Berry et. al., 2007). Climate change impacts are hard to predict for example the response of invasive species to increased temperature in waters or the effect of changing rainfall patterns on wetland biodiversity. Climate change could potentially result in changes in the species composition and diversity of vegetation communities, and result in water level changes at lakeshore sites. Some populations of species with a northern distribution at the southern edge of their distributional range or mountain species at their lower altitudinal limit may die out. Climate change threatens many species such as bees especially habitat specialists as their habitats may disappear or change position too rapidly for the bees to adapt to the change. Much more research is required to elucidate responses by different species to global warming in Ireland.

Insensitive Management Practices – Insensitive restoration of heritage stone bridges by strengthening can result in the unintentional entombment or exclusion of roosting bats. Bat roosts in old hollow veteran trees can also be destroyed by felling and insensitive tree surgery.

Overgrazing – this removes surface vegetation leading to loss of the characteristic plant communities of conservation importance. A reduction in vegetation cover can also result in soil erosion with subsequent silting up of watercourses and possible adverse impacts on fish spawning grounds.

Undergrazing – some habitats such as semi-natural grasslands require traditional low intensity grazing if their conservation interest is not to be lost to encroaching scrub. Scrub can also result in excessive shade along rivers and streams resulting in loss of aquatic plants due to light exclusion. Fish populations also rely on the right balance between shade and more open well-lit conditions along watercourses. A number of wetlands have areas of wet woodland present, in particular on their margins. In some cases this wet woodland development may mainly be due to natural colonisation by Willow and Alder. However the spread of such woodland areas over a site may also be an indication of hydrological conditions that favour the spread of woodland at the expense of fen communities. It may be necessary to monitor the changing status of wet woodland areas, and where these threaten the long term survival of open fen areas, some degree of scrub removal or a suitable grazing regime to halt the woodland spread may be need to be considered in relation to the future management of these sites.

Turbary – Turbary is the right of private individuals to cut turf for domestic use. This has been carried on for centuries in rural areas of Ireland. Since the 15th century traditional turbary has been responsible for the loss

of 544,000ha of raised and blanket bogs or 46% of the original peatland area in the Republic of Ireland (Source: IPCC Conservation Plan 2005). Drainage preceding peat cutting results in destruction of the hydrological integrity of the bog. The characteristic peatland communities are also permanently removed during peat cutting operations. More recently mechanised extraction has become the norm with the use of chain cutter, hopper and milling machines. One positive development has been the new 'Planning and Development Act, 2000 in which turbary on all bogs is no longer regarded as an agricultural activity outside of planning control. The Irish Peatland Conservation Council (IPCC) published a new action plan entitled *Ireland's Peatland Conservation Action Plan 2020 – halting the loss of peatland biodiversity* during 2009. The aim of this plan is to develop a national strategy for the conservation and management of all peatland types in Ireland.

Impact of Shellfisheries - It is suspected that there are serious problems with shellfisheries in Carlingford Lough (CL) SAC/SPA/pNHA in relation to bottom trawling of mussel spat. This industry is unsustainable and has been collecting mussel spat from the southern end of Dundalk Bay to transfer into Carlingford Lough. In addition, Dundalk Bay has had a big issue with cockle dredging although this may now have been solved.

Burning - In the Carlingford Mountain SAC Illegal burning of moorland has been a big problem as well. The Fire Service has tried to work with local farmers to address this but only in a casual and *ad hoc* manner.

7. Actions and Projects to Enhance Biodiversity and Raise Awareness

7.1 The Role of the Different Stakeholders in Protecting and Enhancing Biodiversity

Louth Local Authorities

Louth County Council has a key role in delivering biodiversity in the county through its many roles and functions from monitoring our water quality to the cutting of our road verges. The planning system has a particularly important role in the protection of important sites, landscapes and habitats, especially through County Development Plans. While site protection policies can protect designated sites, it is just as important for plans to seek to protect biodiversity outside these areas. The Louth County Development Plan 2013-2019 includes a number of policies aimed at protecting and enhancing biodiversity.

The County Louth Heritage Plan and Forum

Louth Heritage Office is responsible for the development and implementation of the County Louth Heritage Plan, County Louth Biodiversity Action Plan and the conservation of protected structures. The position of Heritage Officer and the implementation of the Heritage Plan is jointly funded by the Heritage Council and Louth County Council. Each year a number of heritage projects are undertaken.

The Heritage Office acts as the secretariat for the County Louth Heritage Forum, which advises on the implementation of the Heritage Plan. The forum is a multi-stakeholder body and consists of elected members, statutory and non-statutory agencies, community and voluntary groups and Louth County Council staff. The County Louth Heritage Plan (2007-2011) outlines the priorities for heritage over the life of the plan.

National Parks & Wildlife Service (NPWS)

Part of the Department of the Environment Heritage and Local Government, the NPWS is responsible for the conservation of a range of habitats and species in Ireland, including through the appropriate designation and protection of NHAs, SPAs and SACs. They also have responsibility for the management of Statutory Nature Reserves.

Teagasc

Teagasc is the national body providing research, advisory and training to the agriculture and food industry and rural communities. The main impact of Teagasc on biodiversity in Louth is through the management of the Rural Environment Protection Scheme (REPS), and also the Forest Environment Protection Scheme (FEPS). These enable farmers to be paid for environmental options in managing farmland and private forestry. However, on 9 July 2009 the REPS 4 scheme was closed by the Department of Agriculture Fisheries and Food to new applicants.

The FEPS scheme is a forestry grant scheme for REPS farmers. It encourages farmers to establish and maintain high nature value forestry through measures such as increasing biodiversity and protecting water quality'. Producing commercial timber is also listed as an objective of FEPS but the strong emphasis is on

the environment. Farmers planting under FEPS will have to adhere to 12 mandatory measures. These relate to areas of biodiversity enhancement, setback from boundaries, archaeology, species mix, fertiliser application, vegetation control, road planning and a requirement to attend a woodland course. Other measures are optional; 6 are chosen from a menu of 20 options. These concentrate on biodiversity, species mix, environmental impact and visual considerations and habitats. Among the 20 are providing deadwood for invertebrate, creating wildlife corridors and increasing setback distances from roads.

Forest Service
The Forest Service is responsible for ensuring the development of forestry within Ireland in a manner and to a scale that maximises its contribution to national socio-economic well-being on a sustainable basis that is compatible with the protection of the environment. It is responsible for grant aid for private forestry as well as the development of FEPS (see above) and has potential to have a significant influence on biodiversity.

Inland Fisheries Ireland (IFI)
Inland Fisheries Ireland (IFI) the state agency responsible for the protection, management and conservation of Ireland's inland fisheries and sea angling resources. IFI was formed on July 1, 2010 following the amalgamation of the Central Fisheries Board and the seven Regional Fisheries Boards into a single agency. Ireland has over 74,000 kilometres of rivers and streams and 128,000 hectares of lakes all of which fall under the jurisdiction of IFI.

Coillte
Coillte is a semi-State owned company operating primarily in forestry, and has responsibility for around ha of Louth’s commercial forested area. Coillte is committed to the Forestry Stewardship Council (FSC) certificate, which means that the timber it produces can be guaranteed to be from sustainable sources. In order to maintain this certificate, Coillte has committed to manage 15% of its properties for biodiversity.

Others
Many other organisations, NGOs and communities have an impact on biodiversity in Louth, from organising surveys to monitoring sites carrying out important conservation work.

Bat Conservation Ireland

Charity dedicated to the conservation of Ireland's bats. It promotes conservation of bats by disseminating educational materials, giving talks and leading bat walks, carrying out nationwide surveys and monitoring of bats. In 2007, a pilot scheme for monitoring woodland bats was carried out by Bat Conservation Ireland supported by the National Parks and the National Parks and Wildlife Service of the Department of the Environment, Heritage and Local Government (Roche and Aughney, 2007). Bat Conservation Ireland also carried out a car-based monitoring scheme between 2006 and 2007 again supported by National Parks and Wildlife Service of the Department of the Environment, Heritage and Local Government (Roche et al., 2006, Roche et. al., 2007). Brown long-eared bats *Plecotus auritus* roost monitoring was also monitored in 2007 (Aughney and Roche, 2007).

BirdWatch Ireland

BirdWatch is engaged in a series of surveys of many of our scarcer breeding birds – red grouse *Lagopus lagopus hibernicus* and hen harrier *Circus cyaneus* are among those for which we now have a much better understanding of their status and needs.

Botanical Society of the British Isles

This voluntary organisation of both amateur and professional botanists has been meticulously recording our plant life since 1826. Each county including Louth has a plant recorder that encourages and co-ordinates plant recording in their assigned county.

Irish Peatland Conservation Council (IPCC)

The mission of the IPCC is to conserve a representative sample of living intact Irish bogs and peatlands for the benefit of the people of Ireland, and to safeguard their diversity of wildlife.

7.2 Previous Actions and Projects to Enhance Biodiversity and Raise Awareness

A BAP for Louth was produced covering the period 2008-2012. This outlined a series of objectives and accompanying actions to conserve and enhance and create awareness about Louth's biodiversity. Over the life of this plan, a number of objectives and actions within the plan were achieved or are in progress through a partnership of Louth County Council, statutory government agencies, landowners and community and voluntary sector. These are presented in **Appendix 6.**

7.3 Priority Objectives and Actions for Louth Habitats and Species

Identifying habitats in need of action

An analysis on the pressures and issues facing different habitats in County Louth was undertaken in formulating the actions in this plan. The actions, therefore reflect the importance and urgency needed to take action for different habitats. A Biodiversity Action Plan seeks to reconnect us and our decisions with the natural environment, taking account of what is most important in a local context.

Identifying species in need of action

As with many counties, information is often lacking on the distribution and needs of important species in Louth. In many cases, the most pressing issue is to find out about the status of habitats and species building on information in habitat and species surveys to date in the county so that appropriate priorities for action can be set

Identifying areas of high importance for biodiversity

Biodiversity is not just confined to nature reserves and nationally important designated sites. It can be found in areas, large or small, in urban and rural settings. An important part of a Biodiversity Action Plan is to take action to help understand, appreciate and help our wider biodiversity. Another important issue, however, is to acknowledged that there are a number of areas that are particularly important for biodiversity in a county context, but may not make it to designation at a national level. It is important that these areas are given an appropriate level of recognition and protection through Local Authority functions. Agreeing and implementing the best way of identifying and protecting these areas is a key action in the plan.

Filling gaps in knowledge on biodiversity

There are many areas in which we do not know enough about our biodiversity in order to help conserve it. Determining gaps in knowledge is an important step in deciding appropriate action for biodiversity.

The more well-studied plant and animal groups tend to be the most charismatic groups of popular appeal (e.g. birds, mammals and flowering plants) with relatively few species that are often more easily identified. In addition the extent and distribution of a number of key habitats remain under-surveyed including wet and dry heaths, and hedgerows. In addition the survey of lakes in the County has been piecemeal in extent and level of detail depending on the survey objectives. Other neglected habitats include quarries, railways, parkland and veteran trees. Many of the actions in this plan aim to address knowledge gaps relating to Louth's biodiversity. Taking account of the above issues, the objectives for this review of the Louth BAP are presented in **Appendix 7.**