# AUDIT OF BIOLOGICAL DATASETS
# ROSCOMMON COUNTY COUNCIL

County Roscommon
Heritage Forum

Fóram Oidhreachta
Chontae Ros Comáin

An Chomhairle Oidhreachta
The Heritage Council

Prepared by:

MERC Consultants
environmental and conservation services

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## Acknowledgements

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Contents

# Executive summary

As a requirement of international legislation, Ireland has produced a National Biodiversity Plan that sets out actions and methods of implementation for the conservation of Ireland's biodiversity. As part of this plan local authorities are required to prepare Local Biodiversity Plans in consultation with the relevant stakeholders. In order to prepare such plans information pertaining to the natural heritage of the county is essential. This study has collated natural heritage datasets relating to County Roscommon from a wide variety of sources contained in published and unpublished sources, including books, reports and scientific papers containing information relating to the ecology and biodiversity of the county. Further to the collation of these data, gap analysis was carried out to establish areas within the county where data was lacking or otherwise on various habitats and species. The report provides conclusions and recommendations for future work within the county to address any gaps in the knowledge identified.

A database of biological records relating to County Roscommon forms the main part of this project. This database currently contains 203 records. Each record provides information on the type of research carried out, the reasons for the study, a brief description of the study, the habitats and species investigated and information relating to the accessibility and ownership of the dataset.

Subsequent gap analysis of the dataset is provided in the form of summary statistics on both the habitats and species recorded. General conclusion and recommendations for future work to address gaps highlighted are presented.

The main findings of this report include the following strengths and weaknesses in relation to habitat information for County Roscommon:
There is a good level of information relating to:

- Peatlands, especially raised bogs,
- Lakes and ponds including turloughs
- Semi-improved grassland.
- Woodlands including Semi-natural woodland

There is a poor level of information relating to

- Rivers and streams outside of designated areas
- Highly modified non-native woodland

The main findings of this report include the following strengths and weaknesses in relation to species information for County Roscommon:
There is a good level of information relating to:

- Wetland breeding birds
- Vascular plants, lower plants and trees within designated areas

There is a poor level of information relating to:

- Freshwater and terrestrial invertebrates
- Vascular plants and lower plants outside designated areas
- Bats

The following general conclusions are made:

- With the exception of surveys conducted by the National Parks and Wildlife Service very little biodiversity research is conducted in Co. Roscommon.
- Given the number of rivers and streams in the county little information on these habitats is available outside of designated areas.

The following general recommendations are made:

- Surveys of species and habitats of conservation importance, outside of designated sites and known to occur in Co. Roscommon should be conducted (e.g. Bats, terrestrial and freshwater invertebrates, birds - other than wetland breeding birds).
- Biodiversity hotspots in the wider county side should be identified and mapped.
- While encouraging the on-going research into habitats and species of national and EU importance, also encourage studies and inventories of other habitats and species that are poorly known.
- The database should be kept up to date by entering data related to Environmental Impact Assessments as they become available.

Roscommon County Council should seek to address the basic information gaps in relation to the following habitats and species for which there is little or no information available Habitats:

1. Rivers and streams
2. Highly modified non-native woodland

Species:

2. Terrestrial and freshwater invertebrates.
3. Birds – other than wetland breeding birds
4. Bats

# 1 Introduction

The Convention on Biological Diversity (CBD) was negotiated under the auspices of the United Nations Environment Programme (UNEP) at the 1992 Earth Summit in Rio de Janeiro. The CBD was signed by Ireland in 1992 and ratified in 1996.

The CBD reaffirmed that the responsibility for achieving its goals rests primarily with the individual countries that ratified the agreement. The CBD also reaffirmed that states are responsible for conserving their own biological diversity and for using their biological resources in a sustainable manner. The main provisions of the CBD are goals and policies rather than specific tasks, and each contracting party has the right to formulate its own national policy within the guidelines of the CBD. Within the CBD a programme known as Agenda 21 sets out the actions to be taken globally, nationally and locally by organisations and governments in every area in which humans impact on the environment and its sustainable development. In this respect Ireland was bound to develop a national strategy on biodiversity conservation, as outlined in article 6a of the CBD. Ireland's National Biodiversity Plan launched in April 2002 provides for this requirement.

The preparation of Local Biodiversity Action Plans is part of the overall process that the government has initiated to fulfil its international obligations under the CBD. Generally Local Biodiversity Action Plans are a complementary component of Local Heritage Plans prepared by each local authority.

Without the relevant information relating to the current status of the natural heritage within the local authority area, the preparation of Local Biodiversity Plans is extremely difficult, if not impossible. The collation and accessibility of such data has been the subject of recent attempts by a number of government departments and agencies; including the Heritage Council and the National Platform for Biodiversity Research - under the auspices of the Environmental Protection Agency and the National Parks and Wildlife Service. The current Framework for a Biodiversity Research Programme for Ireland[1] reiterates the need for a central database of all biodiversity research in Ireland. The need for a database for all biodiversity research carried out within Ireland stems from the need to perform gap analysis on the current research so that informed policy decisions can be made. The process of setting up a Biodiversity Records Centre has already been initiated. However, it will be some time before this facility if fully functional and in the interim it has proved essential that local authorities access and collate information on local biodiversity record sets so that the process of preparing Local Biodiversity Plans can be completed.

The aims of this project included:

- The creation of a bibliography of all natural heritage datasets included in published information including books, reports and papers containing information pertaining to the ecology of County Roscommon.

- Identification and inclusion of datasets included in unpublished information including that contained in Environmental Impact Statements, under-graduate and post-graduate theses, reports and datasets held by Government organisations, non-governmental

[1] Framework for a Biodiversity Research Programme for Ireland (2005). A report by the Irish National Platform for Biodiversity Research.

organisations, educational institutes, environmental consultancies and individual recorders, both within and outside Ireland, as relevant.

- Consultation with all holders of national datasets, to ensure that all relevant information for the county was included. An estimation of the relevance of the datasets to the county was required.
- Analysis of the dataset for the county, identification of strengths and gaps in area, habitat and species knowledge, and recommendations for priorities in future work.

This project has achieved the aims outlined above by the production of a database containing metadata pertaining to biological datasets available for County Roscommon and the subsequent gap analysis of this data. Recommendations for priorities for future work were made following examination of the gap analysis.

# 2. Methods

## *2.1 Information gathering*

A full list of all sources consulted is given in Appendix 1. The approach taken and certain caveats to information gathering are listed under each of the categories below.

### 2.1.1 Approach to data sourcing

In general relevant organisations were contacted and the aims, objectives and reasons for this audit were explained. In some cases a data capture spreadsheet designed by the National Platform for Biodiversity Research was used to gather information. In many other cases information was gathered by site visits to repositories of data (e.g. University libraries, ENFO, Local Authorities etc). Web based searches of suitable on-line catalogues and web sites were consulted. In addition much of the information was obtained through telephone conversations with the organisation in question that subsequently provided data by telephone, email or forwarding relevant documentation by post.

### 2.1.2 Caveats to information gathering

**Non-Government Organisations**

All relevant NGO's (listed in Appendix 1) in Ireland were contacted by telephone, branches where possible were contacted by e-mail. The aims of the project were discussed with the NGO and any relevant data was provided by telephone if possible. In many cases NGO's provided documentation containing information on datasets. In some cases NGO's were unwilling to release full datasets and provided summary data instead.

**ENFO**

Local Authorities are required to provide copies of all Environmental Impact Statements (EIS's) to ENFO. ENFO enter basic information relating to each EIS into a database that is available to download as a PDF file at http://www.enfo.ie/Library_Database_Files/EIS%20Inventory.pdf. The full content of all EIS's are also scanned by ENFO into a database. This database is available to view fully at the ENFO offices in Dublin. It should be noted that although the requirement to provide EIS's to ENFO lies with the local authority it has been found that in some cases the information is either not provided in a timely manner or has been omitted. While ENFO makes every effort to obtain information from the local authority the ultimate responsibility lies with the local authority and omitted EIS files can lead to gaps in the ENFO database.

After 2000 only four EIS's for Co. Roscommon are lodged with ENFO. In general the level of information contained within the EIS's was poor and of little ecological value. Where an EIS alluded to habitats or species but did not contain inventories of species or habitats the EIS was entered into the database with a note in the description section outlining that there was limited biological information contained.

**Theses**

Contact was made with the secretary of the relevant departments in each third level institute. However, few departments had lists of the theses that they produced. The main source of information was library catalogues accessed through websites. These catalogues do not list

undergraduate theses and so institutes were visited to access this information. Using the library catalogue and a keyword search, relevant postgraduate theses were located and the relevant information obtained. However, in some cases even when a title was listed in the catalogue the actual copy of the thesis was missing from the library and was therefore not available for consultation. In addition University College Cork maintained that undergraduate thesis were effectively exam material and therefore would not be available for consultation. In these cases only the title of the thesis was made available

**Local contacts**
Individuals and organisations involved in collecting biological data at a county level were contacted by phone and e-mail.

**Additional (non datasets)**
Additional sources of information not strictly considered as datasets, were included in the search. For example all of the site synopsis for designated areas (Special Areas of Conservation, Natural Heritage Areas and Special Protection Areas) were included in the database. It was considered the inclusion of such information would be necessary to fully ascertain the biodiversity of the Co. Roscommon and would provide a useful source of information for users of the database.

**Data relevance**
For each dataset, an estimation of the percentage relevance of the dataset to the county is given. If a dataset related solely to the county it was recorded as 100% relevant. In some cases it was necessary to estimate the number of records pertaining to the county, particularly for very large national datasets that were not stored in a searchable format. In the case of national datasets, where only a proportion of the total dataset related to the county, an estimation of its relevance is given. For example, Co. Roscommon represents approximately 3.5% of the total land mass of Ireland, so if a national dataset included an equal spread of records across the country with Co. Roscommon being equally represented, a figure of 3.5% was applied. If a national dataset contained less information relating to the county, because the dataset was incomplete in relation to the county, then a lower figure was applied. If a dataset contained a slightly higher proportion of data for the county then the national average then a higher figure was applied.

This decision was taken following consultation with staff of the National Parks and Wildlife Service who are the managers of most of the national datasets referred to in this audit.

## *2.2 Creation of a database*

A database, to hold all data collected during the information gathering stage of the project, was created in Microsoft Access 2000®. This database was designed in a very simple format to provide a user-friendly front end that would allow the database to be updated as required with minimal effort or knowledge of databases. The database contains only one form, from which data can be entered. A series of simple query options are provided on the main switchboard of the database to allow records to be found by searching for either a project title name, Data owner, data holder, site name, project start date, species or a habitat. This query option could be expanded upon at any stage in the future to allow a search based on any fields or combination of fields contained within it.

Because all datasets did not provide a Fossitt habitat classification code it was sometimes necessary to assign a Class. In such cases the higher-level classification was used e.g. FW: Watercourses. To fully search the database for all levels within the Fossitt classification system

it is necessary to search under each individual habitat class (e.g. FW, FW1, FW2, FW3 and FW4). Further information on how to use and search the database is provided through the main entry switchboard within the database.

The fields provided in the database (see Appendix 2) mirror those fields contained with the Heritage Councils metadata database. However, it also contains many more additional fields that were felt necessary in order to fully query the dataset and provide a useful format for gap analysis. All entry fields are non-compulsory, with the exception of the project title field. This allows only a subset of the fields to be completed if required, as many fields will not relate to all datasets.

## *2.3 Data entry*

Data was entered into the database following examination of the relevant datasets. The fields indicated (see section 2.2 above) were completed as fully as possible. However, all fields were not relevant to each dataset and in some cases the required data was not available to complete the data entry form fully.

**Habitats**

Throughout this project the habitat classification scheme of Fossitt (2000) was used. If a dataset did not provide a habitat code according to Fossitt, the relevant code was provided following examination of the dataset. The full Fossitt Habitat Classification System is provided in Appendix 3. Where a particular habitat rather than a species, was the main focus of the dataset, only the habitat was entered. Habitats listed under Annex 1 of the EU Habitats Directive were also included as a separate field within the database.

**Species**

In the case of species, a broad species term was generally used to describe the data. The terms used were similar to those provided by the Heritage Councils metadata database, for example if a dataset contained an inventory of wetland wintering bird species the term "Birds: Coast and Wetland wintering" would have been used, as to list all species would not have been practical. However, if a dataset contained less than 5 species, a full species listing was generally entered. A separate field was provided for species of conservation importance, including those protected under national or EU legislation or species of known conservation importance e.g. Red Data Book species, Flora Protection Order etc. The broad species groups used are provided in Table 1.

Table 2.1: Broad species groups

| Broad_species_Group | Broad_species_Group |
|---|---|
| Amphibians and Reptiles | Plants: Fungi |
| Annelids: Oligochaetes and Leeches | Plants: Trees |
| Arachnids: Spiders, ticks, mites and scorpions | Plants: Vascular plants (excluding trees) |
| Arthropoda: Centipedes and Millipedes | Protozoa |
| Birds: Coast and Wetland breeding | |
| Birds: Coast and Wetland wintering | |
| Birds: Farmland breeding | |
| Birds: River breeding | |
| Birds: Summer breeding (migratory) | |
| Birds: Upland breeding | |
| Birds: Woodland breeding | |
| Freshwater: Fish | |
| Freshwater: Macroinvertebrates | |
| Freshwater: Mollusca | |
| Insects: Coleoptera | |
| Insects: Diptera | |
| Insects: Hemiptera | |
| Insects: Hymenoptera | |
| Insects: Lepidoptera | |
| Insects: Odonata | |
| Insects: Other insect orders | |
| Mammals: Bats | |
| Mammals: Carnivores | |
| Mammals: Deer | |
| Mammals: Insectivores | |
| Mammals: Rabbits, Hares and Squirrels | |
| Mammals: Rodents | |
| Mammals: Seals | |
| Mammals: Whales and Dolphins | |
| Marine: Algae | |
| Marine: Arthropods | |
| Marine: Chordates (other than fish) | |
| Marine: Cnidaria and Ctenophora | |
| Marine: Crustaceans | |
| Marine: Echinoderms | |
| Marine: Fish | |
| Marine: Foraminifera | |
| Marine: Mollusca | |
| Marine: Porifera | |
| Marine: Worms | |
| Molluscs: Snails and slugs | |
| Plants: Bryophytes, lichens and liverworts | |

## *2.4 Gap Analysis*

Following complete population of the database a series of queries were carried out to provide an estimate of the number of datasets for each habitat or species group included in the database. However, knowing the number of datasets pertaining to a particular species or habitat does not provide an accurate estimation of the real value of the data. For example, some datasets are not fully relevant to the county and treating them, as 100% relevant will provide inaccuracies. Therefore, following query analysis on the full database additional data mining was carried out on each habitat or species group to assess the real value of particular habitats or species that appeared to have a high number of datasets for the county. In this way a more accurate estimation of true gaps in the biodiversity knowledge for the county could be made. This was carried out by examining the records for each habitat or species category to ascertain the value of the record as a measure of the knowledge of that habitat or species for the county.

In addition, data from certain surveys e.g. the Irish Wetland Bird Survey (IWEBS) and the Waterways Bird Survey is provided as an individual record for each site where records were available for the county within the database. However, the entire IWEBS and Waterways Bird Survey dataset were included as one record in the gap analysis. Caveats to explain the results of the data analysis are provided in section 3.

# 3 Results

## *3.1 Habitats studied (By Fossitt Classification system)*

**Figure 3.1. Number of datasets recorded within each habitat type studied.**

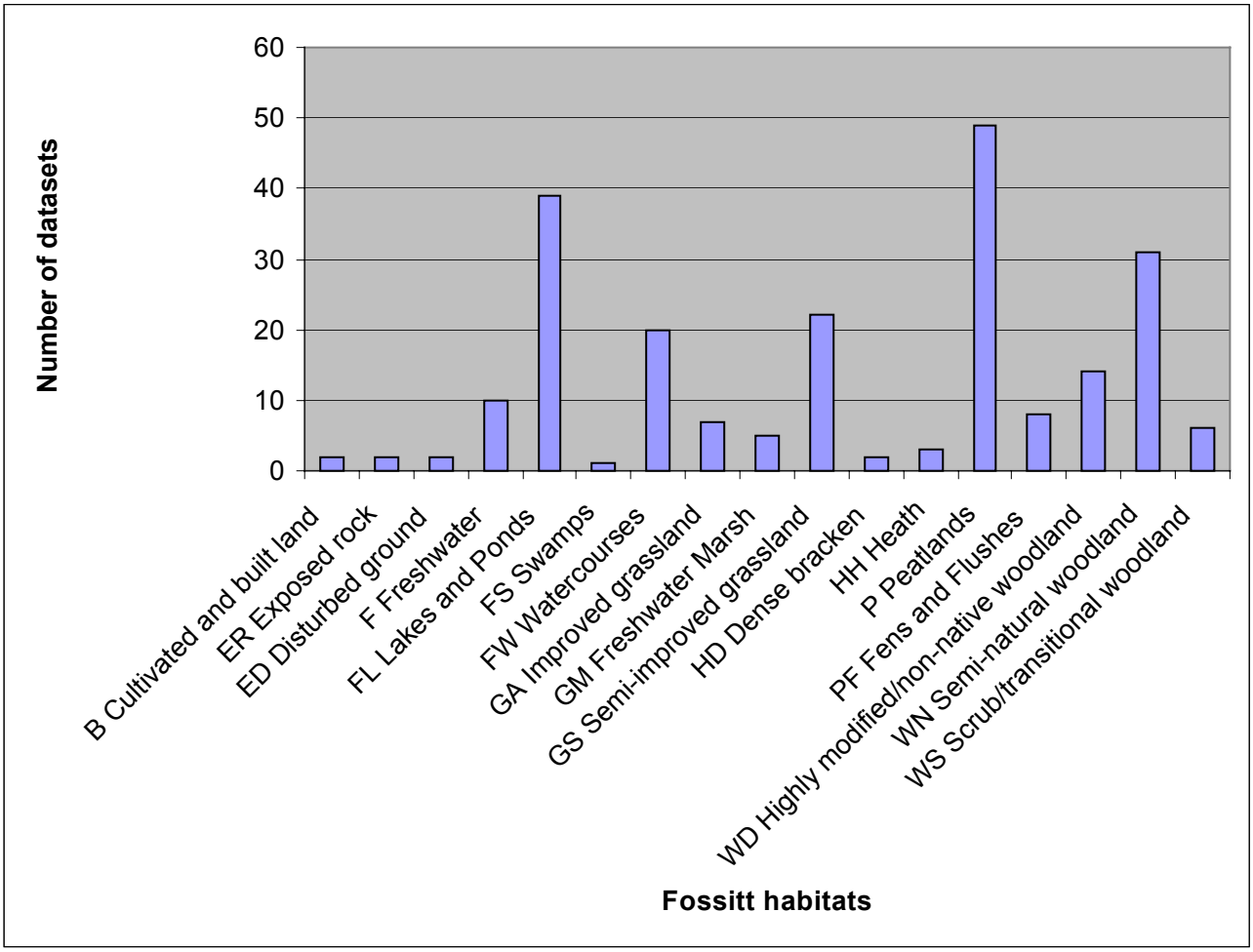


Figure 3.1 indicates the number of datasets contained within the database for each Fossitt habitat category that information was available for within the County Roscommon. It should be noted that a dataset may contain more than one record for an individual habitat and this analysis was carried out on datasets rather than individual records. Appendix 4 provides a more detailed breakdown of all "class 3" Fossitt habitat categories for which data was available. In cases where the dataset did not provide an obvious habitat classification the broader Fossitt habitat category was used. For example, if a dataset related to P: Peatlands, but the peatland type was not specified that habitat was listed as P: Peatland.

The main strengths of the dataset include information relating to habitat classes P Peatlands, WN Semi-natural woodland and FL Lakes and Ponds. The habitat classes GS Semi- improved grassland and W Watercourses had a reasonable amount of available information (See notes below).

P Peatlands

The majority of data relating to peatlands referred to raised bogs within designated sites. One additional dataset, provided by the Irish peatland Conservation Council, indicated a large number of peatland areas outside of designated sites. These areas consisted of a wide range of

peatland types, including fens, raised bog and cutover bog. The data suggests that the range and location of peatlands in Co. Roscommon is well documented.

FL Lakes and Ponds

The majority of data in this category related to turloughs, limestone marl lakes and mesotrophic lakes.

FW Watercourses

Although FW Watercourses appeared to score as a highly studied area much of the data relating to watercourses related rivers within designated sites and little information is available for rivers or streams outside of designated areas.

GS semi-improved grassland

A systematic survey of grasslands in Co. Roscommon during the summer of 2007 by the National Parks and Wildlife Service has provided a highly useful dataset relating to this resource. This study, which systematically surveyed semi-natural grassland and heath of biodiversity value has greatly increased the amount of information relating to this habitat. Figure 3.1 indicates approximately 20 datasets were sourced for this habitat but the addition of the 2007 survey has greatly increased the knowledge of this habitat in Co. Roscommon.

W Woodland and scrub

As a result of the Native Woodland survey and the Native Woodland scheme most counties in Ireland, including Co. Roscommon are well studied in relation to this habitat. In addition, a number of woodlands of conservation value in County Roscommon are within Special Areas of Conservation or Natural Heritage areas and therefore data is available for them. The Co. Roscommon Hedgerow survey has also greatly contributed to the knowledge of this habitat within the county.

## *3.2 Habitats studied (Designated under Annex 1 of the EU Habitats Directive.)*

Table 3.2 indicates habitats designated under Annex I of the EU habitats Directive for which there were records in County Roscommon. All of these habitats are included within the Fossitt Classification system shown in Figure 3.1 and do not indicate additional records but indicate the level of data available for designated habitats in County Roscommon. All of the habitats recorded here are within Special Areas of Conservation.

Table 3.2: EU Habitats Directive Annex I habitats for which data was sourced

| EU_Annex 1 habitats | Number of datasets |
|---|---|
| Active Raised Bogs (Code 7110) | 22 |
| Alkaline fens (Code 7230) | 2 |
| Alluvial Forest (Code 91e0) | 4 |
| Blanket Bog (Active) (Code 7130) | 4 |
| Bog Woodland (Code 91d0) | 7 |
| Calcareous Fens with Cladium mariscus (Code 7210) | 1 |
| Degraded raised bogs still capable of natural regeneration (Code 7120) | 5 |
| Depressions on peat substrates of the Rhynchosporion (Code 7150) | 5 |
| Hard Oligo-Mesotrophic Waters with Benthic Vegetation of Chara Spp. (Code 3140) | 4 |
| Juniperus communis Formations on Heaths or Calcareous Grasslands (Code 5130) | 1 |
| Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis) (Code 6510) | 2 |
| Molinia meadows on calcareous peaty or clayey-silt-laden soils (Molinion caerulae) (Code 6410) | 1 |
| Natural Eutrophic Lakes (Code 3150) | 1 |
| Old sessile Oak woods with Ilex and Blechnum (Code 91A0) | 2 |
| Rivers with Muddy Banks with Chenopodion rubri p.p. and Bidention p.p. Vegetation (Code 3270) | 1 |
| Semi-Natural Dry Grassland and Scrubland Facies on Calcareous Substrates (Code 6210) | 2 |
| Species-Rich Nardus Grasslands, on Siliceous Substrates in Mountain Areas (Code 6230) | 3 |
| Transition mires and quaking bogs (Code 7140) | 1 |
| Turloughs (Code 3180) | 12 |

## *3.3 Species studied*

**Figure 3.3. Number of records recorded within each broad species group**

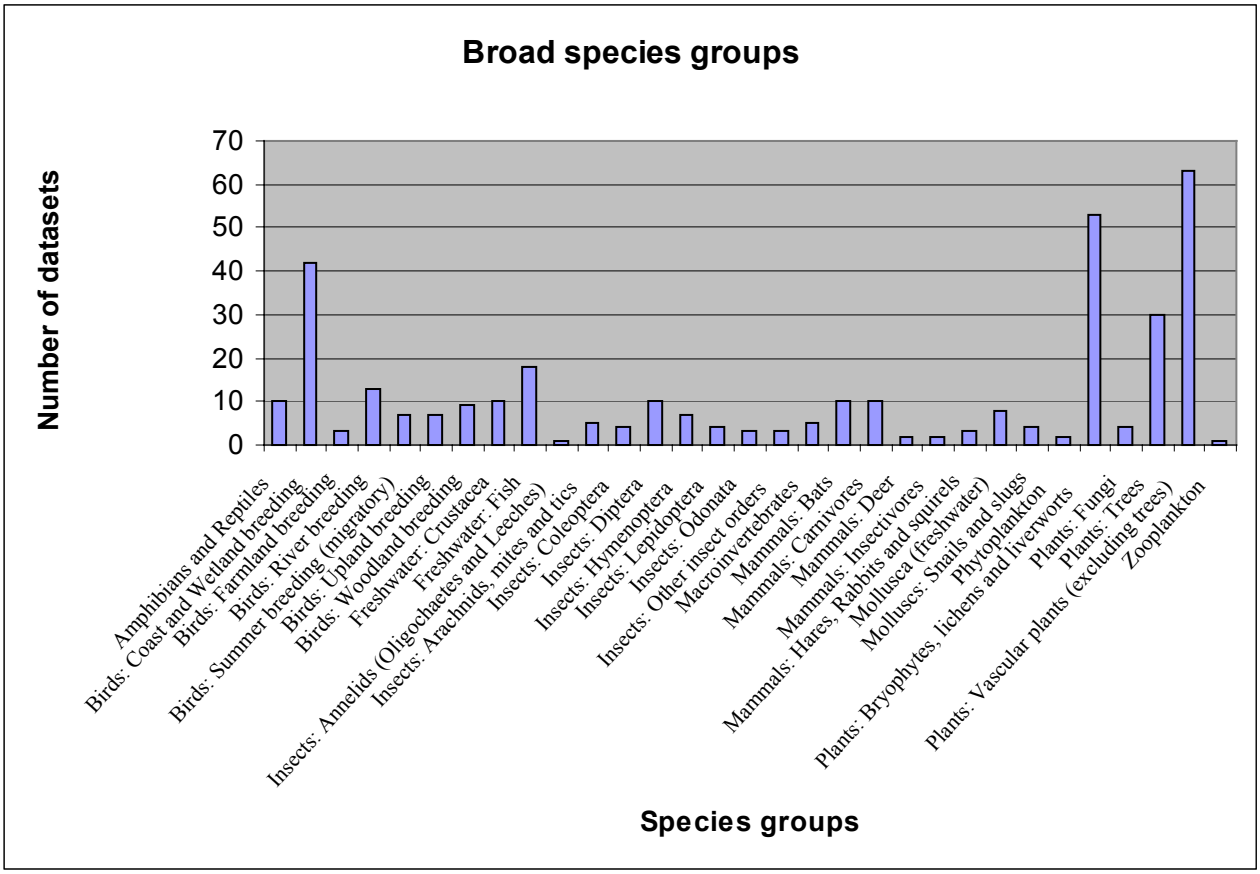


Figure 3.3 indicates the number of datasets contained within the database for each broad species group. A particular dataset may contain more than one record for a particular species and it should be noted that this analysis was carried out on datasets rather than individual records within a dataset. Figure 3.3 indicates that the species groups, Vascular plants (except trees), Trees, Lower plants and wetland breeding birds are best represented in the dataset. More detailed examination within the individual species groupings indicated the following:

- The majority of information on terrestrial mammals relates to otters and hares. While figure 3.3 indicates a low level of information for both of these species, systematic surveys of the county, as part of a larger national datasets indicates that there is a good level of data available for these species.
- The high level of information for trees, vascular plants and bryophytes, lichens and liverworts is a result of National surveys of habitats such as woodlands and peatlands and research carried out by third level institutions and relates mainly to these species occurring within designated areas.
- There is a low level of information relating to almost all other species groups including freshwater fish, invertebrates (both freshwater and terrestrial) and birds, other than wetland breeding birds.

### *3.4 Species of conservation importance*

A list of species considered to be of conservation importance is provided in Appendix 5. Species of conservation importance were selected if they were included under, Annex II or IV of the EU Habitats Directive, The EU Birds Directive, The Flora Protection Order 1999, Irish Red data books or the Irish Wildlife act 1976 and Wildlife amendment act 2000.

# 4. Conclusions

Roscommon's landscape of rivers, lakes, mountains and semi-natural grassland provides for a rich diversity of habitats of high biodiversity value. However the majority of biological datasets reflect the work of the National Parks and Wildlife Service within designated areas and there is little information on biodiversity hotspots outside of designated areas, with the exception of some national surveys such as the native woodland survey and the Irish hare and squirrel survey. Additional recent studies such as the Roscommon hedgerow survey and the National Parks and Wildlife grassland survey are two of the few surveys that have contributed to the wider knowledge of the county side outside of designated areas. This is, however, a pattern reflected across much of Ireland, where both government agencies and third level institutes concentrate their research efforts and surveys within designated areas, primarily because this is where opportunities for funding lie. While this information is highly important for the conservation of these areas it leaves a basic gap in our knowledge of other habitats and species that may become vulnerable in the future.
Increasingly, calls are being made at EU level[2] for research efforts to identify areas of conservation value in the wider countryside, outside of the NATURA 2000 network.

Current estimates indicate that approximately 60% of the land in Co. Roscommon is marginal and this area is largely comprised of either mountains and hills or wet lowlands, and peatlands. Habitat mapping of Co. Roscommon would greatly facilitate future baseline surveys, outside of designated sites. Such surveys can act as an effective management tool for planning and future conservation efforts.

While a good deal of basic survey information is available for some habitats in Co. Roscommon (Semi-natural woodlands, Hedgerows, peatlands and lakes) and certain species (wetland breeding birds, vascular plants and trees) Many habitats and species in the county which do occur are poorly studied, in particular there is a lack of information on the location and biodiversity of river systems and their associated habitats and birds (other than wetland breeding birds) outside of designated areas.

In common with the rest of Ireland, the level of detail included in Environmental Impact Assessments is often weak. Frequently species inventories (even when carried out) are not included and habitat classifications are not based on the Fossitt (2000) habitat classification system. Valuable species and habitat information is lost when these inventories are not

[2] EU COM (2006): Halting the loss of biodiversity by 2010 - and beyond. Sustaining ecosystem services for human well–being: Technical Annex

included. In addition, it would save considerable time and resources on behalf of ENFO if full Environmental Impact Assessments were provided to them in electronic PDF format.

# 5. Recommendations

Detailed recommendations in relation to the natural heritage of Co. Roscommon are outlined below. In addition to these specific recommendations it has become clear through the collection and collation of the data contained within this report that the necessity for a central database of biological data is critical for the future management of biodiversity at both national and local levels. It is therefore recommended that local authorities, through their Heritage Officers and liaison with the Heritage Council be provided with the means to input recommendations and methods for ensuring that the Biodiversity Records Centre collects and collates information in a format useful for local biodiversity management. Specifically, the manner the data is held by the biodiversity Records Centre should provide for the query and extraction of information relating to individual counties.

In order for the local authority database to be kept up to date it would be necessary for it to be produced in an on-line Internet accessible format (such as that provided by the Heritage Council). Such a database would then require considerable administration as passwords to allow data entry would be necessary and data entry fields would need to be created with strict criteria attached to ensure complete and accurate population. It is recommended that the Biodiversity Records Centre provides a central service which may be a more cost effective method of ensuring that data relating to a particular county is kept up top date and accurate.

At a minimum the database that accompanies this report could be kept up to date by entering information from EIS's as they become available. In addition, while it may be difficult to encourage the relevant third level colleges to provide titles and abstracts of undergraduate and postgraduate projects, such a request to such institutes may be granted and should be sought. Such a process would be more likely to be successful if all local authorities provided a simple and efficient standardised format through which such institutes could provide this information in one single exercise.

Currently it is not possible to ensure that all holders of data provide information on their datasets to either the Biodiversity Records Centre or Local Authorities. However, the local authorities could make recommendations through their respective representatives to request that all national funding agencies and other institutes that provide funding do so on condition that the metadata from such projects is provided to the Biodiversity Records Centre.

Other incentives, which may encourage researchers who are not in receipt of funding to provide information on their datasets, could include the use of facilities of the local authorities such as access to data held by the local authority, including maps and Geographical Information System data.

The collation of biological datasets would also be greatly enhanced if local authorities requested that when Environmental Impact Assessments are carried out that the full species inventory (where appropriate) is included with the EIS.

Specifically, Roscommon Co. Council should:

- Request that when Environmental Impact Assessments are carried out that the habitats described are based on the Fossitt (2000) habitat classification system.
- Encourage universities to carry out research in areas that are poorly studied by providing some level of financial support (e.g. travel and subsistence) for such studies to undergraduate students embarking on their final year projects.
- Seek to become partners in large-scale biodiversity studies (examples of which are Ag-Biota, BioForest and BioChange). By becoming involved in such projects Roscommon County Council would be better placed to request such studies directly target either species or habitats that are poorly studied in the county. While the above projects may not be directly applicable to Co. Roscommon or are nearing completion, funding for large-scale projects normally comes on stream on an annual basis.
- Commission habitat maps of the county.
- Roscommon Co. Council, while encouraging the on-going research into habitats and species of national and EU importance, should also encourage studies and inventories of other habitat and species that are poorly known.

Roscommon Co. Council should also seek to address the basic information gaps in relation to the habitats and species outlined in section 3.1 and 3.2, that indicated that there was little or no information available on the following habitats or species, which is the context of the habitat and species diversity of Co. Roscommon should have more information available:
Habitats:

- Rivers and streams
- Mixed broadleaf woodland

Species:

- Birds (other than wetland breeding birds)
- Bats
- Freshwater and terrestrial invertebrates

# Appendices

## *Appendix 1: Sources consulted*

| | |
|---|---|
| **Government Agencies** | Coillte |
| | Teagasc |
| | National Parks and Wildlife Service |
| | National Botanic Gardens |
| | Environmental Protection Agency |
| | The Heritage Council |
| | Central Fisheries Board |
| | Natural History Museum |
| | |
| **Non-government organisations** | BirdWatch Ireland |
| | Irish Peatland Conservation Council |
| | An Taisce |
| | Irish Wildlife Trust |
| | Bat Conservation Ireland |
| | |
| **Third level Institutes** | University College Cork |
| | National University of Ireland Galway |
| | University College Dublin |
| | University of Limerick |
| | University College Maynooth |
| | University of Dublin, Trinity College |
| | Galway-Mayo Institute of Technology |
| | |
| **ENFO** | Environmental Impact Statements |
| | Environmental reports |
| | |
| **Others** | National Platform for Biodiversity Research |
| | Local contacts |
| | |
| | |
| **Publications** | Royal Irish Academy Publications |
| | Irish Naturalists Journal |
| | Irish Biogeography Society |
| | Irish Wildlife manuals |
| | |
| **Consultancies** | BEC Consultants Ltd |
| | EcoServe |
| | RPS |
| | |

| | |
|---|---|

## *Appendix 2: Database fields*

| Field Title | Field Description |
|---|---|
| Autonumber | Provides a unique identifier for the record |
| Title of Data | Name of research project, study, or publication |
| Principal investigator | Name of the individual that actually carried out the work, normally main researcher or leader of a large scale project |
| Percentage relevance of the dataset | Provide an estimation of the relevance of the dataset to the county, especially in the case of national datasets where only limited records apply to the county. |
| Owner/Manager of data | Person/organisation that commissioned the work or currently manages it. |
| Address data Owner/Manager | |
| Phone number of Owner/Manager of data | |
| Email address of Owner/Manager of data | Hyperlink field |
| Name of Holder of data | Where the data is currently stored if access is required. Often the same as field 5 |
| Address of Holder of data | |
| Description of data | Provides a brief description of what information is contained within the dataset. |
| Location of study site | The specific location of the study. This may not be available if the dataset relates to a larger area, such as All Ireland. |
| Townland | The name of the Townland to which the data relates if available. |
| Grid -easting | The grid reference (easting) of the study site if available |
| Grid- northing | The grid reference (northing) of the study site if available |
| Objective of research | E.g. Research, Inventory, management, EIS, etc. |
| Web address of data | Hyperlink field. If the dataset is online this filed should be completed. |
| Web address of further information | Hyperlink field. If other information relating to the dataset is available, such as research projects information. This field should be completed |
| Project start date | |
| Project end date | |
| Confidential report | Check box if the report is a confidential report |
| EIS | Check box if the report is an EIS |
| ER | Check box if the report is an ER |
| Planning Reference Number | County Council Planning application reference number |
| Management Plan | Check box if the report is a management plan |
| Postgraduate thesis | Check box if study is produced as a Post graduate thesis |
| Book | Check box if study is produced as a book |
| Report | Check box if study is produced as a report |
| If Book Name of Book/Report | If a book or report give name |
| Book Publisher | If a book or report give name of publisher |
| Scientific publication | Check box if study resulted in a scientific publication |
| Name of Scientific publication | If scientific publication, give full publication reference |
| ISBN | If publication has been assigned an ISBN number, provide the number |
| CD | Check box if results are available on CD |
| Web based | Check box if results are available on the World Wide Web |
| Other | Provide information on other methods of data storage |
| No published findings | Check box if the study has resulted in no publications of any kind |
| Paper storage | Check box, if the data is stored on paper |
| Electronic storage | Check box, if the data is stored electronically |
| No Storage | Check box, if the data is not stored anywhere |
| Data Availability on request to | Check if further information on the dataset is available from the data |

| | |
|---|---|
| holder | holder. |
| Data Availability on request to owner | Check if further information on the dataset is available from the data owner or manager. |
| Memo re-data-request | Notes relating to any difficulties with data requests. |

## *Appendix 3: Fossitt Habitat Classification*

| | | |
|---|---|---|
| **Non-Marine** | | |
| **F Freshwater** | FL Lakes and Ponds | FL1 Dystrophic lakes |
| | | FL2 Acid oligotrophic lakes |
| | | FL3 Limestone/marl lakes |
| | | FL4 Mesotrophic lakes |
| | | FL5 Eutrophic lakes |
| | | FL6 Turloughs |
| | | FL7 Reservoirs |
| | | FL8 Other artificial lakes and ponds |
| | FW Watercourses | FW1 Eroding/upland rivers |
| | | FW2 Depositing/lowland rivers |
| | | FW3 Canals |
| | | FW4 Drainage ditches |
| | FP Springs | FP1 Calcareous springs |
| | | FP2 Non-Calcareous springs |
| | FS Swamps | FS1 Reed and large sedge swamps |
| | | FS2 Tall herb swamps |
| | | |
| **G Grassland and Marsh** | GA Improved grassland | GA1 Improved agricultural grassland |
| | | GA2 Amenity grassland (improved) |
| | GS Semi-natural grassland | GS1 Dry calcareous and neutral grassland |
| | | GS2 Dry meadows and grassy verges |
| | | GS3 Dry-humid acid grassland |
| | | GS4 Wet grassland |
| | GM Freshwater marsh | GM1 Marsh |
| | | |
| **H Heath and dense bracken** | HH Heath | HH1 Dry siliceous heath |
| | | HH2 Dry calcareous heath |
| | | HH3 Wet heath |
| | | HH4 Montane heath |
| | HD Dense bracken | HD1 Dense bracken |
| | | |

| | | |
|---|---|---|
| **P Peatlands** | PB Bogs | PB1 Raised bogs |
| | | PB2 Upland blanket bog |
| | | PB3 Lowland blanket bog |
| | | PB4 Cutover bog |
| | | PB5 Eroding blanket bog |
| | PF Fens and Flushes | PF1 Rich fen and flush |
| | | PF2 Poor fen and flush |
| | | PF3 Transition mire and quaking bog |
| | | |
| **W Woodland and scrub** | WN Semi-natural woodland | WN1 Oak-birch-holly woodland |
| | | WN2 Oak-ash-hazel woodland |
| | | WN3 Yew woodland |
| | | WN4 Wet pedunculate oak-ash woodland |
| | | WN5 Riparian woodland |
| | | WN6 Wet willow-alder-ash woodland |
| | | WN7 Bog woodland |
| | WD Highly modified/non-native woodland | WD1 (Mixed) broadleaved woodland |
| | | WD2 Mixed broadleaved/conifer woodland |
| | | WD3 Yew woodland |
| | | WD4 Conifer plantation |
| | | WD5 Scattered trees and parkland |
| | WS Scrub/transitional woodland | WS1 Scrub |
| | | WS2 Immature woodland |
| | | WS3 Ornamental/non-native shrub |
| | | WS4 Short rotation coppice |
| | | WS5 Recently-felled woodland |
| | WL Linear woodland/scrub | WL1 Hedgerows |
| | | WL2 Treelines |
| | | |
| **E Exposed rock and disturbed ground** | ER Exposed rock | ER1 Exposed siliceous rock |
| | | ER2 Exposed calcareous rock |
| | | ER3 Siliceous scree and loose rock |
| | | ER4 Calcareous scree and loose rock |
| | EU Underground rock and caves | EU1 Non-marine caves |
| | | EU2 Artificial underground habitats |
| | ED Disturbed ground | ED1 Exposed sand, gravel or till |

| | | |
|---|---|---|
| | | ED2 Spoil and bare ground |
| | | ED3 Recolonising bare ground |
| | | ED4 Active quarries and mines |
| | | ED5 Refuse and other waste |
| | | |
| **B Cultivated and built land** | BC Cultivated land | BC1 Arable crops |
| | | BC2 Horticultural land |
| | | BC3 Tilled land |
| | | BC4 Flower beds and borders |
| | BL Built land | BL1 Stone walls and other stonework |
| | | BL2 Earth banks |
| | | BL3 Buildings and artificial surfaces |
| | | |
| **C Coastland** | CS Sea cliffs and islets | CS1 Rocky sea cliffs |
| | | CS2 Sea stacks and islets |
| | | CS3 Sedimentary sea cliffs |
| | CW Brackish waters | CW1 Lagoons and saline lakes |
| | | CW2 Tidal rivers |
| | CM Salt marshes | CM1 Lower salt marsh |
| | | CM2 Upper salt march |
| | CB Shingle and gravel banks | CB1 Shingle and gravel banks |
| | CD Sand dune systems | CD1 Embryonic dunes |
| | | CD2 Marram dunes |
| | | CD3 Fixed dunes |
| | | CD4 Dune scrub and woodland |
| | | CD5 Dune slacks |
| | | CD6 Machair |
| | CC Coastal constructions | CC1 Sea walls, piers and jetties |
| | | CC2 Fish cages and rafts |

| **Marine** | | |
|---|---|---|
| **L Littoral (intertidal)** | LR Littoral rock | LR1 Exposed rocky shores |
| | | LR2 Moderately exposed rocky shores |
| | | LR3 Sheltered rocky shores |
| | | LR4 Mixed substrata shores |
| | | LR5 Sea caves |
| | LS Littoral sediment | LS1 Shingle and gravel shores |
| | | LS2 Sand shores |
| | | LS3 Muddy sand shores |

| | | |
|---|---|---|
| | | LS4 Mud shores |
| | | LS5 Mixed sediment shores |
| | | |
| **S Sublittoral shores (subtidal)** | SR Sublittoral rock | SR1 Exposed infralittoral rock |
| | | SR2 Moderately exposed infralittoral rock |
| | | SR3 Sheltered infralittoral rock |
| | | SR4 Exposed circalittoral rock |
| | | SR5 Moderately exposed circalittoral rock |
| | | SR6 Sheltered circalittoral rock |
| | SS Sublittoral sediment | SS1 Infralittoral gravels and sands |
| | | SS2 Infralittoral muddy sands |
| | | SS3 Infralittoral muds |
| | | SS4 Infralittoral mixed sediments |
| | | SS5 Circalittoral gravels and sands |
| | | SS6 Circalittoral muddy sands |
| | | SS7 Circalittoral muds |
| | | SS8 Circalittoral mixed sediments |
| | | |
| **M Marine water body** | | MW1 Open marine water |
| | | MW2 Sea inlets and bays |
| | | MW3 Straits and sounds |
| | | MW4 Estuaries |

## *Appendix 4: Habitats breakdown*

| Fossitt habitat | Number of datasets | Fossitt habitat | Number of datasets |
|---|---|---|---|
| B Cultivated and built land | 1 | WN4 Wet pedunculate oak-ash woodland | 2 |
| BL3 Buildings and artificial surfaces | 1 | WN5 Riparian woodland | 2 |
| E Exposed rock and disturbed ground | 1 | WN6 Wet willow-alder-ash woodland | 5 |
| ED4 Active quarries and mines | 1 | WN7 Bog woodland | 8 |
| ER Exposed Rock | 1 | WS1 Scrub | 4 |
| ER2 Exposed calcareous rock | 1 | | |
| F Freshwater | 10 | | |
| FL Lakes and Ponds | 10 | | |
| FL3 Limestone/marl lakes | 5 | | |
| FL4 Mesotrophic lakes | 7 | | |
| FL5 Eutrophic lakes | 1 | | |
| FL6 Turloughs | 14 | | |
| FL7 Reservoirs | 1 | | |
| FL8 Other artificial lakes and ponds | | | |
| FS1 Reed and large sedge swamps | 5 | | |
| FW Watercourses | 9 | | |
| FW1 Eroding/upland rivers | 1 | | |
| FW2 Depositing/lowland rivers | 8 | | |
| FW4 Drainage ditches | 2 | | |
| GA Improved grassland | 5 | | |
| GA1 Improved agricultural grassland | 2 | | |
| GM1 Marsh | 5 | | |
| GS1 Dry calcareous & neutral grassland | 9 | | |
| GS3 Dry-humid acid grassland | 2 | | |
| GS4 Wet grassland | 11 | | |
| HD Dense bracken | 2 | | |
| HH Heath | 3 | | |
| L Littoral | 1 | | |
| P Peatlands | 2 | | |
| PB Bogs | 6 | | |
| PB1 Raised bogs | 25 | | |
| PB2 Upland blanket bog | 3 | | |
| PB3 Lowland blanket bog | 1 | | |
| PB4 Cutover bog | 12 | | |
| PF Fens and Flushes | 3 | | |
| PF1 Rich fen and flush | 2 | | |
| PF2 Poor fen and flush | 2 | | |
| PF3 Transition mire and quaking bog | 1 | | |
| S Sublittoral | 1 | | |
| W Woodland and scrub | 2 | | |
| WD Highly modified/non-native woodland | 1 | | |
| WD1 (Mixed) broadleaved woodland | 6 | | |
| WD2 Mixed broadleaved/conifer woodland | 3 | | |
| WD4 Conifer plantation | 3 | | |
| WD5 Scattered trees and parkland | 1 | | |
| WL1 Hedgerows | 6 | | |
| WL2 Treelines | 3 | | |
| WN Semi-natural woodland | 5 | | |
| WN1 Oak-birch-holly woodland | 2 | | |
| WN2 Oak-ash-hazel woodland | 7 | | |

# *Appendix 5: Species of conservation interest for which data was available*

| Designated_species | No of datasets | Designated_species | Number of datasets |
|---|---|---|---|
| *Erigeron acer* | 1 | *Papaver hybridum* | 1 |
| *Accipiter nisus* | 1 | *Petalophyllum ralfsii* | 1 |
| *Acinos arvensis* | 2 | *Petromyzon marinus* | 3 |
| *Alcedo atthis* | 4 | *Pipistrellus pipistrellus* | 3 |
| *Anas acuta* | 4 | *Pipistrellus pygmaeus* | 2 |
| *Anas clypeata* | 4 | *Pippistrellus pippistrellus* | 1 |
| *Anas strepera* | 1 | *Plecotus auritus* | 2 |
| *Anser albifrons* | 1 | *Pluvialis apricaria* | 19 |
| *Anser albifrons flavirostris* | 16 | *Podiceps caspicus* | 1 |
| *Athya ferina* | 2 | *Pseudorchis albida* | 1 |
| *Austropotamobius pallipes* | 5 | *Pyrausta sanguinalis* | 1 |
| *Aythya ferina* | 6 | *Rana temporaria* | 6 |
| *Calidris alpina* | 1 | *Rhinolophus hipposideros* | 2 |
| *Carduus nutans* | 1 | *Rorippa islandica* | 1 |
| *Cephalanthera longifolia* | 3 | *Salmo salar* | 2 |
| *Cgynus columbarius bewickii* | 2 | *Salvelinus alpinus* | 1 |
| *Chara curta.* | 1 | *Sanguisorba officinalis* | 1 |
| *Circus cyanea* | 1 | *Spiranthes romanzoffiana* | 1 |
| *Circus cyaneus* | 2 | *Stachys officinalis* | 2 |
| *Colletes floralis* | 1 | *Sterna hirundo* | 5 |
| *Coregonius autumnalis* | 2 | *Succisa pratensis* | 1 |
| *Coturnix coturnix* | 1 | *Tringa tetanus* | 1 |
| *Crex crex* | 2 | *Triturus vulgaris* | 2 |
| *Cygnus columbarius bewickii* | 5 | *Tyto alba* | 1 |
| *Cygnus cygnus* | 22 | *Vanellus vanellus* | 6 |
| *Erigeron acer* | 1 | *Vertigo geyeri* | 2 |
| *Eurodryas aurinia* | 3 | *Viola lactea* | 1 |
| *Falco columbarius* | 1 | | |
| *Falco peregrinus* | 1 | | |
| *Falco tinnunculcus* | 1 | | |
| *Frangula alnus* | 2 | | |
| *Galeopsis angustiflolia* | 2 | | |
| *Groenlandia densa* | 1 | | |
| *Hamatocaulis vernicosus* | 1 | | |
| *Hordeum secalinum* | 2 | | |
| *Inula salicina* | 1 | | |
| *Lacerta vivipara* | 2 | | |
| *Lagopus lagopus* | 1 | | |
| *Lagopus lagopus scoticus* | 6 | | |
| *Lampetra fluviatilis* | 3 | | |
| *Lampetra planeri* | 3 | | |
| *Lepus timidus hibernicus* | 9 | | |
| *Limosa lapponica* | 1 | | |
| *Lutra lutra* | 11 | | |
| *Margaritifera margaritifera* | 1 | | |
| *Martes martes* | 3 | | |
| *Melanitta nigra* | 5 | | |
| *Meles meles* | 2 | | |
| *Monotropa hypopitys* | 1 | | |
| *Myotis daubentonii* | 5 | | |
| *Myotis mystacinus* | 1 | | |
| *Myotis nattererii* | 2 | | |
| *Numenius arquata* | 2 | | |
| *Nyctalus leisleri* | 4 | | |
| *Omalotheca sylvatica* | 1 | | |

| | |
|---|---|
| *Orchis morio* | 3 |
| *Papaver hybridum* | 1 |
| *Petalophyllum ralfsii* | 1 |