

Fifth Irish Ornithological Research Conference



Book of Abstracts

University College Cork, 15th November 2008



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Current Ornithological Research in Ireland

5th Ornithological Research Conference

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It is five years since the fourth Conference on Ornithological Research in Ireland was held at University College Cork in November 2003. Since then a number of projects have been completed, others started and some long-term studies are ongoing. It is now appropriate to provide an up-to-date summary of our ornithological research activities. And so the fifth conference is being held at University College Cork on 15 November 2008. As before, all known workers in Irish ornithology, at the universities, institutes of technology, Government departments, conservation organisations, other NGOs and ecological/environment consultants were invited to submit abstracts ahead of this conference detailing their current research activities.

This year the keynote address will be delivered by Dr. John Quinn from the Department of Zoology at the University of Oxford, England. The title of his presentation is "Predation Risk and Individual Behavioural Variation in Birds".

A total of 135 abstracts were received for this conference compared with 115 in 2003, 159 in 1997, 120 in 1992 and 98 in 1985. There has been a shift in the numbers and types of projects, with a growing trend of inter-university collaborations, and joint studies between universities and conservation organizations. There is also evidence of increased international collaboration with the universities and other groups in Europe. The studies have also changed from those describing occurrence and distribution to more detailed ecological studies of single species, in particular those under threat or of conservation concern, and studies of those species that interact with humans and their structures. A further point of note is the number of studies that link their work in a global context, reflecting the international importance of research in both Irish habitats and their birds.

Organising Committee

John O'Halloran, UCC
Stephen Newton, BirdWatch Ireland
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RESEARCH ABSTRACTS

Peril in the uplands – will biodiversity dwindle as undergrazing increases?

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Through changes in the Common Agricultural Policy (CAP) a new threat to the uplands has emerged – undergrazing. Here we integrate empirical and theoretical approaches to study biodiversity change in upland ecosystems. We investigate biodiversity change among plants, invertebrates and birds across a range of farmland management regimes. Focusing on the birds, this study asks whether bird diversity, density, species richness and evenness differ between management states.

Testing the effectiveness of agri-environment options for Yellowhammer *Emberiza citrinella* in Northern Ireland

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The Yellowhammer was one of the most common birds in Britain and Ireland in the 19th century. The NI population is estimated at 5,000 pairs and is declining. In recognition of its unfavourable conservation status, the Yellowhammer is the subject of a Species Action Plan (SAP) in NI, published under the auspices of the NI Biodiversity Strategy, the target of which is to maintain the breeding population at 5000 pairs and by 2015 increase the population size to 11,400 breeding pairs.

This project is the only Yellowhammer recovery project in the UK and Ireland. As agri-environment schemes in the wider countryside are seen as the primary mechanism for maintenance of the population, this project aims to investigate the effects of a good uptake of the 'arable options' available through the Department of Agricultural and Rural Development (DARD) Countryside Management Scheme (CMS), combined with good management advice, on the breeding Yellowhammer population. Since 2006 Yellowhammers have been monitored at 40 sites in their stronghold in east County Down. The approach compares bird occupancy at experimental (arable/mixed systems have added arable options to their CMS agreements and are being given continual advice by the Yellowhammer Project Officer; n=18) and control sites (arable/mixed farms not in CMS and are not implementing any management prescriptions for Yellowhammer, through the course of the project they will receive no advisory visits from the Project Officer; n=22). A baseline survey was carried out on all 40 farms in spring/summer 2006 a final follow up survey will be carried out in spring /summer 2010. All 18 experimental farms have added 'summer insect-rich' arable options to their agreements in 2006 and receive continued advice on the uptake and management of these and other seed-rich arable options available to them through CMS.

Results from research carried out by RSPB on rough grass margins (RGMs; CMS arable option) in January 2007 showed that Yellowhammers and other seed-eaters were not using RGMs. It is thought that the margins are too dense for Yellowhammers and other passerines to forage in. We are testing the effectiveness of sward management (cutting/grazing) in opening up the swards in RGMs and increasing accessibility.

Analyses of seabird and marine mammal monitoring for the Arklow Bank Offshore Wind Farm

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In August 2003, Airtricity and GE began the construction of an offshore wind farm on the Arklow Bank off County Wicklow. The Arklow Bank is a shallow undersea sand bank, approximately 26 km in length, between 8 and 13 km offshore. The first seven turbines were installed in 2003, and became operational in June 2004. Seabirds and marine mammal surveys commenced in 2000 using an adaptation of the standard Joint Nature Conservation Committee (JNCC) Seabirds at Sea survey method. Birds were counted using a 300m transect, and the snapshot method to assess densities for flying birds. The estimated height of flying birds was also recorded. Surveys were conducted along pre-determined transects at various distances from and parallel to the Arklow Bank, with the majority of birds recorded on the two transects on each side of the Bank.

Surveys found that species such as Little Gull *Hydrocoloeus minutus*, Kittiwake *Rissa tridactyla*, Guillemot *Uria aalge*, Razorbill *Alca torda* and Common Gull *Larus canus* can occur in large numbers, while Red-throated Divers *Gavia stellata* occurred mainly during winter and spring. Highest bird densities occurred on the two survey legs nearest the Arklow Bank.

Statistical analyses were conducted on all seven years of survey data, covering three years pre-construction baseline data, one year construction phase data, and three years of post-construction data, with 7 operational turbines. The analyses aimed to assess the impact of the installation of the turbines on the distribution and abundance of 12 key species. These were Red-throated Diver, Fulmar, Manx Shearwater *Puffinus puffinus*, Gannet *Morus bassanus*, Shag *Phalacrocorax aristotelis*, Little Gull, Kittiwake, Arctic Tern *Sterna paradisaea*, Common Tern *Sterna hirundo*, Guillemot, Razorbill and Harbour Porpoise *Phoca vitulina*. All statistical analyses were carried out using non-parametric permutation and bootstrapping techniques within the R statistical package. The main finding was that a strongly statistically significant decline ($P=0.005$) occurred in the numbers of Red-throated Divers on the outer Bank leg. This decline appeared to be strongly associated with the proximity of turbines. However, on the inner Bank leg, there was no evidence of a decline in Red-throated Divers numbers. The statistical analysis also found a weakly statistically significant decline ($P=0.03$) in Harbour Porpoise numbers on the inner Bank leg. However, there was no evidence that this decline was related to the proximity of the turbines. All the other key species showed no statistically significant declines following construction of the turbines.

Interactions between Northern Gannets *Morus bassanus* and fisheries in the Celtic Sea: a multi-tool approach combining GIS, vessel monitoring data and stable isotopes

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The Celtic sea is one of the most productive regions in Europe supporting several important fisheries. The region also supports some very large seabird communities and the large Gannet colony at Grassholm probably the most striking visual evidence of these. In conjunction with Gannet colonies in other parts of the North Atlantic, the numbers of birds at Grassholm have increased by over 70% in the last 40 years and this is at least in part thought to be linked to increased use of discarded fish from commercial fisheries. However little is known about how interactions with fisheries might alter the foraging tactics of seabirds and the ways in which they use the marine environment. Here we combine fine scale GPS measurements of Gannet foraging trips with oceanographic data

(bathymetry, primary productivity, copepod abundance), fishing vessel position information and stable isotope data (to infer actual diet of Gannets during foraging trips) in order to unravel the types of cues that Gannets might be using to locate food and how interactions with fishing vessels influence foraging behaviour. The data indicate that Gannets make very little use of the Irish Sea tending focus their foraging efforts in the Celtic Sea area. Moreover, Gannets utilising fishery resources have foraging tracks and time budgets that are distinct from those using “natural” food sources

Pioneering Brent Geese – to map and evaluate food resources for wintering Brent Geese *Branta bernicla hrota* in Dublin

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Ireland hosts 95% of the global population of wintering Light-bellied Brent Geese *Branta bernicla hrota*. Dublin Bay is an internationally important site for these birds with over one third of the wintering population, according to the I-WeBS five-year mean count up to 2000. Dublin Bay provides abundant estuarine food resources but there is evidence of pioneering behaviour among the Brent population with significant numbers now known to feed on amenity grasslands and winter cereal growing sites in the Dublin area. Geese are also known to commute between feeding sites. Food quality is a significant parameter in habitat choice in other populations of Brent. Patch choice and food quality will be mapped and evaluated for the Dublin area. This mapping exercise may be of practical conservation interest where food sources are constrained for wintering geese populations. While there is little current evidence of conflict with agricultural, amenity or sporting interests, a scientific basis for any recommendations on amenity grassland management or the provision of alternative feeding areas may be of interest.

Non-estuarine Waterbirds

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During the winter of 2006/07, the second survey of wintering waterbird populations of non-estuarine coast of Ireland (NEWS II) was carried out. The main aim was to quantify proportions of wintering waterbirds occurring along coastal stretches which are not normally counted during regular monitoring schemes. A random selection of coastal sections, 343 in total, was covered (minimum of 50% of sections in each county). In total, almost 80,000 birds and 62 species were recorded. Gulls were particularly numerous, with large counts of Black-headed *Chroicocephalus ridibundus*, Common *L. canus* and Herring *L. argentatus* Gulls reported. Oystercatcher *Haematopus ostralegus* and Curlew *Numenius arquata* were the most numerous wader species recorded, while Common Scoter *Melanitta nigra* was the most numerous wildfowl species. Herring Gull, Oystercatcher, Cormorant *Phalacrocorax carbo*, Curlew, Great Black-backed Gull *L. marinus* and Common Gull were the most widespread, all recorded in more than 260 sections. A direct comparison of bird totals between those same stretches of coast which were also covered during the first NEWS in 1997/98 (total of 162 sections) shows that numbers of most species have remained similar, or have increased. However, there may have been some redistribution of species.

An assessment of the distribution range of Greylag Geese (Icelandic-breeding & feral populations) *Anser anser* in Ireland

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Each winter Ireland supports over 5,000 Greylag Geese *Anser anser*, most of which migrate from breeding areas in Iceland, the remainder of which are resident feral birds descended from birds released during the 20th century. This study set out to establish the current number and distribution range of Icelandic and feral birds, and identify movements of Icelandic birds between roosts and feeding areas. All sites known to be used by Greylag Geese were surveyed twice during the winter of 2007/08. Sites known to be used by migratory (Icelandic-breeding) geese were surveyed in greater detail in December in an attempt at identifying regularly used feeding and roosting areas, and at defining goose movements. Overall, 405 visits were made by over 50 observers to 86 sites. A total of 5,989 birds was counted in November and 3,272 in January. The November count comprised one single, and very large, count of 3,599 at the Lough Swilly/ River Foyle/ Lough Foyle complex. The next highest November counts were 497 at Dundalk and 401 on the Lower River Suir. In January, just 1,029 birds were recorded at the Swilly/Foyle complex, while just 123 birds were recorded at Dundalk, and 166 at the Lower River Suir. It is not known where the remaining birds were located during the latter (January) count. A follow-up census has been conducted in August and September 2008 in an attempt at confirming the origins of all Greylag Goose flocks in Ireland.

Irish Wetland Bird Survey

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The Irish Wetland Bird Survey aims to monitor wintering waterbird populations and their wetlands in the Republic of Ireland, and is a joint project of the National Parks and Wildlife Service and BirdWatch Ireland. This objective is achieved through regular monitoring of the main wetland sites between September and March. I-WeBS has been carried out during all seasons since 1994/95. Overall, some 717 sites comprising 2035 sub-sites has been covered, although fewer sites have been covered on a regular basis; 323 sites were covered on 50% of occasions and are included in the analysis of trends. Some 144 waterbird species have been recorded overall, 62 of which occur on a regular basis at 10 or more sites, including 33 wildfowl (and their allies), 22 wader and six gull species. Large proportions of several populations occur in Ireland, particularly Whooper Swan *Cygnus cygnus*, Greenland White-fronted Goose *Anser albifrons flavirostris*, Light-bellied Brent Goose *Branta bernicla hrota* and Black-tailed Godwit *Limosa limosa islandica*. The greatest declines have been reported for Common Pochard *Aythya ferina*, Tufted Duck *A. fuligula*, Grey Plover *Pluvialis squatarola*, Lapwing *Vanellus vanellus*, Knot *Calidris canutus* and Dunlin *C. alpina*. In contrast, there were considerable increases in Barnacle Goose *Branta leucopsis*, Light-bellied Brent Goose, Oystercatcher *Haematopus ostralegus*, Sanderling *C. alba* and Black-tailed Godwit. There are several sites in Ireland which have remained consistently important for wintering waterbirds over the past 40 years, and have been designated as Special Protection Areas under the EU Birds Directive. Among the most important of these sites are Dundalk Bay, the Shannon and Fergus Estuary, Wexford Harbour and Slobbs, Cork Harbour and Lough Corrib.

The racing pigeon *Columba livia* var. *domestica* and its management in relation to aviation safety in Ireland

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Racing pigeons, also known as homing pigeons, feral pigeons, town pigeons, city pigeons and Rock Doves belong to one species *Columba livia*, but are comprised of three, more or less different, ecological groupings. Wild Rock Doves are virtually extinct in Northern Europe but survive at some locations on rugged inaccessible cliffs in the west of Ireland and Scotland. Feral pigeons (also known as town and city pigeons), are descendants of the wild populations but now exist almost exclusively as pests of man in urban environments. The third group known as racing or homing pigeons are actively maintained and husbanded by man for the “the sport of pigeon racing”. It is this latter group in particular that poses a threat to aviation safety in Ireland. The serious hazard that may be caused by racing pigeons relates a) to the large flocks they form -sometimes in excess of 300 individuals, b) their body weight which can be up to 500g and c) their apparent, relatively poor ability, to avoid moving aircraft while racing. This paper analyses the pattern of racing pigeon strikes to aircraft at Dublin Airport, Ireland, over the interval 1973-2006. Most of the strikes appear to have been caused by the “racing pigeon group” rather than the “wild” or “feral” populations. The results of a monitoring programme are presented together with a detailed account of how this unique “wildlife” problem has been managed.

The racing pigeon *Columba livia* var. *domestica* and its management in relation to aviation safety in Ireland: tracking birds using GPS tags

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Racing pigeons *Columba livia* var. *domestica* continue to pose a hazard to aviation in Ireland and elsewhere in Europe, North America and the Far East. This preliminary study is attempting to track pigeons being raced from the Counties Cork and Waterford, to lofts in Northern Ireland using GPS tags. The primary objective of this research is to identify the flight directions of pigeons being raced from the south to Northern Ireland in specific relation to the at-risk air space at Dublin Airport.

Feeding ecology of the Chough *Pyrrhocorax pyrrhocorax* in Ireland

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The Chough, *Pyrrhocorax pyrrhocorax*, has undergone Europe-wide declines over the past two centuries and is listed as a top priority (Annex 1) species on the EU Birds Directive. Changes in agricultural practices and land-management systems are suspected to be the main reasons for the decline of the Chough across Britain and Ireland. The main focus of this project is to gain understanding on the diet and optimal foraging habitats, of the Red-billed Chough in the south of Ireland. Aspects of breeding biology and population movements are also being investigated. The activities of wild foraging birds were recorded using a handheld video camera, in a variety of habitats and in all seasons. Surface- and soil-dwelling invertebrates were sampled at feeding sights, to establish potential prey items. Chough diet is being determined mainly through analysis of faecal samples collected at roost

sites, nest sites and feeding areas. Stable isotope analysis is also being employed to establish habitat-utilisation of nest-provisioning adults during the breeding season (by comparing carbon and nitrogen isotope signatures in nestling blood-samples with invertebrates from the five important foraging habitats).

Nest studies have been conducted over three breeding seasons. Data on broods, nests and nestlings have been collected from over 35 breeding attempts. Nestlings have been colour-ringed to enable monitoring of nestling dispersal. Chough population dynamics are monitored in selected areas by regular counts at communal roost-sites. Preliminary analysis into genetic diversity of the Chough has been carried out (on nestling blood samples), using primers from other corvid studies, but with limited success to date.

Boleybrack Mountain Red Grouse *Lagopus lagopus* Project

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Irish Red Grouse are currently receiving long overdue research and conservation effort. Population studies in Mayo, National surveys in Northern Ireland and the Republic of Ireland and DNA research are ongoing or have been completed in recent years. Further trialing and monitoring of conservation management techniques are needed to augment the more recent research findings. Boleybrack Mountain is located north of Lough Allen and lies between the towns of Drumkeeran, Manorhamilton and Blacklion. A large portion of the northern side of the mountain overlooks the parish of Glenfarne. Boleybrack Mountain comprises an extensive upland plateau, dominated by mountain blanket bog and wet heath, with small lakes scattered throughout. Most of Boleybrack Mountain is designated as a Special Area of Conservation (SAC) under the EU Habitats Directive. Much of the Boleybrack uplands lie within the club territory of Glenfarne Gun Club (GGC). GGC has a strong wildlife conservation ethos. Of particular concern is the decline in Red Grouse *Lagopus lagopus* on Boleybrack - an area that could be managed in order to protect and enhance its important Grouse population. In 2007, GGC commissioned a report to provide for management of Grouse on Boleybrack. The Heritage Council, the National Parks and Wildlife Service (NPWS) and the Golden Eagle Trust provide financial and/or technical assistance for this project. Key objectives of the resultant Red Grouse Habitat Management Plan are: to maintain and increase the Red Grouse population, and to maintain and enhance sensitive habitats. The successful implementation of this plan could lead to Boleybrack securing 1% of the Irish Red Grouse population, while helping conserve habitats and other species in the study area. The Boleybrack Mountain Red Grouse Project offers a unique opportunity for a pilot project on an area of commonage. Patches of degenerate heather have been strimmed and demonstration plots around denuded heather have been fenced off. Monitoring of the grouse population and its productivity is ongoing. Predator control will also form part of the conservation effort on site and hunters have been asked not to hunt or shoot game, or any protected species, or train their dogs on Boleybrack Mountain. We aim to study which heather management techniques are most suitable for Irish Red Grouse in commonage areas.

Studies on the eye of the Rook *Corvus frugilegus*

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The Rook is an abundant and widespread species in Ireland. However, the Rook also visits airfields where it is frequently struck by aircraft. This study investigated the schematic eye of the Rook, its capacity for ultraviolet vision, its handedness and its vigilance behaviour under varying conditions.

Migrations of Greenland Barnacle Geese *Branta leucopsis*: preliminary results from satellite telemetry

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Three recognised flyway populations of Barnacle Goose *Branta leucopsis* exist – a population breeding in Svalbard and wintering in SW Scotland, one breeding in high-Arctic Russia and wintering in The Netherlands and Germany and the Greenland flyway population. This population of Barnacle Goose breeds in NE Greenland between 70° and 79° N and winters on the western coast of Ireland and Scotland. On both the spring and autumn migration the population uses Icelandic staging areas. In the four decades since censuses began the population has increased seven-fold to a contemporary assessment of over 56,000. The importance of the main wintering haunt on Islay in western Scotland has increased steadily such that it currently holds around two-thirds of the population, the remainder occurring in northern and western Scotland, and Ireland (currently 9,000 in Ireland). In Ireland the largest concentration is the flock on the Inishkea Islands in NW Mayo (54° 07'N, 10° 12'W), holding a peak count of 2,841 birds between 1993 and 2003. This site is one of 5 internationally important sites in Ireland. The Inishkea flock has been intensively studied since the 1960s and is the only site at which numbers have been annually monitored over the last 45 years. At this site the average productivity (8%) is somewhat lower than that on Islay (15%).

The Greenland population is the least studied of the flyway populations. In part, studies in the Irish wintering grounds are inhibited by the fact that the majority of the population either occur partially or wholly on offshore islands. In the Icelandic staging areas the limited surveys which have been undertaken have been in spring but there is a general understanding of the sites at which birds occur (north coast in spring and the south coast in autumn). Despite several expeditions to the breeding grounds in NE Greenland, there are significant gaps in our knowledge of the breeding biology of this species.

The availability of miniaturised satellite transmitters has afforded the opportunity to answer a range of questions throughout the annual cycle. The use of telemetry combined with field observations in Ireland will enable many aspects of the species ecology to be investigated. These questions will have direct relevance towards the development of sound conservation management approaches in Ireland (e.g. examination of the roles of food depletion and disturbance in selection of feeding sites; defining home ranges and securing disturbance-free roost sites), Iceland (e.g. defining staging locations in spring and autumn in Iceland, determining the importance of improved vs. unimproved grassland and distribution in relation to hunting activities), and Greenland (locations of pre-breeding feeding areas and breeding sites). The project aims to describe of daily foraging routines and usage of roosts, aspects of the various migrations between wintering, staging and breeding ranges, and smaller scale dispersal patterns within each area. The results will be compared to parallel studies on the conspecific Svalbard Barnacle Goose population.

Bird Atlas 2007- 2011

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The Bird Atlas 2007-11 is a joint project between BirdWatch Ireland, the British Trust for Ornithology and the Scottish Ornithologists' Club to map the distribution and abundance of all of Ireland and Britain's birds during both the winter and the breeding season. . Fieldwork started on 1 November 2007 and will span four winters and four breeding seasons, during which the whole of Ireland and Britain will be surveyed. The aims of the Atlas are to map bird distributions at 10 km scale, to map broad patterns of relative abundance and to assess changes in bird distributions and relative abundance since previous breeding atlases in 1970 and 1990, and since the last winter

atlas of early 1980s. Two fieldwork methods are involved - Roving Records and Timed Tetrad Visits (TTVs). Roving Records aim to capture distribution records such as species lists for grid squares and one-off records of hard to find species. They are also a means of accumulating evidence of breeding and for providing records of nocturnal species. TTVs are principally concerned with elucidating the broad patterns of relative abundance. They are timed counts in tetrads (2x2 km squares) in 10 km squares. Two counts in the winter and two in the breeding season are carried out for a minimum of one hour and the main habitats in the tetrad are surveyed. To achieve minimum coverage of 8 tetrads in every 10 km square in Ireland, 6251 tetrads need to be surveyed by TTVs. In the first year of the Atlas 970 tetrads in the winter (15%) and 998 tetrads in the breeding season (16%) were surveyed. It is hoped that this effort can be sustained and increased to achieve minimum coverage of 6251 tetrads.

Re-introduction of the Red Kite *Milvus milvus* into County Wicklow, Ireland

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The Wicklow Red Kite project is managed by the Golden Eagle Trust (GET) Ltd. in partnership with the National Parks and Wildlife Service and the Welsh Kite Trust. The Irish Raptor Study Group and the Golden Eagle Trust started development of the project in January 2006. Early on in the planning phase contact was made with the Welsh Kite Trust to discuss sourcing donor stock from Wales. Welsh Red Kites. Because of their proximity, are believed be the most suitable for re-introduction to Ireland. The GET conducted a detailed assessment of potential release areas. From the outset it was felt the East Coast of Ireland was best suited given its lower rainfall and higher average summer temperatures, compared to other areas in Ireland. County Wicklow was selected primarily on the basis of the mixed habitat types present, high percentage of forestry and an increasing, productive population of common buzzards *Buteo buteo*.

The project proposes to release Red Kites in County Wicklow over a five – year period, with a minimum of 100 kites being released. The project is now in its second year and to date fifty six kites have been released. All the birds are fitted with PVC wing tags and tail mounted radios. Two birds released in 2008 were fitted with back mounted satellite tags. A minimum of 80% of the initial release survived their first winter. A minimum of three territorial pairs established themselves during the spring. All territorial activity has been within 10 km of the release site. Kites from the 2007 release have been recorded up to 250 km from the release area. Research into the dispersal of the kites from the release site and the diet of kites in County Wicklow is ongoing.

Breeding seabirds on Rathlin Island: cause for concern?

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Rathlin Island is the largest seabird colony in Northern Ireland, supporting over 100,000 pairs of seven species. Concerns have been raised in recent years about declines in the numbers of some species and widespread breeding failures. A detailed study initiated in the 2008 breeding season focused on provisioning rates, parental attendance and productivity of Kittiwakes, Guillemots *Uria aalge* and Razorbills *Alca torda* on the Rathlin colony. Results of this work, a review of recent survey data and discussion in the context of wider seabird declines in Ireland, the UK and elsewhere are included in the current edition of *Irish Birds*.

Breeding ecology of the Common Buzzard *Buteo buteo* on the east coast of Ireland

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A breeding season study was carried out on Common Buzzards *Buteo buteo* on the east coast of Ireland, between 2005-2007. The breeding productivity, breeding season diet, growth rates of the young and habitat characteristics of the nest areas were assessed. Nest searches were conducted from the second week of April. All active buzzard nests located were examined to establish clutch size and/or number of young hatching. Repeat visits were made to nest to assess growth rates of the young and diet during the 2005 and 2006 seasons. Data recorded on these visits were: weight, wing length and tarsus thickness. During these visits prey items in the nest were also recorded. Whole or partly eaten prey items were weighed, photographed and marked by removal of the feet and / or tail. Inedible prey remains were removed for subsequent identification.

Average clutch size was 3 (n=30). Average size of brood at hatching was 2.61 (n=28). Mean number of fledged young per breeding attempt was 2.07 (n=28). Mean number of fledged young per successful breeding attempt was 2.64 (n=22). The most common cause of breeding failure was nest collapse. Mean laying date was the 11 April (n=18). A total of 288 prey items were recorded in the nest. Diet was dominated by rabbit *Oryctolagus cuniculus*, rat *Rattus norvegicus* and medium sized birds. All nests were located in mature trees. Average nest tree height was 23.27m, while average nest height was 15.48m.

Breeding Golden Plover *Pluvialis apricaria* in the Owenduff/Nephin complex SPA, County Mayo

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The Owenduff/Nephin complex, County Mayo, is designated as Special Protection Area (SPA) for two scarce breeding species: Golden Plover *Pluvialis apricaria* and Merlin *Falco columbarius*. The SPA is approximately 25,000 ha and includes the Owenduff blanket bog and part of the Nephin Beg Mountain range. Ballycroy National Park forms part (11,000 ha) of the SPA. The objectives of this study are to locate breeding pairs of Golden Plover within the SPA and to establish their habitat requirements. This involved conducting a random survey of breeding pairs: 25 x 1 km squares in 2005 and 26 in 2006. All bird species were recorded and habitat data was collected along transects. In 2005, seven squares were occupied with a further three pairs recorded outside the survey squares. One square with floodplain grassland also held 16 foraging adult plovers. In 2006 eight squares were occupied by breeding pairs.

In 2007 & 2008 the objective was to investigate the specific habitat requirements of breeding pairs. This involved radio-tracking chicks. In 2007, four regularly-used breeding territories were monitored. One nest was located and radio tags were attached to two chicks. One transmitter was found beside the nest after 24 hours. Locations and habitat data were collected for the second chick (and brood) for two weeks. Preliminary analysis shows that the chicks moved up to 1 km from the nest site on specific habitat types, particularly utilising grassier streamside vegetation.

In 2008, seven known plover sites were selected for surveying and potential radio-tracking within the SPA. Five squares were occupied by plover and three of these had confirmed nesting pairs. One pair probably failed, while the other two pairs exhibited behaviour consistent with fledging young. A flock of 26 plover were observed in breeding plumage overhead close to one of these sites. Another nest was located in the SPA but the clutch hatched earlier than expected and was not radio-tracked; later, a fledged juvenile was observed with the adult pair. In addition, a known higher density breeding site north of the SPA was also selected for observation. Two nests located at this site were depredated.

Declines of diving ducks on Lough Neagh

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The Lough Neagh and Lough Beg Special Protection Area (SPA) is the most important site for diving ducks in the UK and Ireland and is the most important non-estuarine SPA in the UK and Ireland. The site is also designated as an ASSI and a Ramsar site. Recent changes in wintering numbers at the site have shown significant downward trends since 2001-02. These have been of a sufficient magnitude to trigger red alerts for Tufted Duck *Aythya fuligula* (-70% to 9,000), Pochard *Aythya ferina* (-80% to 8,000) and Goldeneye *Bucephala clangula* (-71% to 4,000), and an amber alert for Scaup *Aythya marila* (-48% to 2,600). Red or Amber alerts were triggered for 11 of 18 waterbird species evaluated under the WeBS alerting procedure (WeBS Alerts: winters to 2004-05 inclusive). Despite a range of studies on the diving duck populations the causes of the declines remain unclear. Potential site-related issues which may be contributory mechanisms include reductions in food supply (related to changing water quality), increased disturbance, illegal netting, competition (with fish), damage to the site arising from sand abstraction, and redistribution to other wintering sites. Further research suggests that site-related issues are primarily responsible but migratory short-stopping may also be a contributing factor. A broad assessment of other ecological components in the Lough showed no significant changes over the timescales during which the diving duck populations have declined. This study aims to identify the possible mechanisms which may have led to the decline of diving ducks on Lough Neagh. It will focus on the role of changes in food availability and changes in large-scale distribution patterns in determining the numbers of diving ducks using the site. A study on the feeding ecology of the four duck species on the Lough will examine diet, and the role of changes in food availability in causing the decline. This integrated study will lead to an understanding of the carrying capacity of the Lough and how or if this has changed. In addition the role of changes in migratory patterns (with the relevant species redistributing) will be examined through analyses of European waterbird monitoring data (IWC dataset) and flyway-scale ring recoveries from EURING.

The specific project objectives include:

An assessment of the role of migratory short-stopping in leading to diving duck declines at Lough Neagh (Tufted Duck, Pochard, Goldeneye and Scaup); this may include examination of the role of the NAO/European weather in large-scale between winter distribution patterns Assessment of diet, temporal changes in trophic positions, and food availability. Description of the spatial distribution of diving ducks on the Lough, especially the distribution of nocturnal feeding birds (including exploration of novel approaches to address these questions)

Development of a multi-species population model relating primary diet data, energetics and measures of food supply to changes in duck populations.

Flyway-scale studies of East Canadian High Arctic Light-bellied Brent Geese

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The East Canadian High Arctic population of Light-bellied Brent Geese are one of 7 flyway populations of *Branta bernicla* with circumpolar breeding distributions and temperate wintering distributions. This flyway population breeds in the Queen Elizabeth Islands of Arctic Canada and uses a flyway extending from there, south to Greenland and Iceland as far south as northern Spain. The population is especially important in an Irish context as Ireland hosts the majority of the population in mid-winter and especially during the autumn staging periods. The majority of coastal SPAs around the island of Ireland have Brent as a feature species.

In recognition of its relatively small population size (below 25,000 till 2003, but has since increased) the species has been the subject of an AEWA Flyway Management Plan arising from which are a range of national and international actions aimed at maintaining a vulnerable population at or above the 25,000-level.

To this end and commencing in 2001, WWT, the Irish Brent Goose Research Group, and Icelandic Institute of Natural History, funded primarily by the Northern Ireland Environment Agency, National Parks & Wildlife and Natural Environment Research Council, have developed an international programme of research and associated activities. Through collaboration with colleagues in Canada, Iceland, Greenland principally, the project is multi-disciplinary encompassing pure and applied scientific research, education and awareness-raising. Activities include on-going, recent or planned NERC-funded PhD and postdoctoral studies on habitat-switching, migratory connectivity, energetics and breeding performance, staging ecology, socio-biology, migration, and dispersal and used novel microsatellite DNA and isotopic studies. Underpinning all of this are studies of food availability, a major ringing and resightings programme and annual monitoring of the population size and composition in Iceland and Ireland. Aspects of the project have also focussed on raising awareness of the species' migration and energetics through collaborative projects with the media and through twinning schools in different countries.

This paper summarises the achievements of the project to date, future plans, and describes the long-term objectives and emerging potential effects on the population.

Decrease in the size of Blackbirds wintering in County Tipperary between 1982 and 2006

Collins, K.

Ballygambon, Lisronagh, Clonmel, County Tipperary

The Blackbird *Turdus merula* breeds throughout Europe in a variety of habitats. Some populations are completely migratory, some are partial migrants and some are completely sedentary. In Ireland, the resident population is mostly sedentary, with an influx of birds in winter from Northern Britain and Scandinavia. Bergmann's rule states that "in warm-blooded animals, races from warm regions are smaller than races from cold regions". Wing length has been found to be the most reliable and reproducible measure of overall body size for a range of species. Measurements of museum specimens from throughout Europe show that wing length increases with latitude, consistent with Bergmann's Rule. The migration route to Ireland for Blackbirds from northern Britain has largely been abandoned in recent years, and fewer migrants from northern Europe are spending the winter in Britain and Ireland. This is probably due to milder winters accompanied by a move into more hospitable suburban habitats in northern Europe. In this paper Blackbird biometric data collected by the Munster Ringing Group in County Tipperary over 25 years are analysed to ascertain if there has been any temporal variation in Blackbird body size, which will allow the hypothesis that global warming has resulted in fewer large Blackbirds from northern Europe wintering in County Tipperary to be tested. There has been a significant decrease in the mean wing lengths of adult male Blackbirds over the 25 year period;

1982-1986 135.0mm \pm 0.54 (n=25) 131-140

1999-2006 132.3mm \pm 1.43 (n=9) 126-139
The study is continuing to increase the sample size.

Census of Heronries in Tipperary

Collins, K.

Ballygambon, Lisronagh, Clonmel, County Tipperary

In 2006 the Tipperary Branch of BirdWatch Ireland commenced a census of all heronries in the County. Records from 1850 are described in Thompson and from 1900 in Ussher & Warren. There was a partial national survey carried out in 1964 but the results were never published. However, the data were submitted to the BTO who provided the Tipperary for 1964.

Many of the old heronries have disappeared, but some from 1900 are still in use today. All the nests are in tall trees, usually Scots Pine and Beech. We located 33 heronries to date but we know there are more to be located. The peak period of activity at heronries is the second half of April. The count unit we use is the 'apparently occupied nest' or AON. This is used because in most cases we cannot see the actual nest and we have to use estimates.

The Tipperary Branch of BirdWatch Ireland would like to acknowledge the Heritage Council for supporting this project and to thank the BTO and BWI for supplying data.

Countryside Bird Survey

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The Countryside Bird Survey (CBS) established in 1998 is a joint project of the National Parks and Wildlife Service, the Heritage Council and BirdWatch Ireland. It aims to monitor breeding bird populations in the Republic of Ireland. A random sample of 10 km squares was selected, and within each, the most southwesterly 1 km square is surveyed twice during each breeding season. Bird numbers are counted along two parallel 1 km transects. A total of 398 1 km squares has been surveyed to date, with an average of 300 squares covered in any one season. Coverage is best in the east, although other regions are considered to be adequately covered. The total number of species recorded in the period was 148. Wren *Troglodytes troglodytes*, Robin *Erithacus rubecula*, Blackbird *Turdus merula* and Chaffinch *Fringilla coelebs* were the most widespread, and were recorded in 90% or more of squares, while Rook *Corvus frugilegus*, Starling *Sturnus vulgaris*, Wren, Jackdaw *Corvus monedula* and Woodpigeon *Columba palumbus* were the most abundant. Trend analyses were carried out on 56 species. In general, terrestrial breeding bird populations have fared well since 1998. The majority of species remained stable, and greatest increases were seen in Blackcap *Sylvia atricapilla*, Goldfinch *Carduelis carduelis*, Redpoll and *C. flammea*. Greatest declines were seen in Kestrel *Falco tinnunculus* and Swift *Apus apus*. With 10 years of data now accumulated, more detailed analyses are possible, and are presently being conducted.

The ecology of farmland birds in Ireland, with special reference to agri-environment measures

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Research from this project aims to determine current impacts of the Rural Environment Protection Scheme (REPS) on biodiversity (using birds as indicators) in Ireland and offer recommendations on improving the scheme for wildlife, both through proper monitoring and new or improved agri-environment measures. Bird and habitat data were collected from 61 pairs of farm sites that either participated or not in REPS during three bird breeding seasons (April - June; 2003-2005). A subset of farm pairs (41) was surveyed during the intervening winter periods (mid-November – mid-February). Fieldwork was undertaken in three geographical regions in Ireland (north-west, Midlands and South-east) which generally reflect a gradient of farming intensity in Ireland from extensive farms in the North-west to intensive farms in the South-east.

A simple and rapid approach to making biodiversity assessments of REPS is being developed, and initial drafts have been circulated for consultation. Bird and habitat data suggest that REPS has, to date, not had any demonstrable impact on bird populations on farmland, although it is acknowledged that the introduction of more recent biodiversity options within the scheme may be of benefit. Species-habitat studies indicate the difference between the requirements of birds on Irish farmland and other farming landscapes and systems, highlighting the need for further, detailed research on farmland bird ecology in Ireland.

Aspects of the ecology of the Dipper *Cinclus cinclus* in the Slieve Bloom Mountains

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Breeding and roosting Dippers in the Slieve Bloom area of counties Offaly and Laois have been studied since 2002. The aim of the work is to monitor the density of Dipper populations in the area, study aspects of the species breeding ecology (first egg dates, clutch and brood size, instance of double brooding, etc.) and identify habitat management opportunities for nesting and roosting birds. A minimum of two visits to 155 bridges are conducted between April and June to check for breeding evidence of all bird species, with a particular emphasis on Dippers *Cinclus cinclus* and Grey Wagtail *Motacilla cinerea*. Where possible, nestlings are ringed. During the winter period, two visits between November and February are made to the same bridges to count roosting Dippers. Where roosting birds are accessible, these are also caught and ringed. Assessments have been made of the suitability of all the bridges visited for usage by avifauna. Future work will include surveys of a sample of the main river systems in the study area (e.g. River Camcor, Clodiagh River) to determine Dipper densities along the whole river. On these rivers, bridges have been identified where Dipper nesting platforms could be provided, and the impact that such nest box provisioning has on the Dipper population as a whole (in the river and whole study area) will be assessed. Recommendations on the management of bridges will be prepared for use by County Council engineers and planners.

Distribution and population of the Barn Owl *Tyto alba* in Ireland

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The update of the Barn Owl Active Sites Register from 1995-1997 was completed in 2007. Of the 105 active sites originally confirmed, only 28 remain active – a decline of 73% in just 10 years. Fieldwork for the National Barn Owl Survey to develop a standardised methodology and collect population data commenced in 2007. A total of 30

randomly selected 10 km squares from throughout the country were selected. Posters asking for Barn Owl reports were sent to all Post Offices located in the survey square, and those situated within 5 km of each square. Each square was visited, and all historic sites (castles, fortified houses, etc.) checked for signs of Barn Owl use. While surveying the square, reports were followed up and any buildings that looked suitable for nesting Barn Owls were checked where possible. One third (ten) of squares had Barn Owls present and a further five had signs of recent activity. A further 42 squares were selected for survey in 2008. Due to a potential bias in the 2007 sample towards the Midlands and South-west, square selection was based upon the number of 10 km squares in each county, with a minimum of two squares surveyed per county. Appeals for breeding and roosting records continue. By the end of 2007, 81 active Barn Owl sites were confirmed. This work continues in 2008, with data from reports feeding in to improving our knowledge of the species population in Ireland.

The Birds of the Phoenix Park, County Dublin

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A bird survey of the Phoenix Park carried during the summer of 2007 and winter of 2007/08 aimed to quantify abundance and distribution, as part of the Office of Public Works Management Plan. The park was divided into 29 sections: each was visited twice during summer and winter. All birds seen or heard were mapped whilst walking along a survey route which took them to within 50m of every part of the section. A total of 72 bird species was recorded, including 62 species during the breeding period and 58 in winter; 35 species were considered to be definitely breeding, while a further 10 were probably breeding, and two were possibly breeding. Blue Tit *Cyanistes caeruleus*, Great Tit *P. major* and Magpie *Pica pica* were among the most widely distributed. Jackdaw *Corvus monedula* and Blue Tit were among the most numerous species recorded. The number of species recorded in each section ranged between 20 and 47. Greatest diversity abundance was recorded in both summer and winter in the Dublin Zoo sections. The overall density of birds was estimated at 6.9 birds/ha in summer and 8.7 birds/ha in winter. This is the first thorough bird survey of the Phoenix Park, and it is hoped that the results will form a baseline from which we can measure patterns over time.

The Winter Garden Bird Survey

Crowe, O.

BirdWatch Ireland, PO Box 12, Greystones, County Wicklow

BirdWatch Ireland's Garden Bird Survey (GBS) has been running since the winter of 1994/95. Participants provide the peak count of each species seen in their gardens over a 13-week period, beginning in the first week of December. Data were submitted for a total of 2,085 gardens between 1994/95 and 2006/07. The large majority of these (56%) were located in Leinster, and one-third of gardens were located in County Dublin alone. Most gardens were located in suburban (47%) or rural (44%) areas. Almost all participants provided additional food, mostly peanuts (95%). A total of 123 species was recorded during the GBS. Gardens supported between 3 (two gardens in 1994/95) and 50 (one garden in 2001/02) species, while most supported between 16 and 25 species. The greatest diversity of species and highest numbers overall were found in large rural gardens, while urban gardens generally supported fewer birds and fewer species, probably due to more limited diversity of habitats available (fewer trees and shrubs in particular). Robin *Erithacus rubecula*, Blackbird *Turdus merula*, Blue Tit *Cyanistes caeruleus* and Chaffinch *Fringilla coelebs* were consistently among the most widespread species recorded, while House Sparrow *Passer domesticus*, Greenfinch *Carduelis chloris*, Starling *Sturnus vulgaris* and Rook *Corvus frugilegus* were the most abundant.

An assessment of the effects of arterial drainage maintenance on birds dependent on riparian habitats

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² Office of Public Works, Headford Rd., Galway

This survey of the birds occurring along waterways in Ireland, carried out in 2006 and 2007, is a joint project of the National Parks and Wildlife Service, the Office of Public Works and BirdWatch Ireland. It aims to gather information on the distribution of waterways birds and to examine impacts of arterial drainage maintenance on bird communities. Arterial drainage works are required to control flooding and bank erosion and improve river alignment and channels for navigation. These activities result in loss of habitats and increased disturbance to birds. Bird surveys were undertaken along 13 channels, most of which were at least partially managed within the past three years. Observers covered ten 500 m sections. Two visits were conducted during the breeding period. Observers recorded all birds seen or heard. The surveyed channels were relatively homogenous, and located in low-lying areas surrounded by farmland. Totals were calculated and compared between visits and habitats. A total of 72 bird species was recorded, including 14 riparian species, of which Mallard *Anas platyrhynchos* and Grey Heron *Ardea cinerea* were the most widespread, and Mallard and Sedge Warbler *Acrocephalus schoenobaenus* the most numerous. The pace of arterial drainage work is relatively slow, and there was little evidence during the present work which suggested that such activities impact on birds. It seems more likely that bird species distribution and abundance is more influenced by other factors, such as water flow and quality and the complexity of the adjacent bank habitats.

Waterways Birds Survey 2006 & 2007

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A survey of the birds occurring along waterways in Ireland was carried out in 2006 and 2007. It is a joint project of the National Parks and Wildlife Service, the Office of Public Works and BirdWatch Ireland. It aimed to gather data on the distribution and abundance of birds occurring along waterways, and to provide information on potential impacts of arterial drainage maintenance work on birds. Some 77 randomly selected waterways were covered by walked transects. Observers covered ten 500 metre sections in each. Three visits were undertaken in 2006; one breeding and two post-breeding visits, while two visits were conducted in 2007, during the breeding period only. Observers recorded all birds seen or heard. A total of 93 bird species was recorded, including 17 riparian species, of which Mallard *Anas platyrhynchos*, Grey Wagtail *Motacilla cinerea*, Grey Heron *Ardea cinerea* and Sedge Warbler *Acrocephalus schoenobaenus* were among the most widespread, and Mallard, Sand Martin, Sedge Warbler and Grey Wagtail were the most numerous. The River Lee, Co Cork and the canal near Kilmore Quay, in Wexford supported most species. A public survey was undertaken seeking records of Kingfisher *Alcedo atthis* sightings over the past 10 years. Some 2,231 records at 1,017 locations were received from 426 participants. They showed that Kingfisher distribution remains widespread throughout lowland rivers. It was recommended that the random waterways selected are surveyed on a regular basis so that changes in numbers may be tracked and significant trends detected.

Assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on two SAC river systems in Ireland

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Two river systems designated as Special Areas of Conservation (SAC), namely the River Boyne and River Blackwater SAC in County Meath and the (Munster) Blackwater SAC in County Cork formed a basis for this survey. An early and a late visit was made to each river system. Additional early and late visits were made to the Boyne system in an attempt at evaluating whether or not a two-visit approach is adequate. Observers walked along one bank recording all waterways birds seen or heard. Bird and habitat data were recorded in 500m sections. Additional survey work based on counts from a boat was trialled on the Blackwater system within a few days of the walked transects. An observer drifted downstream in a small inflatable, and recorded all birds seen or heard in 500m sections. Species densities were estimated and used to compare between visits, rivers and between methods. Some 214km of six rivers on the Boyne system and 282km of six rivers on the Blackwater system were covered. Overall, 28 waterways bird species were recorded, including 27 on the Boyne system and 21 on the Blackwater. Sand Martin *Riparia riparia* was the most abundant species on both systems. Mallard *Anas platyrhynchos* was also abundant and widespread. Kingfisher territory density ranged between 0.094 and 0.103 territories per kilometre on the Boyne system and 0.067 and 0.071 on the Blackwater. There was good agreement in the overall count between replicate early and late visits on the Boyne system, and between counts made from a boat and those from walked transects. Thus, a standard two-visit approach seems adequate for monitoring waterways birds, and boat-based surveys should be carried out where feasible as it is much less labour intensive than walked transects.

The changing fortunes of Red Grouse *Lagopus lagopus* in Ireland: results of the national Red Grouse Survey 2006-08

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Changes in Red Grouse *Lagopus lagopus* distribution between breeding atlases, with an estimated 60% decline in range, led to its inclusion on the Irish Red List in 1999, where it still remains. Much of these changes have primarily been caused by afforestation, mechanical exploitation of turf, and increased grazing in marginal areas, largely by sheep. Hence, many 'moorland' birds that once flourished have experienced declines. Concern was raised with its addition to the Red List and in 2002, the EU Commission decided to take Ireland to task for its failure to protect the Red Grouse and its habitat. The Red Grouse Survey came about largely in response to this EU ruling. A baseline national population estimate was a priority in order to establish the extent of the decline for a species that although sedentary is largely ground dwelling and secretive and thereby difficult to survey. Over the past two years many potentially suitable grouse areas have been surveyed using both traditional count methods and more innovative tape-playback methods. A total of 491 1 km² sites were surveyed using tape-playback. Red grouse occupied 222 sites, with fresh droppings recorded in a further 9 sites, thereby giving a total occupancy of 231 sites (47%). The main results of the standardised survey indicate that there has been no further decline in range in the Republic since the New Atlas 1988-91. Indeed, the addition of supplementary records indicate that the decline in range may have been overestimated, while further analyses on estimating population size will soon be completed.

Studies on the overwintering behavioural ecology of the Greenshank *Tringa nebularia* and Little Egret *Egretta garzetta*

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² Limosa Environmental, Dunmanway County Cork

The overwintering behavioural ecology of the Greenshank has been investigated at estuaries in County Cork since 2002. More recently, the overwintering behavioural ecology of the Little Egret has been included in the study as the probability of competitive inter-actions between the two species became apparent. Current studies, while continuing the measurement of feeding success rates, censuses and spatial distribution of both species, are also focusing on prey availability –especially the Shrimp *Crangon crangon* and other intertidal crustacea.

Breeding productivity of Sandwich *Sterna sandvicensis* and Roseate Terns *S. dougallii* at Lady's Island Lake, County Wexford, 2004-2008

Daly, D.¹ & Newton, S.F.²

¹ National Parks & Wildlife Service, c/o Wexford Wildfowl Reserve, Ardcavan, County Wexford

² BirdWatch Ireland, PO Box 12, Greystones, County Wicklow

The National Parks & Wildlife Service have monitored and managed the Lady's Island Lake tern colony since 1993; BirdWatch Ireland have advised on methodologies and assisted in the maintenance of the databases and production of annual reports over the last five years. Islands in the lake support a colony of 1122-1945 pairs of Sandwich Terns and 66-109 pairs of Roseate Terns. Roseate Tern productivity was high between 2004 and 2007 (1.20-1.43 chicks fledged per egg-laying pair) but in 2008 the late arrival of adults, small clutch sizes and poor weather significantly reduced productivity as also happened at Rockabill, County Dublin. Productivity has been assessed for a small sample of Sandwich Tern nests: this was highest in 2004 (1.21) and declined to 0.60 in 2007 as the number of nesting pairs increased. The Sandwich Tern colony is now one of the largest in Britain and Ireland.

Comparison of Plumages of White-throated Dipper *Cinclus cinclus* and Blackbird *Turdus merula*

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This study compares the plumage of a single Eurasian White-throated Dipper with that of three Blackbirds (all found dead). As expected, the Dipper had far more feathers (3374) than the Blackbirds (mean 1704), with Dipper down and contour feathers being significantly shorter than those of Blackbirds. However, contrary to published information, the plumage of dippers is not exceptionally dense; the mean follicle density of the Dipper was 59.2 follicles cm⁻², that of the Blackbirds 58.6-61.7 follicles cm⁻². Instead, the enhanced insulation of diving Dippers stems from a) much more extensive plumage (the apterylae between feather tracts are fully feathered, whilst naked in Blackbirds), b) substantial down cover of head (absent in Blackbirds), c) extensive down cover of wings. Much of the higher number of feathers in the Dipper is made up of contour feathers rather than down/semiplume feathers (the ratio between Dipper contour and down/semiplume feathers, 3.35:1, was similar to that of Blackbirds, 3.55:1), indicating an insulative function for contour feathers as well as down. Ultrastructural investigation showed

that Dipper chest and back down was substantially finer (more complex) than in Blackbirds, but leg down, and contour feathers of the two species were indistinguishable.

Management of habitats on the Shannon Callows with special reference to their suitability for Corncrake *Crex crex*

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This study was set out to investigate why the corncrake population on the Shannon Callows in the midlands of Ireland showed no recovery despite the introduction of conservation measures in the early 1990s. It was thought, from knowledge of a previous study, to be due mostly to poor survival of chicks during and after the mowing season.

The ecology of chicks between the period of independence and fledging, in particular the timing of their migration; their response to mowing; use of habitats and refuges during and after the mowing season, and the effect of mowing activity were all investigated using radio tracking.

Migration occurred at a mean age of 45 days; the mean migration dates were 3 August for first brood chicks and 3 September for second brood chicks. As most mowing is in August, second brood chicks were exposed to considerably higher risk, though in the absence of mowing, survival of second broods from independence to fledging was similar to that of first broods. Habitat selectivity during the mowing and pre-migratory periods was found to be unrelated to structure and more likely to be determined by availability. Centre out mowing was not effective at reducing chick mortality if the adjacent plot had been cut and use of mowers of width 10' or more increased the risk of chicks being overtaken during mowing operations in these situations.

Provision of narrow margins at plot edges reduced the deaths of chicks where the adjacent plot had been cut whilst the provision of whole plots left as late cover until second brood migration was well advanced provided the best pre-migration refuges. These measures and some additional modifications were built into existing corncrakes conservation measures on the Shannon Callows.

Monitoring and management of Corncrake *Crex crex* populations in Ireland 2003-2008

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Corncrake populations continue to be monitored annually in the three core areas of Ireland - Donegal, West Connacht and the Shannon Callows. Since 2003, the total Irish population has increased overall from 131 to 139 singing males. However, the trends differ across each of the core areas. The population in West Connacht has risen steadily from 27 in 2003 to 44 in 2008; in Donegal numbers rose from 82 to 92, with a high of 108 in 2006. The Shannon Callows population decreased from 22 in 2003 to 4 in 2008. This decline is likely to be attributable almost entirely to summer flooding. In five out of the last six years, flooding occurred at some stage of the Corncrake breeding season, potentially leading to high losses of nests and young. The Corncrake Grant Scheme remains the key mechanism for delivery of Corncrake conservation in Donegal and West Connacht. Habitat management in key areas, such as Tory and Inishbofin islands in County Donegal and Inishbofin, County Galway continues. The aim of this programme is to provide suitable nesting conditions by, e.g., the provision of additional early and late cover vegetation and the recovery of abandoned hay meadows. In the Shannon Callows, the National Parks and Wildlife Service Farm Plan Scheme and Corncrake measures in REPS are gradually replacing the Corncrake Grant Scheme as the key delivery mechanisms for Corncrake management.

Breeding wader research on the Shannon Callows 2007/8

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Populations of the key breeding wader species of Lapwing *Vanellus vanellus*, Curlew *Numenius arquata*, Redshank *Tringa totanus* and Snipe *Gallinago gallinago* have been declining on the Shannon Callows since at least 1997. Research into breeding success has been carried out at four research sites on the Callows in 2007 and 2008. Nest success was monitored through direct observation and/or use of TinyTag® data loggers and nest cameras. Broods were ringed, including colour ringing, and survival was assessed through radio tracking and/or field observations.

Relatively high densities of breeding waders were recorded across all sites in both years. However, high levels of nest predation were observed, averaging between 70-80%. Data loggers suggested that mammalian predators were largely responsible and this was confirmed by nest cameras, with fox and pine marten being observed predating nests at night. Evidence of corvid and mink predation was also observed. Chick survival to fledging was very low in both years, with broods also apparently experiencing high levels of predation, again suspected to be mostly mammalian.

Upland bird monitoring in relation to wind turbines at Slieve Rushen, County Cavan

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Upland birds were monitored between 2000 and 2007 in relation to wind farm development at Slieve Rushen, Co Cavan, using CBS/upland wader walk-over methods. For most species, there was little change in breeding numbers over the period. Red Grouse *Lagopus lagopus* numbers appeared to decrease over several years, but recovered in the latter years of the study. The number and distribution of breeding Golden Plover *Pluvialis apricaria* was constant over the initial four years, but a decline was evident thereafter, with no breeding confirmed in the final years of the study. The outcomes are considered in relation to a range of factors.

In a separate study (2004 and 2005), habitat use by foraging Hen Harriers *Circus cyaneus* was recorded using vantage point watches. The use of open moorland and second rotation forestry was mapped in an area containing a breeding site and operational wind turbines. The results are considered with regard to foraging habitat preferences and the degree of wind turbine avoidance.

Red-throated Diver *Gavia stellata* breeding population, County Donegal

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The small Red-throated Diver breeding population in north and west Donegal was surveyed from 1997 to 2008. The number of breeding pairs varied annually from 3-7, with a mean value of 4.8 pairs. Breeding success (fledged young per breeding pair) decreased from 0.9 in 1999 to 0.3 by 2002, but has recovered to 0.5 in 2008, based on 3-year mean values.

In 2005, amid fears of population decline NPWS initiated a project to provide more intensive research and monitoring of this population, and to implement measures to control predation and manage habitat. There are indications that, surveillance, mink trapping and anti-predator fencing have aided breeding success. Three artificial nest rafts have not, as yet, been used by divers.

A significant constraint to breeding appears to be the availability of suitably sized and located breeding loughs that also meet the other morphological and habitat criteria). Poor sites result in poor breeding performance. It appears

that sites must be within 10 km of the coast and within 5 km of one or more large salmonid lakes used to feed the young. A foraging lake is also important for social behaviour prior to breeding.

Settlement and commercial development has increased steadily near the coast, so that the level of human activity rules out the use of some potential breeding sites and threatens some existing sites due to inadvertent disturbance and habitat damage.

Predation affects at least half of the current breeding sites. Over the four years of the NPWS project, a total of seven young have been lost to predation, mostly by mink, it is suspected, accounting for juvenile mortality of 30% – 40% at three susceptible sites. At other sites, where there is a history of (repeat) clutch losses or early site abandonment, predation appears to be a likely factor. Adult mortality is also a serious concern for such long-lived birds, with at least one incubating bird killed by mink since 2005. Prior to this, three adults were killed over two seasons in 2003-2004 at a long-established site that has not subsequently been re-occupied.

Birds: their protection, promotion and role in developing a sustainable future for Ireland's environment

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Is the neglect and over exploitation of Ireland's natural environment during the life of the Celtic tiger ringing home with the public, government and the public purse? Birds have a significant role in helping to make the political, cultural and economic shift towards a more sustainable future. Despite the prospect of multimillion euro fines we lack proper investment in protecting key natural heritage assets. In particular, there is an urgent need to address the protection of wild birds and their habitat requirements as identified by the European Court of Justice Judgement of December 2007. Specifically, to protect Natura 2000 sites, to put measures in place outside the boundaries of designated areas for priority wild birds and to build on the valuable research and data resource that can in turn inform and build national policy. How do we get the message across to people with the most influence and to those who will ultimately pay the price of losing the immeasurable public benefit that wildlife and their habitats provide? How can we justify investment in our natural infrastructure in an economic downturn? Not least what role could wildlife tourism or ecosystem services play in a sustainable future for Ireland? Using the right information to make informed decisions about conservation priorities, BirdWatch Ireland is developing its policy work as an individual NGO and on a partnership basis with Birdlife International and others. We are targeting the general public, our politicians, and the workings of national and local government.

The influence of edge habitat on biodiversity in a novel crop environment: bird diversity in Irish plantations of Elephant Grass *Miscanthus x giganteus*

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Changes in the amount of edge habitats are important consequences of agricultural intensification. However, we have a poor understanding of how different biota respond to edge effects. Elephant grass is a novel Asian biomass crop in the Irish agricultural landscape that is rapidly replacing traditional land uses. There is some indirect evidence that birds are generally more diverse near a crop edge, but little is known about wildlife use of *Miscanthus*, and the studies to date are poorly replicated or statistically unsound. Sampling was conducted on six farms in southern Ireland from March to June 2007. Birds were surveyed using point counts from the crop edge during three, once-monthly visits. Birds recorded in the crop were allotted to one of two distance bands (0-20m or 20-40m). Changes in diversity, species richness and abundance were analysed with increasing distance into the crop away from the field margin. Comparisons were also made of field boundary versus *Miscanthus* crop bird diversity. Relationships were analysed using GLMs. Bird diversity, species richness and abundance were all significantly higher in the first 20 metres of the crop than 20-40 metres into the crop. Birds were also more diverse

in the field boundaries than in *Miscanthus*. The results highlight the importance of maintaining field margins to bird diversity in *Miscanthus* plantations. Many farmland bird species will be lost from *Miscanthus* cropped areas if the amount of edge habitat is not maximised by maintaining small field sizes.

Management for breeding waders on the Shannon Callows 2007/8

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The 1987 survey of breeding waders on the Shannon Callows recorded one of the three largest concentrations of breeding waders of lowland wet grassland sites in Ireland and Britain, including nationally important numbers of Redshank. However, numbers declined significantly between 1987 and 2002, Lapwing by 82%, Redshank by 71%, and Snipe and Curlew by 68% and 83% respectively. In response, the Breeding Wader Research Project and associated Management Project were established in full in 2007. The Breeding Wader Grant Scheme is administered through the Management Project; its aim is to maintain and restore suitable conditions for breeding through the management of stock. A breeding tier protects nests and chicks and a late season tier creates suitable conditions for breeding the following spring. To date, 273.77 hectares are under agreement.

Several key sites have been targeted for additional habitat restoration work, such as clearing encroaching scrub and increasing chick rearing habitat. Tree removal was carried out on one site during winter 2007 and spring 2008 and Lapwing were confirmed breeding on this site for the first time since 1987. Additional work is proposed for another three high priority sites. This work will also reduce habitat for predators, identified as a key issue by the associated Research Project. A predator control strategy was introduced in 2008. Between February and June, 16 fox, eight mink, 33 Hooded Crows, 19 Magpies, *Pica pica* four rats and one pine martin (live trapped and relocated) were controlled on three key breeding sites.

DNA analysis of Red Grouse: an analysis of taxonomy and genetic diversity

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The taxonomic status of Red Grouse in Ireland has been the subject of considerable debate over the past century. Many ornithologists believe that Irish red grouse should be classified as *Lagopus lagopus scoticus*, which is the same subspecies of red grouse as that in England, Scotland, and Wales. Others believe that the red grouse in Ireland merit unique sub-specific status, namely *L. lagopus hibernicus*. The aim of this study was to compare DNA sequences from red grouse in Ireland and Great Britain to see whether there was evidence of genetic distinction between the two putative subspecies.

However, we found no evidence of genetic differentiation between Red Grouse in Ireland and Great Britain, and therefore our data do not support the classification of Irish Red Grouse as *L. lagopus hibernicus*. Furthermore, the ecological and morphological evidence do not present a strong case in support of *hibernicus*, and therefore we do not currently recommend that Irish red grouse be awarded unique sub-specific status. It is important to note that we cannot entirely rule out the possibility that *hibernicus* is a distinct subspecies because there are a number of evolutionary and demographic reasons which could explain why sub-species or even species share the same DNA sequences.

Evidence was found that levels of genetic diversity in Irish Red Grouse have been declining over the past century, presumably as a result of diminishing population sizes. Loss of habitat and declining numbers fully justify their designation as a Northern Ireland Priority Species for conservation.

Caching behaviour in the Rook *Corvus frugilegus*

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Rooks regularly cache food items-particularly in the autumn and winter. This study investigated the seasonal and diurnal patterns of Rook caching in Cork City and Dublin Airport, Ireland. Detailed studies have been undertaken on the differences in caching behaviour of adult and immature Rooks. These studies have been assisted by the colour marking of a proportion of the Rook population breeding in the grounds of University College Cork.

Long term study of Black Guillemots *Cephus grylle*

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2008 saw the 24th year of study into, amongst other things, the breeding biology of Black Guillemots in the marina at Bangor, County Down. The timing of breeding has changed and is believed to be caused by changes in marine temperatures (*Bird Study* 54, 378-9). Breeding success in the marina varies between sites: the North Pier produces around 1.3 young per pair, whilst the Central Pier produces only 0.6 young per pair. The introduction of a programme of individually colour marking birds has started to show some interesting recoveries that by traditional ringing methods would not have been picked up. In 2008 a Bangor bird was seen as far away as County Louth (so I am appealing for birders to keep their eyes peeled when looking at Black Guillemots on land – are they colour-ringed and if so can the ring be read and even better photographed. Contact me on j.greenwood@stran.ac.uk with all such sightings). Long term study has enabled pair and site fidelity to be assessed.

Identifying Marine Special Protection Areas for the Manx Shearwater *Puffinus puffinus*

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The Manx Shearwater is a widespread breeding seabird in the United Kingdom and Republic of Ireland, nesting mainly on isolated offshore islands. European legislation in the form of the Birds Directive provides a framework for the protective designation of these colonies. The study site, the Copeland Islands in County Down, Northern Ireland, has recently been designated a Special Protected Area based mainly on its Manx Shearwater colony. For seabirds protection is also needed for marine areas around the colony and this can be enforced by creating seaward extensions to existing SPAs. In the case of the Manx Shearwater this means protecting aggregations (rafts) of birds gathering offshore in the evening before alighting at the colony.

Recent work has been carried out by the Joint Nature Conservation Committee which recommends a seaward extension of 4 km for Manx Shearwater colonies unless better local data exists. A new project has been initiated on Old Lighthouse Island, in the Copeland group, which uses Global Positioning Devices (GPDs) to determine the areas used by rafting shearwaters and will provide recommendations for the seaward extension of the existing

SPA. GPDS also allow the feeding movements of shearwaters to be tracked and this information can be used to inform the designation process for offshore Marine SPAs in the Irish Sea.

The winter distribution of Manx Shearwaters is being examined using Geolocators provided by British Antarctic Survey. These Geolocators are also providing data on the feeding areas of the Manx Shearwater during the pre-laying period.

Investigating the role of migratory connectivity in Light-bellied Brent Goose *Branta bernicla hrota* population dynamics and conservation

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Migratory connectivity is the intensity of the spatiotemporal links between breeding, staging and wintering areas. Connectivity can range from 'strong' where groups/populations of individuals breeding or staging together tend to be found together in discrete wintering areas to 'weak' where there is little structure within the flyway and individuals mix much more freely across the annual cycle. Quantifying the strength and elucidating patterns of migratory connectivity for a species has important implications for our understanding of population dynamics and conservation. For example if connectivity is strong, it is likely that some sites (either during wintering or staging) contribute disproportionately to the population either through better annual productivity rates (mediated via carry over effects) and/or higher survival rates. Thus conservation efforts targeted at those sites would represent the most effective use of resources. Similarly some non-breeding sites are likely to be critical at certain times of year (such as Strangford Lough, used as an intermediate staging area prior to winter dispersal into less densely populated regions). This means that both spatial and temporal variation in migratory behaviour is likely to influence population dynamics. Here we use the ongoing programme of marking individual Light-bellied Brent Geese set up by the Irish Brent Goose Research Group and the Icelandic Institute of Natural History and the associated re-sighting database to map linkages between wintering and staging grounds in the Light-bellied Brent Goose. We also consider how such substructure could drive population dynamics and inform future conservation efforts.

Shorebird use of an intertidal and terrestrial habitat matrix during winter: analysis of relative profitability of foraging habitats

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Many shorebirds utilise a combination of coastal intertidal and terrestrial habitats during the non-breeding season. The relative quality of habitats used over this period has implications for individual survival and subsequent breeding success. Availability of these habitats varies across the winter range for most migratory shorebirds. Icelandic black-tailed godwits *Limosa limosa islandica* use both estuarine mudflats and freshwater grassland habitats during the non-breeding season in Western Europe. We studied Black-tailed Godwits *Limosa limosa islandica* in Co Cork, Ireland. Eight study sites consisting of estuarine mudflat and freshwater grassland complexes and one site was seasonally flooded inland grassland. Each habitat matrix was used by godwits throughout the winter months. Large-scale surveys and foraging behaviour studies were conducted to address the following questions: how are intertidal and terrestrial habitats used throughout the winter? What is the relative profitability of foraging on each habitat? What are the vigilance and disturbance costs on each habitat? Despite a

lower average intake rate (IR) on all grassland sites it is apparent that they play an integral role in meeting the energetic requirements for black-tailed godwits throughout the non-breeding season. A combination of mudflat and grassland sites within each matrix are used on a daily basis throughout the non-breeding season. Understanding the habitat requirements of migratory species is essential in conserving habitats to maintain populations. The freshwater grasslands used in Ireland by shorebirds are mainly grazing pasture with little or no protection; here we show that they are an essential part of the habitat matrix.

Mediterranean Gulls *Larus melanocephalus* in Dublin Bay

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Mediterranean Gulls *Larus melanocephalus* have been monitored in Dublin Bay from Dalkey to Sutton since September 2003. The main emphasis of the study has been counting gulls, together with locating and reading colour rings and reporting these to the French-based Mediterranean Gull Research Group.

The birds are monitored year round, with particular attention being paid to when they leave for mainland Europe to nest, which is usually in early March, and to when they return in July. A special search is made for returning juvenile Mediterranean Gulls in July and early August, including the possible occurrence of Irish colour-ringed birds among them.

The numbers of birds are increasing, with the largest flock of 75 (including nine juveniles) being recorded in 2008. Numbers fall rapidly in August as birds disperse to places unknown, including possibly feeding areas offshore in the Irish Sea. Research is continuing to locate their presently unknown wintering area away from Sandycove, where the gulls are hand fed almost daily. There is a roosting area in Dublin Bay, but this does not account for the missing large numbers.

Wader communities in Dublin Bay

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Wader counts have been made on a weekly basis in Dublin since September 2003. Weather permitting, birds are counted 52 weeks per year, to obtain detailed data on the seasonal distribution of species, plumage/moult details, the presence and numbers of juveniles, and on colour rings and flags. To date (mid-September 2008) over 300 detailed counts have been made, with particular emphasis on the North Bull Island, (over 200 counts). These are continuing on a weekly basis. The purpose of the study is to compare the pattern of Irish wader migration with that of species using identical or similar ecological niches on the Canadian prairies, because the nesting areas of the two flyway groups are similar. Examples are Red Knot *Calidris canutus*, Sanderling *C. alba*, Dunlin *C. alpina* and Ruddy Turnstone *Arenaria interpres*.

Special emphasis is placed on obtaining counts in the previously neglected period of May to mid-August, when it was assumed that not much was happening in Irish estuaries. Papers published by the author of this abstract, and Canadian colleagues, on prairie waders have shown that there is a great deal of movement occurring during this summer period. The same has proved to be true in Dublin Bay. There is a gap of about ten days between the end of the northwards spring migration in June and the appearance of the first Lapwing *Vanellus vanellus*. In addition, moulting Oystercatchers *Haematopus ostralegus*, Bar-tailed Godwits *Limosa lapponica* and Curlews *Numenius arquata* are present through the summer.

The distribution curve for waders in Dublin Bay shows that the lowest numbers occur in mid-June, but there are always five wader species present. From around 24th June wader numbers rise very rapidly as presumed unsuccessful breeding birds return to the bay to moult, or stage on migration further south. Peak numbers occur from 21st November to 24th February. They then decrease very rapidly as mainland European nesting birds depart for eastern staging areas such as The Wash (England) or the Wadden Sea (Germany, Denmark and The Netherlands). This is indicated by the presence of colour-ringed or flagged birds from these well-studied wader

areas. A considerable number of waders from Iceland and Greenland, and probably Nunavut-bound migrants, also pass through Dublin Bay, as proved by colour-ringing.

Considerable effort has been put into finding colour ringed or flagged birds in order to identify the origins of waders using Dublin Bay. The general areas of origin have been known for a long time (i.e. Europe and North America), but now this study has clarified the origins of five wader species. The most interesting finding so far is that Sanderlings in Dublin Bay have come from north-east Greenland and Mauretania. This study is continuing, with emphasis on establishing wider links with the Nunavut-Greenland wader breeding areas.

Bird connections between Ireland and North America

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The fact that birds from Greenland and continental North America occur in Ireland has been known since before the 1840s. In the Irish literature emphasis has always been placed on the rare, misdirected North American east coast migrants. On a biomass basis, by far the most important connections with Ireland are those bird species breeding in Nunavut Canada and Greenland and regularly wintering in, or passing through Ireland. The total species and sub-species interconnections with Ireland are over 125, and the list is increasing almost every year. This is due to a number of factors: increased observer knowledge and experience, an increase in the number of colour-ringing and flagging schemes, and shifts in some North American species towards the north-east.

The North American bird connections with Ireland can be summarised as follows, although many species can fit into more than one category:

- (1) Regular migrants to/from Nunavut (north-east Canadian Arctic) – 16 species.
- (2) Regular migrants to/from Greenland – 22.
- (3) Species that potentially follow the northern migration route (Nunavut-Greenland-Iceland) to Ireland and Britain – 61 species.
- (4) Species that follow the North American east coast hurricane-influenced route – 85 species.
- (5) Species that potentially follow a route from south of Bermuda to the north-east due to tropical storms – 10 species.
- (6) Species that originate from the Pacific coast – 2.
- (7) Species that may originate from the Canadian Maritimes-Labrador – 1 species (Great Northern Diver *Gavia immer*).

The connections between Ireland/Britain and North America have already been proved for 41 species, by ringing and by colour ring sightings. The increasing use of colour ringing and flagging is providing much useful data. Ringing has also proved that some Irish and British seabirds visit fishing grounds off Newfoundland and eastern North America.

To try and identify the potential origins of trans-Atlantic migrants, a study was made of the extensive literature on theoretical and actual flight distance capabilities of waterfowl, waders and passerine migrants. For waterfowl and waders the trans-Atlantic crossing to Ireland is well within their flight capabilities, but for small passerines strong favourable winds or ship assistance is essential.

Comparison was made with the known migration time of waders on the Canadian prairies and east coast, and for passerine migrants from North to South America. Most birds are misdirected to Europe during southward migration in the hurricane season (June – November). The timing of Nearctic wader occurrences in Ireland indicates that they are mostly first winter birds, as the Nunavut breeding adults have reached South America one or two months earlier.

Data for rare birds was obtained by a search of the literature on Irish birds going back to 1800. For the common species, data were obtained from published and unpublished sources, and also from the author's 35 years research on the Canadian prairies and Arctic, with additional work in Ireland since 1947.

Breeding gulls on Lough Mask (2006-2008) and Lough Corrib (2007)

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Between 1977 and 2000 the breeding gull populations of Connaught's inland lakes suffered dramatic declines. Numbers pairs of Lesser Black-backed Gull *Larus fuscus* and Black-headed Gull *Chroicocephalus ridibundus* crashed by over 80% and numbers of Common Gull *Larus canus* by 75%. Herring *L. argentatus* and Great Black-backed Gulls *L. marinus* are now largely absent as a breeding species. While gulls are still nesting at all five of Connaught's inland lakes, the main breeding numbers are now concentrated on Loughs Corrib and Mask. In 2006 and 2007 surveys of nesting and fledgling gulls took place at the main nesting colonies of Lough Mask and a nest count was completed in 2008. While the nesting gull population on Lough Mask appears to be stable, productivity is variable. Depredation by American Mink *Mustela vison* and Red Fox *Vulpes vulpes* has been identified at three islands and in 2007 a trial mink trapping programme was successfully completed. In 2007 a survey of Lough Corrib gathered data on the nesting gulls at this site. While gull numbers appear to have stabilised since 2000, the declines during the 1980s and 1990s have yet to be explained. Limited data on terns and Common Scoter *Melanitta nigra* were also gathered.

A surprising cost to raising a family: the carry over effects of late winter foraging asymmetries in Light-bellied Brent Geese *Branta bernicla hrota*

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It has been thought for some time that carry over effects may explain a significant amount of variation in life history parameters; however it is only in the past 10 years that we have begun to get a feel for just how important they might be. Here we describe a migratory system (Light-bellied Brent Geese) where there is marked season variation in habitat use and despotic exclusion of sub-ordinate individuals from high quality habitats during overwintering at Strangford Lough. We use stable isotope analyses to show that there is a paradox, whereby dominant individuals fail to gain access to the highest quality habitats (marine) in late winter, a time when most birds are starting to put on body mass for spring migration. This pattern seems likely to be driven by the poor efficiencies of offspring foraging on a depleted resource, forcing their parents to follow them on to terrestrial habitats where resources are superabundant but of much lower quality. We have evidence that these effects are carried over onto the staging and ultimately the breeding grounds and likely have a pronounced influence on population dynamics.

Granivorous passerines across an agricultural gradient in winter

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Farmland granivorous passerines have shown particular sensitivity to habitat changes associated with agricultural intensification, and winter mortality resulting from reductions in the availability and quality of winter foraging resources is implicated as a primary driver of population declines. In response, conservation measures propose the supplementation of foraging resources in affected areas. Better understanding of habitat preferences and use

patterns is needed, however, to maximise the cost-effectiveness of measures, as species may differ in habitat requirements proximate to supplemented resources.

A comparative study of granivorous passerines was made along a 20 km agricultural gradient in an area of intensive farming in the Fingal region of County Dublin. Attention was focused on species relationships with structural and infra-structural variation in the field boundary habitat. 1 km transect summaries of community and landscape were complemented by fine scale measures of habitat and habitat use, and these were analysed respectively using Redundancy Analysis and Logistic Regression. Species showed significant variation in distribution with respect to farming type. Within seed rich habitat, species responded differently to hedge height, the availability of trees, and to hedgerow intersections.

The Brillouin Index of diversity was used to measure species' "weight of use" of transects (implicating abundance and fine scale distribution). Simple correlative tests identified associations between these measures and the spatial extent of various habitat components, linking habitat use with broader community patterns. The results of the various analyses suggest habitat structure is important in shaping local species assemblages, and provide pointers regarding landscape and local habitat contexts for optimising the location of introduced winter foraging resources.

Does the pattern of bird strikes reflect the rise and fall of bird populations?

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Analyses of the trends in the annual numbers of bird strikes can be based on different scales i.e. micro- scale (local to the airport), macro- scale (regional level) or mega-scale (continental or global). While each airfield may be unique in terms of its environmental and ecological settings, and wildlife management regime, it is of interest to know if the fluctuations in the total number of bird strikes recorded at different airports are correlated. Avian population fluctuations are likely to occur on a continental or regional scale and will be influenced, *inter alia*, by climate, food supply, conservation and legal protection, pollution and disease. Research in the United States has shown that population growth and recovery of large bird species, e.g. Double Crested Cormorant *Phalacrocorax auritus* and Canada Goose *Branta canadensis*, have resulted in a parallel increase in the number of bird strikes (*Proc.IBSC* 26:49-67). However, little comparable work has been undertaken in Europe where, for example, major shifts in some bird species populations are known to be occurring in response to such things as climate change. This paper presents the results of an analysis of bird strike data from Ireland most of which relates to Dublin Airport for the interval 1973-2007. The preliminary results show clear decreases in the number of bird strikes involving the Herring Gull *Larus argentatus*, Starling *Sturnus vulgaris* and Lapwing *Vanellus vanellus* which match well the documented declines in the population sizes of these species. By contrast, at Dublin Airport, there appear to have been increases in the numbers of strikes involving the Woodpigeon *Columba palumbus*, the Golden Plover *Pluvialis apricaria* and most recently the Curlew *Numenius arquata*, which again appear to parallel growth in the populations of these species, although in the case of *P. apricaria* and *N.arquata*, further investigation is required. The results are discussed in the general context of the changing fortunes of bird species in Ireland, in Europe and in the wider Palaearctic, as well as in relation to the possible implications of the Moran Effect.

Bird song and man-made noise

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To date, half of the world's human population is living in urban areas, and if this urbanisation continues, the characteristic environment will be urban. The continuous growth of the human population is accompanied by an increase in man-made noise. Animals must either abandon or adapt to these noisy environments. Observations suggest that noise contributes to a decline in species diversity and population density. The mechanisms underlying these declines are poorly understood, but elevated noise levels could impair the ability of animals to communicate and making it more difficult to attract mates and defend territories. Thus, individuals in noisy habitats will have difficulty in obtaining vital resources, which will ultimately lead to a population decline. I present data on how different bird species change their signals to adjust their song to traffic noise by using a novel experimental approach. By using priority species in the future, this research will make an important contribution to conservation efforts helping when deciding to set the right conservation actions. Moreover, the results are of specific interest to policymakers since noise has been recognised as a major threat for humans and animals.

The effects of rodenticides on the Irish Barn Owl *Tyto alba* population

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The Barn Owl is a Red-listed *Bird of Conservation Concern in Ireland* due to a decline of over 50% in their population during the past 25 years. The reasons for the Barn Owl decline are poorly understood, but can most likely be attributed to the loss of suitable habitat due to agricultural intensification. The use of second-generation anti-coagulant rodenticides has also been implicated as a factor contributing to the decline. Barn Owls are small mammal specialists, and in Ireland commensal rodents can make up a significant proportion of the diet. Rodenticide use as a means of controlling rodents, especially rats, is increasing, and the rodenticides themselves are becoming more toxic. Therefore the potential of secondary poisoning of rodent predators such as the Barn Owl is a concern. Research in Great Britain has shown that the percentage of Barn Owl carcasses containing residues of second-generation rodenticides has increased from 5% in 1983-84 to 38% in 1995-96. In Ireland rodenticides may be having more of an impact, as commensal rodents constitute a greater percentage of the Owls' diet. This research aims to determine the impacts of rodenticide use on the Barn Owl population, and the role these toxins have played in the recent decline. Widespread appeals for Barn Owl carcasses have been made and over 30 carcasses have been collected. From liver tissue analysis, the rodenticide exposure of a sample of the population can be assessed, from which an estimation of the risk of rodenticide use to Barn Owls can be determined.

The ecology of the Barn Owl *Tyto alba* in Ireland, with special reference to two introduced small mammal species; the Bank Vole *Myodes glareolus* and the Greater White-toothed Shrew *Crocidura russula*

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Throughout its range the Barn Owl is primarily a small mammal specialist. Ireland has a reduced small mammal fauna compared to Great Britain and continental Europe. The Bank Vole was first discovered in Kerry in 1964; it is thought to have been accidentally introduced with imported machinery to Limerick in the 1920s. It has since

extended its range, and now occupies the south and mid west, and parts of the midlands. Where it occurs, the Bank Vole is a significant element of the Barn Owls' diet. In March 2008 skeletal remains of the Greater White-toothed Shrew were discovered in Barn Owl pellets collected from a roost in south Tipperary (*Mammal review*, 2008). This species is now known to occur in south Tipperary and east Limerick. The objective of this research is to determine the impacts of these introductions on the Barn Owl population. Study sites have been selected within three geographical regions (inside the range of the shrew and vole, inside the range of the vole and outside the range of the vole). Pellet analysis and infra red nest recording equipment is used to determine the species composition in the diet within each of the three regions. Initial dietary analysis indicates that the shrew is the dominant prey item in south Tipperary, constituting 68.5% of the diet. Radio telemetry allows comparisons of habitat use and home range between the three regions. Breeding ecology and activity patterns at selected sites is also being assessed.

The ecology of the Barn Owl *Tyto alba* in Ireland, with special reference to habitat selection and foraging requirements

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The Barn Owl has undergone a documented decline in its geographical range in recent times. The species is now classified as a Red-listed *Bird of Conservation Concern in Ireland* due to a decline of over 50% in their population during the past 25 years. Recent survey work by BirdWatch Ireland in 2006 and 2007 has revealed further declines over the last ten years. Previous research on the Barn Owl in Ireland has been limited. Due to this lack of research, their ecological requirements, as well as the factors which may have brought about their decline, are poorly understood. In Britain, there has been a greater amount of research focused on the Barn Owls ecology, and in the past the tendency has been to apply this information to Ireland. This may or may not be appropriate. The primary aim of this research is to add to our understanding of the Barn Owls ecology in Ireland, in particular their habitat and foraging requirements, and also to gain a greater insight into the factors which have caused their decline. To determine habitat selection, adult males were trapped and fitted with radio transmitters. Using radio telemetry and night vision equipment, accurate data on the birds' movements, foraging behaviour and habitat use was obtained. Preliminary analysis of this data indicates significant contrasts in habitat use and home range ecology of Barn Owls in Ireland compared to Great Britain. Breeding ecology, diet, and nest and roost site selection is also being investigated at selected study sites.

Hen Harrier *Circus cyaneus* monitoring and research by the Irish Raptor Study Group

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The Irish Raptor Study Group (IRSG) members have been heavily involved in monitoring and conserving the Hen Harrier since the group was founded in 1994. The IRSG was instrumental in promoting the first national Hen Harrier Scientific name survey in 1998-1999. This survey and subsequent surveys and monitoring were the corner stone of the proposed Hen Harrier SPA designations adopted by the NPWS.

Ongoing monitoring by the IRSG in County Monaghan and Counties Cork/Limerick, in particular, were crucial in the IRSG successfully challenging, often as the sole conservation opposition, several key wind farm planning applications among important Hen Harrier sub-populations ranges earlier this decade. The availability of detailed annual breeding records were essential to counter the findings of some shorter term Environmental Impact Statements. At a time when the susceptibility of Hen Harriers to windfarms was being challenged by politicians and interested parties, An Bord Pleanála made some key findings, taking account of IRSG submissions which lead to a greater awareness of the need for a more detailed understanding of the habitat requirements of Irish Hen

Harriers. As a result the precedent of appropriate mitigation for Hen Harriers, in some cases, has become established.

The ongoing UCC Hen Harrier research programme, which aims to guide future forestry policy, was provided with detailed IRSG nest records for some of its study plots in Cork. An initial Hen Harrier winter roost survey by the Munster IRSG has gradually evolved and is now carried out on a national basis. The Munster group initiated Hen Harrier wing tagging in Ireland in 2006, after a long licensing campaign. UCC has effectively expanded the wing tagging effort in their detailed Hen Harrier research programme.

As a specialist raptor group, we will continue to implement tried and tested initiatives as regards Hen Harrier research and conservation management. We duly recognise our group's limitations and will gladly assist other bodies that can maximise our national understanding of this species. Nonetheless IRSG research and lobbying has clearly been at the centre of many Hen Harriers initiatives over the last 10 years. As an amateur group, we need and expect the support of and licensing from the statutory authorities to continue our research, ringing and tagging of Hen Harriers and other raptors going forward.

Roof nesting gulls in Dublin City

Madden, B.

29 La Touche Park, Greystones, County Wicklow

Roof nesting by Herring Gulls *Larus argentatus* in Dublin City was first reported from O'Connell Street in 1972. No further records were published until 1984 when a single pair nested. Nesting has been regularly reported since then though, apart from a limited survey in 1994 (with 21 territorial pairs), no attempt was made to assess the total city population. Lesser Black-backed Gull *Larus fuscus* was first recorded roof nesting in Dublin City in 1991 when a pair bred successfully on a building at Islandbridge. Nesting birds were recorded in the same vicinity in several subsequent years.

In 2001/02, as part of the Seabird 2000 project, a high proportion of the city south of the River Liffey was checked for roof nesting gulls, as well as a substantial part of the city to the north of the River Liffey. A total of 86 proved nesting pairs of Herring Gulls was located in 2001/02. In 2001, chicks were observed in all but seven of 56 nests checked, with a total of 85 chicks counted. Practically all of the pairs nested on chimney stacks, usually utilising the areas between the pots as the nesting site. An approximate total of 20 pairs of Lesser Black-backed Gulls were located in 2001/02. In 2001, successful nesting was proved for eight out of 11 pairs, with a total of 21 chicks. The Lesser Black-backed Gulls showed a preference for flat roofs, with only two on chimney stacks. Since then, nesting by both Herring and Lesser Black-backed Gulls has been proved at three industrial estates in the Dublin suburbs.

The figures presented are minimum totals for the two species and further survey is being undertaken. In light of the dramatic decline in the breeding national Herring Gull population since the mid 1980s (Seabird 2000 data), the population of roof nesting birds in Dublin City is increasingly of conservation value (the city population easily exceeds 1% of the national total).

Birds feeding on berries of non-native species

Madden, B.

29 La Touche Park, Greystones, County Wicklow

A wide range of non-native plants readily set seed in Ireland and are fed upon by fruit eating birds. This study, based in County Wicklow, examines three exotic plants from the southern hemisphere that are widespread in Ireland and which provide, at least locally, useful food supplies for birds. Fuchsia *Fuchsia magellanica* is one of the commonest exotics in Ireland but the fuchsia hedges in western Ireland are composed of var. 'Riccartonii', a horticultural cultivar which hardly ever sets fruit. The typical variety, which is the commonest in eastern Ireland, readily produces fruit and this is taken regularly by Blackcaps *Sylvia atricapilla* and Blackbirds *Turdus merula*. New Zealand Privet *Griselinia littoralis* is frequently used as a screening hedge, though, if allowed, it can grow to a tree of up to 15 m and produces fertile seeds. The small, black berries are taken by Blackcaps and Song Thrushes

Turdus philomelos, and, to a lesser extent, Blackbirds. Cordyline or Cabbage Palm *Cordyline australis* is a frequent tree along the east coast and flowers profusely when mature. The masses of small white berries are fed upon by a wide range of birds, including the resident thrushes, Blackcaps, Starlings *Sturnus vulgaris*, Woodpigeons *Columba palumbus*, Hooded Crows *Corvus cornix* and Magpies *Pica pica*. Of particular interest here is that white berries are absent from the native Irish flora.

Lambay Ornithological Survey, 2003 to 2008

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Studies of seabirds on Lambay continue, with a full breeding census in 2004, partial censuses in 2006 and 2007 and detailed productivity studies on selected species in 2007. Since the last full census in 1999, the most significant population changes in 2004 were for Shag *Phalacrocorax aristotelis* and Razorbill *Alca torda* (substantial increases) and Cormorant *Phalacrocorax carbo* (substantial decrease). The Herring Gull *Larus argentatus* population is now recovering slowly (492 Apparently Occupied Territories in 2007) from a low of 311 apparently occupied territories AOT in 2004. A major development has been the establishment of a gannetry on the island, with a minimum of 68 'good' nests in 2007. The rapid colonisation is particularly noteworthy, with birds noted 'hanging around' the cliffs only in 2006. Also nesting in 2007 was a pair of Common Gulls *Larus canus*, another new breeding species for the island (though nesting may have occurred in the 19th century). These two species bring the total number of seabird species currently breeding on Lambay to 14, making it one of the most diverse seabird colonies in Ireland (though Manx Shearwater *Puffinus puffinus* has a precarious foot-hold). Lambay also supports an important breeding population of Oystercatchers *Haematopus ostralegus*, with 37 occupied territories in 2004.

Winter visits to Lambay continue annually. The Greylag Goose *Anser anser* population declined sharply since winter 2003/04 (252), with practically no birds in the following 3 winters but 60 birds in March 2008. This is likely to be due to a redistribution to other east coast sites, though possibly may reflect a drop in the wintering population in Ireland (see *Wings* 50: 11). In contrast, the wintering Brent Goose *Branta bernicla hrota* population is thriving (mean of 256 for 5 winters 2003/04-2007/08). New species continue to be added to the island list, with Sabine's Gull *Xema sabini*, Little Egret *Egretta garzetta* and Whooper Swan *Cygnus cygnus* recent additions.

The breeding birds of Inishturk, County Mayo

McGreal, E.

NPWS, Aghinish, Ballinrobe, County Mayo

In 2008 an initial breeding bird census was undertaken on Inishturk, an inhabited island measuring c.6.5 km², located some 9 km off the south Mayo coast. This revealed breeding populations of 32 species including 10 diurnal seabirds of which Northern Fulmar *Fulmarus glacialis*, Shag *Phalacrocorax aristotelis*, Black Guillemot *Cephus grylle* and Great Black-backed Gull *Larus marinus* were found to occur in nationally important numbers. A number of former breeding species associated with traditional farming practices such as Corncrake *Crex crex* and Twite *Carduelis flavirostris* were not located. It is hoped to complete the census in 2009 and to include the associated islands of Caher, Inishdalla and Ballybeg and also to ascertain the presence or absence of nocturnal seabird species such as Manx Shearwater *Puffinus puffinus* and Storm Petrel *Hydrobates pelagicus*. The relative accessibility of the seabird colonies, their high species diversity and the existence of a regular ferry service suggest that Inishturk would make a suitable west coast location for long-term seabird monitoring studies.

The corvid populations of southwest County Mayo

McGreal, E.

NPWS, Aghinish, Ballinrobe, County Mayo

Corvid populations in Ireland have benefited from comparatively recent changes in land usage and management. However, with the possible exception of Chough *Pyrrhocorax pyrrhocorax*, very little quantitative information on these populations has been carried out. Since 2005 an effort has been made to ascertain population estimates and distributions of all 7 corvid species breeding within a defined area of 750 km² in Southwest Mayo. Preliminary work has indicated that the Raven *Corvus corax* population has increased substantially due to a contraction in individual territories and the more widespread use of tree nesting sites. A decrease in persecution has also been a contributory factor and this may also apply to the Magpie *Pica pica* and Hooded Crow *C. cornix* populations. The latter has also adapted to exploit new food sources such as that available from finfish and mussel farms. Within the study area Jackdaws *C. monedula* and Rooks *C. frugilegus* are closely associated with grassland and human settlements with the majority of rookeries located in mature Sycamore groves. The range expansion of the Jay *Garrulus glandarius* has corresponded with that of coniferous afforestation over the previous 40 years but the small breeding population is still largely confined to remnant oak woodlands within the area.

The Ecology of Black-headed *Chroicocephalus ridibundus* and Common Gulls *Larus canus* breeding at Lough Mask, County Mayo

McGreal, E.

NPWS, Aghinish, Ballinrobe, County Mayo

Both Black-headed and Common Gulls are now treated as species of conservation concern in Ireland due to a large contraction in breeding range and population size over the previous 25 years. Since 2006 a colour-ringing scheme for both species has been in operation at Lough Mask, County Mayo, an inland site that holds nationally important breeding numbers of both species. The primary aim of the study is to provide information on dispersal patterns, survival rates, site fidelity and longevity and to act as a mechanism for monitoring local population trends. To date over 1000 Black-headed Gull and 270 Common Gull pulli have been colour-ringed at the site. From those ringed in 2006 and 2007 there has been re-sightings received for 4.75% of Black-headed Gulls and 16.3% of Common Gulls. Initial re-sighting returns suggest that dispersal for both species, post fledging, is in a predominantly south/southwest direction but that Black-headed Gulls may disperse over a broader front and at greater distances from the natal colonies. From 2009 the main focus of the study will be to closely monitor fluctuations in breeding numbers, productivity, predation, time budgets and the recruitment of colour-ringed birds back to the breeding colonies.

The Twite *Carduelis flavirostris* in Ireland

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The population and distribution of Twite is believed to have seriously declined over the past 50 years. It is now one of three red-listed passerines on Birds of Conservation Concern in Ireland. Despite this unfavourable conservation status, no study had ever focused specifically on Twite. This lack of knowledge gave us the impetus for a detailed study of its ecology in Ireland. We focused on breeding populations in Counties Mayo and Donegal from 2005 to 2008. We estimate the breeding population for Ireland to be in the region of 100 pairs. This figure is based on intensive breeding surveys in the study areas along with analysis of recent records from throughout Ireland. These birds appear to be restricted to the northwest and north coasts, with a very small population in the west and southwest of the country. Breeding Twite can be categorised as 'Endangered' (EN B1ab(ii, iii); C2a(i)) using the IUCN criteria for the categorisation of Red List species and are therefore considered to be at 'very high risk of extinction in the wild' in Ireland. We estimate a minimum winter-season population of 800-900 birds. This indicates that winter migrants, most likely from Scotland, augment Irish breeders. Colour-ringing studies show that our Twite

over-winter within 25 km of their breeding areas. Twite depend on tall heather within 2 km of low intensity agricultural land during the breeding season. Wintering birds in Ireland use coastal areas, particularly saltmarsh, cattle ring feeders, and areas of disturbed ground as their primary food sources.

Rapid assessment of bird species richness and diversity within agricultural landscapes using the Field Boundary Evaluation and Grading System

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The utilisation of rapid assessment methods in the field to assess bird species richness and diversity is an important objective for the conservation of farmland species. In the current study, the potential of a relatively straightforward index method for evaluation of the potential ecological quality of field boundaries, the Field Boundary Evaluation and Grading System (FBEGS), is assessed as a rapid, surrogate tool for the measurement of breeding bird population statistics in Irish farmland. The FBEGS index is calculated based on structural features, associated features, connectivity features, botanical diversity and overall boundary features. The study was carried out on a sample of fifty farms in the south east of Ireland. The FBEGS index was found to be an effective predictor of a range of bird population statistics during the breeding season. It is concluded that the FBEGS index has high potential as a surrogate measure for tracking the likely effects of ongoing changes in the farmed landscape on bird populations.

Re-establishing a population of the White-tailed Sea Eagle *Haliaeetus albicilla* in Ireland

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Species reintroduction has become an important conservation tool in preventing global extinction of threatened bird species and also in restoring a species to part of its historic range following extirpation. White-tailed Sea Eagles have been extinct as a breeding species in Ireland since 1898 following centuries of range contraction and local extinction resulting from deliberate human persecution. In 2007a project to re-establish a viable self-sustaining population of the species in Ireland began in County Kerry with the release of 15 eaglets collected under licence from nests in Norway. A further 19/20 birds were released in 2008. Following release most birds wintered in upland areas in Kerry rather than disperse to the coast. Most dispersal took place in March-May with two birds summering as far away as Northern Ireland. Based on Norwegian data it is expected that birds will return to near the release site ('natal area') before breeding. Between 2007-2011 we plan to release up to 95 juvenile eagles to form the nucleus of a breeding population. Population modelling based on data from the Scottish WTSE population suggests that 35-45 birds should survive to breeding age (5-6 years). However, in 2007-2008 known mortality was somewhat higher than expected (27%). Moreover, all mortalities (4) were due to a single cause, poisoning. Accidental and/or deliberate poisoning is likely to be the primary threat to reestablishment of WTSEs in Ireland.

A study of the waterfowl populations on Lough Carra, County Mayo, 1967-2006

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¹ Cathair Cill Ard, Killard, Doonbeg, County Clare

² Deceased

³ Carrajames, Belcarra, County Mayo

⁴ Ballyspillane, Middleton, County Cork

This study examined the population fluctuations of nine waterfowl species on Lough Carra in County Mayo by comparing count data from two waterfowl counting programmes conducted from 1967 to 1980 and 1995 to 2006. It also examined the population fluctuations of a further six waterfowl species from 1995 to 2006. To add to existing population data, a total of 36 waterfowl counts were conducted as part of the study over 22 months from November 2004 to August 2006. Comparative breeding surveys on ten islands on the lake were undertaken during 2005 and 2006 to compare current breeding populations to those from 1968 to 1973. To develop hypotheses in relation to the decline in the populations of certain species, predation and negative habitat changes were investigated. It was found that seven duck species have severely declined on Lough Carra since the 1960s/70s with Teal *Anas crecca*, Pochard *Aythya ferina* and Mallard *Anas platyrhynchos* populations down by 91%, 89% and 88% respectively. The once nationally recognised Mallard breeding population has crashed partly due to high levels of predation and changes to breeding and feeding habitat. Evidence suggests that the American Mink *Mustela vison* and Hooded Crow *Corvus cornix* have depredated the nests of Mallard and Tufted Duck *Aythya fuligula* but also suggests that mink prey upon the adults and juveniles of those species as well as Moorhen *Gallinula chloropus* and Teal.

Study of the Dublin Port tern colony

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This project was reported on in the proceedings of the last two Ornithological Research Conferences, in 1997 and 2003. By 2002 the Common Tern *Sterna hirundo* breeding population in Dublin Port was 233 pairs, while 2-6 pairs of Arctic Terns *Sterna paradisaea* bred annually. Since then, the Common Tern population has continued to increase, to 347 in 2006, 443 in 2007 and 460-470 in 2008. Arctic Terns have also increased from 2-6 pairs to c.30 pairs in 2008.

In spite of heavy chick losses in torrential rains in the 2007 and 2008 breeding seasons, a total of 3,669 chicks have been ringed so far, most of which fledged successfully. A paper on the breeding terns in Dublin Port between 1995 and 2003 has been published (Irish Birds 7 369-374). The main tern breeding site in Dublin Port has been proposed for inclusion in the South Dublin Bay Special Protection Area because of its national importance for Common Terns. It is planned to carry out repairs and improvements to the main nesting platform, to allow further increases in breeding pairs and improved breeding success.

Breeding seabirds on Ireland's Eye, County Dublin

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This project, started in 1986, is outlined in the proceedings of the 2003 Ornithological Research Conference and is continuing. Censusing of the breeding seabirds between 2003 and 2008 has shown changes in numbers over that period, notably: Gannets *Morus bassanus* increasing from c.220 to 375 pairs; Cormorants *Phalacrocorax carbo* varying between 485 and 583 pairs; Shags *Phalacrocorax aristotelis* increasing from 44 to 80 pairs; Herring Gulls *Larus argentatus* slowly recovering from a low of 134 pairs to 220 pairs; Kittiwakes *Rissa tridactyla*, which peaked at 1,016 breeding pairs in 2004, decreasing to 478 pairs in 2008, with very low breeding success; Guillemots *Uria aalge* peaking at 3,568 breeding individuals in 2004 and decreasing to 2,829 in 2008; Razorbills *Alca torda* peaking at 810 breeding individuals in 2004 and decreasing to 732 in 2008; Puffins *Fratercula arctica* have

increased recently to an estimated 25-35 pairs. In addition to censusing the breeding seabirds, large numbers of Cormorant chicks are ringed annually, while small numbers of Shag, Herring Gull and Great Black-backed Gull *Larus marinus* chicks are also ringed.

Study of breeding Cormorants *Phalacrocorax carbo* at Irish east coast colonies

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Between Strangford Lough (County Down) and Little Saltee (County Wexford), virtually all the Cormorants breeding on the east coast of Ireland are concentrated in three colonies on the Dublin Coast: Lambay, Ireland's Eye and St. Patrick Island (Skerries). The first colony on Lambay increased from 317 pairs in 1969-70 to a peak of 1,027 pairs in 1985-88 before many of the birds moved to found a second colony on Ireland's Eye. More recently, Cormorants colonised St. Patrick's Island, and the breeding population of the three colonies combined reached c.2,000 pairs, over 40% of the entire Irish breeding population (Seabird 2000). Unfortunately, due to adverse weather and other circumstances, it has not always been possible to census the breeding Cormorants at all three colonies each year, but there has generally been an upward trend in numbers over the last decade. However, the 2008 censuses at Ireland's Eye and St. Patrick's Island produced 485 and 449 pairs respectively, but it was not possible to visit Lambay. It seems likely that the east coast population suffered a significant decline as over 1,000 pairs are unlikely to have been nesting on Lambay.

Apart from censusing the Cormorants, clutch and brood sizes are recorded, and an estimate is made of annual productivity. Food regurgitated by pulli is sampled to indicate which fish species are being exploited. Large numbers of Cormorant pulli are ringed each year (totalling over 7,000 to date) and recoveries indicate that many first-winter birds move to NW France and the Atlantic coasts of Spain and Portugal. Thanks to the Environmental Protection Agency which provided a grant in 2008 to cover the high cost of rings and boat fares. Thanks also to Dr. Ciaran O'Keefe and Julie Roe for assistance at the St. Patrick's Island colony, and to others who helped with ringing on Lambay and Ireland's Eye.

Study of non-breeding Mute Swans *Cygnus olor* at Bray Harbour, County Wicklow and Broadmeadow Estuary, County Dublin

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20 Cuala Road, Bray, County Wicklow

This study commenced at Bray Harbour, County Wicklow in 1996, when numbers of Mute Swans there increased rapidly following the commissioning of a new sewage treatment plant and a great improvement in water quality. Over the following years the numbers of swans has increased to a peak of 170 birds, while at the same time the swans have taken to hand-feeding by the general public. This has made it possible to catch and ring most of the swans present since 2003. It soon became clear from ringing recoveries that many of the Bray Harbour swans moved between here and the Broadmeadow Estuary at Swords, County Dublin, where up to 120 birds are also accustomed to hand-feeding. Catching and ringing Mute Swans at the Broadmeadow Estuary has been carried out since 2006, and censusing and ringing continues at both sites. To August 2008 a total of 450 Mute Swans have been ringed, and resightings and recoveries of ringed birds are yielding interesting information on movements, site fidelity, survival/mortality, causes of mortality, etc. Some birds have moved to north Wales, NW England and the Isle of Man, with one returning to Bray.

Members of the general public are almost always present during swan catching and ringing sessions, and the opportunity is taken to inform them about the objectives and findings of bird ringing, and about wetland and bird conservation. A paper on the Mute Swans at Bray Harbour between 1996 and 2005 has been published (*Irish East Coast Bird Report* 2002). The study was aided by a Heritage Council grant in 2008.

Study of the breeding birds of the Tolka River Valley Park in Fingal County

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The Tolka River Valley Park extends 8 km along the Tolka River from the border Fingal County/County Meath border to Ashtown. Much of it occupies the flood plain of the river and about 75% of the park is currently "undeveloped" as a formal and traditional public park. In order to inform future management and development of the park, a study of the breeding birds of the park was commissioned by Fingal County Council. Following a reconnaissance visit in April 2007, the fieldwork was carried out during two early morning visits in early and late May.

A total of 55 bird species was recorded during the survey, 47 of which were considered to be breeding or probably breeding, three as possibly breeding, and five present but not breeding in the park. The variety of habitats within the park (unmanaged wet grassland, managed grassland, marsh, hedgerows, woodland, meandering and fast-flowing river, ponds, etc.) accounted for the quite high diversity of aquatic and terrestrial bird species. Notable birds recorded included breeding Tufted Ducks *Aythya fuligula*, Grey Wagtails *Motacilla cinerea*, Dippers *Cinclus cinclus*, Blackcaps *Sylvia atricapilla* and Treecreepers *Certhia familiaris*. Based on the findings of the survey, recommendations were made to Fingal County Council regarding the maintenance of the diverse habitats of the park.

Study of aquatic and woodland birds in the Coosan/Killinure Loughs complex, County Westmeath, in 2006-2007

Merne, O.J. & Madden, B.

Biosphere Environmental Services, 29 La Touche Park Greystones, County Wicklow

This study was carried out between March 2006 and March 2007 as part of a study for a proposed extension of the Shannon navigation to Glassan, County Westmeath (proposed by Waterways Ireland). The study investigated the breeding bird communities of Killinure and Coosan Loughs, Ballaghkeeran Bay, the Glassan River Callows, and an adjoining area of mixed woodland. This was done over three visits in April, May and June 2006. The wintering waterbirds using Killinure and Coosan Loughs and Ballaghkeeran Bay were surveyed and censused at monthly intervals between September 2006 and March 2007. In addition, reedbeds at the Glassan River mouth were investigated in July and August 2006 to determine if they were used as a pre-migratory fattening site for Sedge Warblers *Acrocephalus schoenobaenus* and/or a night roost for hirundines.

Ten species of waterbirds were recorded breeding on the lakes and callows, with Little Grebe *Tachybaptus ruficollis*, Great Crested Grebe *Podiceps cristatus*, Mute Swan *Cygnus olor*, Moorhen *Gallinula chloropus* and Coot *Fulica atra* being most numerous. Mallard *Anas brachyrhynchos*, Water Rail *Rallus aquaticus*, Lapwing *Vanellus vanellus*, Snipe *Gallinago gallinago* and Redshank *Tringa tetanus* were also recorded nesting or attempting to nest. The woodland breeding bird community consisted of 30 species, many of which occurred at high density. The most notable species were Blackcap *Sylvia atricapilla*, Spotted Flycatcher *Muscicapa striata*, Jay *Garrulus glandarius* and Lesser Redpoll *Carduelis cabaret*. The maximum number of wintering waterbirds recorded was 1,729 of 23 species, 14 of which occurred in significant numbers, including nationally important numbers of Little Grebes and Teal *Anas crecca*. Outside the main breeding and wintering seasons, a flock of 3,150 Golden Plover *Pluvialis apricaria* was recorded on callows beside Coosan Lough in April 2006. The study found that the reedbeds at the mouth of the Glassan River did not function as a pre-migration autumn site for Sedge Warblers or roosting hirundines. Killinure and Coosan Loughs and Ballaghkeeran Bay are included in the Lough Ree Special Protection Area, while they and the Glassan River Callows and woodland are included in the Lough Ree candidate Special Area of Conservation.

Waterbird monitoring at Dundalk Bay, County Louth

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This project, started by OJM in 1987, and outlined in the proceedings of the 2003 Ornithological Research Conference, is continuing, with BM participating in recent years. The main objective is to provide September to March monthly waterbird counts for the Irish Wetland Bird Survey (I-WeBS), at one of Ireland's most important wetlands which is a Special Protection Area. In addition, Dundalk Bay is covered in April and August (sometimes also in May and July), outside the I-WeBS period, to monitor the large numbers of waterbirds using the site during spring migration and early autumn migration periods. Because the site is so large and complex, and supports high numbers of waterbirds (up to 57,000), it is not possible to complete the monthly counts during the I-WeBS high tide period. A beneficial consequence of this is that a large amount of the data collected over the last 22 years relates to low and medium tide usage of the site by waterbirds, which is useful for assessing the impacts of local developments and activities such as shellfish harvesting. All data are submitted to the I-WeBS database.

Survey of breeding birds in Fingal woods

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Fingal County Council commissioned OM and JR to carry out a survey of breeding birds in eight woodland areas in Fingal County in 2006. The woodlands concerned were at Santry Demesne, Howth Castle Demesne, Malahide Demesne, St. Ita's Hospital (Portrane), Ardgillan Demesne, Hampton Demesne, Gormanstown College and Delvin River Woodland. The survey was carried out by making early morning visits (dawn to 10.00 hrs) to each woodland in April and May 2006, and large representative transects were walked to record all woodland birds seen and heard. The purposes of the surveys were to provide woodland bird community information for the Fingal Biodiversity Action Plan, and to establish baseline data for future monitoring.

Bird diversity in the eight woodland areas varied between 34 and 50 species, with the average being 39. Most were common and typical of lowland, mainly deciduous woodland in the east of Ireland. Some of the woodlands contained ponds, in which Little Grebes *Tachybaptus ruficollis*, Grey Herons *Ardea cinerea*, Mute Swans *Cygnus olor*, Mallard *Anas platyrhynchos*, Tufted Ducks *Aythya fuligula* and Moorhens *Gallinula chloropus* were recorded. Notable among the terrestrial species were widespread Sparrowhawks *Accipiter nisus*, a Peregrine *Falco peregrinus* nest in one wood, Blackcaps *Sylvia atricapilla* common in all woods, Wood Warblers *Phylloscopus sibilatrix* in two woods, and Crossbills *Loxia curvirostris* in a coniferous section of one wood. Worryingly, only one pair of Spotted Flycatchers *Muscicapa striata* was recorded, even though there was much suitable habitat.

Observation and ringing of spring and autumn migrants on Great Saltee, County Wexford

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A Bird Observatory on Great Saltee (off the south County Wexford coast) was manned in spring and autumn between 1950 and 1963. After a gap of 13 years, the Great Saltee Ringing Station (GSRS) was established in 1977. The main objective of GSRS was the annual ringing of thousands of seabirds, mainly chicks, but small-scale ringing of migrants (mainly passerines) was also carried out in late April/May and late August/September (sometimes later into the autumn). Seabird ringing was discontinued after the 2003 breeding season, but ringing of migrants has continued since then, albeit on a smaller scale, with a maximum of 628 birds being ringed in 2007.

Apart from ringing migrants, observations of birds are carried out on a daily basis and records are kept in standard bird observatory format

Studies of Waterbirds in South Dublin Bay, 2006-2008

Merne, O.J., Madden, B., Archer, E. & Porter, B.

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Constraints mapping studies have been prepared for two major development projects centred in South Dublin Bay: the Sutton to Sandycove Promenade and Cycleway (S2S) – Phase 2, extending from Irishtown to Dun Laoghaire West Pier (promoted by Dublin City Council/Dun Laoghaire Rathdown County Council) and the Dublin Eastern Bypass, linking Dublin Port with the N11 road to the southeast (promoted by the National Roads Authority). These developments traverse South Dublin Bay, which is a proposed Special Protection Area under the EU Birds Directive, and as such have the potential for significant impacts on the waterbirds which feed and roost in the Bay. Biosphere Environmental Services (in association with Scott Wilson Consulting Engineers & Thoir Consult respectively) was engaged to carry out baseline surveys and censuses of waterbirds in South Dublin Bay, to inform the assessment of the environmental impacts of the proposed developments on the waterbirds and their feeding and roosting habitats.

The survey/census work for the Eastern Bypass study was carried out at weekly intervals between August 2006 and July 2007, with an extension to September 2007 to provide information on roosting terns for two seasons. The study area for this survey/census covered the intertidal flats between South Bull Wall, Irishtown and Williamstown, including Booterstown Marsh/Williamstown Creek.

The survey/census work was undertaken at weekly intervals between August 2007 and March 2008. The study area for this survey census covered a 300 m wide band of intertidal flats (from the high tide mark) between Irishtown and Dun Laoghaire West Pier, and including Booterstown Marsh/Williamstown Creek. Fieldwork was undertaken at different stages of the tidal cycle, and at different times of the day, in order to establish which areas are most important for feeding and roosting waterbirds. Particular attention was paid to recording post-breeding/pre-migration dusk roosting by internationally important numbers of terns. Previous information on waterbird numbers and distribution in South Dublin Bay derives mainly from the Irish Wetland Bird Survey (I-WeBS), but that survey covers only the months of September to March, when counts are carried out at monthly rather than weekly intervals, and usually around the high tide period. Furthermore, the use of South Dublin Bay as a dusk roosting area by large numbers of terns and gulls is not covered by the I-WeBS counts. Therefore, the combined series of surveys/censuses carried out for these projects represents the most comprehensive study of waterbird species, their numbers, distribution and utilisation of South Dublin Bay carried out so far. It is anticipated that a series of papers on various aspects of the studies will be prepared so that the data will be more widely available as an aid to future studies.

Ecology and conservation management of terns at Lady's Island Lake, County Wexford 2004 – 2008

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National Parks & Wildlife Service, Wexford Wildfowl Reserve, Ardavan, County Wexford

The management and protection of Ireland's largest tern colony at Lady's Island Lake, County Wexford by the National Parks & Wildlife Service has been ongoing. Two islands within Lady's Island Lake support breeding species other than the four regularly breeding terns such as Black-Headed Gull, *Chroicocephalus ridibundus* Shelduck, *Tadorna tadorna* Mallard, *Anas platyrhynchos* Gadwall *Anas strepera*, Shoveler *A. clypeata*, Oystercatcher *Himantopus ostrelagus*, Ringed Plover *Charadrius hiaticula*, Redshank *Tringa totanus* and for the first time in 2008 a single pair of Lapwing *Vanellus vanellus*. All the breeding species benefit from the tern conservation project which starts early in the year with predator management. Terrestrial mammalian and avian predators are controlled under licence and monitored throughout the breeding season. Liaison with lake users throughout the season has generated goodwill for the project and the terns suffer minimal human disturbance.

Black-headed gull numbers have remained stable ranging from 951 pairs to 1042 pairs during 2004-2007 and peaking at 1218 pairs in 2008. Sandwich Terns *Sterna sandvicensis* have continued to increase, possibly at the expense of other colonies and have increased from 1122 pairs in 2005 to 1800 pairs in 2007 and 1945 pairs in 2008. Roseate Terns *S. dougallii* have increased from 66 pairs in 2004 to 109 pairs in 2008. Ring reading suggests that this increase is at least in part the result of previous good productivity years on the site. Common and Arctic terns *S. hirundo* and *S. paradisaea* have also increased every year since 2004 when 673 pairs were counted to 940 pairs in 2008. In 2007 a single pair of Little Terns *Sternula albifrons* nested on Inish giving us all five Irish breeding terns at Lady's Island Lake for the first time. They were unsuccessful and did not nest again in 2008.

Seabird numbers & productivity at Irish SPAs ~ 2006 & 2007

Newton, S.F. & Trewby, M.

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The principle aim of this two-year study was to establish sample plots for monitoring the productivity of seabirds breeding at selected (SPA) colonies in Ireland (list below). By determining breeding success in 2006 and 2007 at these selected sites this study provides baseline breeding productivity estimates, which for each of the species monitored can be compared:

- a) among Irish colonies sites in 2006 and 2007
- b) to productivity at UK colonies in 2006 and 2007, as well as estimates from previous years
- c) to long-term productivity averages from Irish and UK colonies
- d) to future productivity estimates from the same colonies within Ireland

At some of the seabird colonies targeted during this study, complete or partial censuses were conducted for certain species. This count data can be compared to all-Ireland censuses collected during *Operation Seafarer* (1969-70), *SCR Census* (1985-88), *Seabird 2000* (1998-2002) and interim censuses at selected colonies to establish population trends. In addition, regional NPWS staff and volunteers regularly collect information on seabird numbers from colonies within their respective areas. An exercise in the compilation of this valuable data was undertaken.

Sites covered: Rockabill, Skerries Islands, Lambay, Ireland's Eye, Howth Head, Great Saltee, Old Head of Kinsale, Great Skellig, Cliffs of Moher, Downpatrick Head, Aughris Head, Inishmurray, Tawny Hill-Muckros Head-Dundawoona Point, Horn Head.

Species covered: Northern Fulmar *Fulmarus glacialis*, Northern Gannet *Morus bassanus*, Great Cormorant *Phalacrocorax carbo*, European Shag *Phalacrocorax aristotelis*, Lesser Black-backed Gull *Larus fuscus*, Herring Gull *Larus argentatus*, Great Black-backed Gull *Larus marinus*, Black-legged Kittiwake *Rissa tridactyla*, Common Guillemot *Uria aalge*, Razorbill *Alca torda*, Black Guillemot *Cephus grylle*

Upland Bird Survey: the distribution and breeding status of Golden Plovers *Pluvialis apricaria* in west Mayo and Connemara, 2004

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The primary focus of Year 3 of the Upland Bird Survey was the detection and determination of Golden Plover breeding status in order to estimate the size of the breeding population in the remainder of their range in the Republic of Ireland. We surveyed parts of County Mayo (Owenduff/Nepin complex SPA) and suitable habitat in both east and west Connemara, County Galway. All sites visited were surveyed for Golden Plover *Pluvialis apricaria* between 2 April and 13 July. Sites selected were based on prior knowledge from earlier breeding atlas surveys and from known historical sites on file at NPWS, BirdWatch Ireland and other sources. A total of 91 tetrads (2 km x 2 km) were surveyed. Most tetrads were surveyed twice (n=69, 75.8%), except for those that were considered unsuitable as breeding habitats for Golden Plover on the basis of the first visit. The dominant habitat types of Golden Plover tetrads were largely upland and lowland blanket bog and areas of eroded bog and heath.

Sites were surveyed using transect methodologies with one or two surveyors walking parallel 1km transects 200m apart. Where possible all apparently suitable habitats in a tetrad were covered. Overall Golden Plover were recorded in 48 tetrads with breeding birds detected in 42 tetrads. Golden Plover were located in 36 out of 85 tetrads on first visits (including flocks of 17, 20, 23, 32 individuals) with an estimated 40 breeding pairs recorded in 32 tetrads (average per tetrad: 0.47 ± 0.07 breeding pairs). An estimate of 53 breeding pairs (average per tetrad: 0.79 ± 0.14 breeding pairs) located in 33 out of 69 tetrads on the second visits was made. Two flocks (10 & 30) of Golden Plover were also seen in adjacent tetrads to those surveyed on first visits with three records (including flocks of 8-12 & 5 birds) for adjacent tetrads on second visits. The most important Golden Plover sites were located in the Owenduff-Nephin complex SPA in north Mayo; on the Maumtrasna Plateau, near Lough Mask in south Mayo and in east Connemara, north of Spiddle. Of the 52 bird species recorded at these sites, Red Grouse *Lagopus lagopus*, Lapwing *Vanellus vanellus* and Curlew *Numenius arquata* are species of high conservation concern (Red List) with 17 Amber-listed (medium conservation concern) species, including Golden Plover, recorded. Red Grouse were recorded in 33 tetrads and there were also two records for Red Grouse outside survey squares. Breeding Dunlin *Calidris alpina* and Snipe *Gallinago gallinago* (both Amber-listed) were present in eight (plus one outside record) and 25 tetrads respectively. Unfortunately, lack of time prevented survey of potential Ring Ouzel *Turdus torquatus* sites in 2004.

Ecology & conservation of terns on Rockabill, County Dublin, 2004-2008

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Rockabill Island is the single most important colony of Roseate Terns *Sterna dougallii* in Europe and is pivotal in the dynamics of the NW European metapopulation. The number of pairs nesting on Rockabill has increased steadily during the 5-year period (mean 776, range 658-928). Their productivity was high during the period 2004-2006 (mean at 1.44 chicks fledged per egg-laying pair, range 1.36-1.48) but decreased in 2007 to 1.11 and again in 2008 to 0.73. High rainfall was considered to be the main factor influencing the low productivity in 2007, whereas in 2008 an unusually low mean clutch size of 1.36 (the reason for which still needs to be determined) and poor weather were the principal factors. Food supply over the 5-year breeding periods was apparently sufficient, principally comprising sprats *Sprattus sprattus*. Sandeels *Ammodytes* sp. were a minor component of their diet. Common Tern *Sterna hirundo* numbers have increased throughout the 5-year period (range 1068-1411 pairs). The mean clutch size was relatively steady during 2004-2007 (mean 2.38, range 2.26-2.57) but fell in 2008 to 1.89. Productivity dropped to 0.84 in 2007 and to 0.55 in 2008 for which prolonged rainfall in both years, and low clutch size in 2008 were deemed principal factors. The Arctic Tern *S. paradisaea* colony on Rockabill is somewhat peripheral to, and independent of, the Roseate / Common Tern colony. Numbers remained stable during the 5-year period (range 200-281). Their productivity for 2004-2007 ranged <0.16-0.66. Productivity was not estimated in 2008. Clutch size ranged 1.62-1.98 for the 5-year period with the lowest clutch recorded in 2008. Rockabill supported one breeding pair of Sandwich Terns in 2006 and 2008, with a chick successfully fledging in 2008. Tern conservation and research at Rockabill is jointly managed by BirdWatch Ireland and National Parks & Wildlife Service with additional financial support from the RSPB. The Commissioners of Irish Lights provide accommodation on the island.

Conservation of terns at Dalkey Island, County Dublin, 2004-2008

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² Dún Laoghaire-Rathdown County Council, Town Hall, Dún Laoghaire, County Dublin

The smaller satellite islets to Dalkey Island in south County Dublin support a small nesting colony of Common and Arctic Terns. Following prolonged targeted action, including the provision of flat terraces with clusters of nest boxes, small numbers Roseate Terns *Sterna dougallii* have been encouraged to nest amongst them. Fine gravel is deployed in shallow depressions for use as nesting substrate by Common and Arctic Terns. Numbers of nesting pairs of Common *S.hirundo* and Arctic Terns *S.paradisaea* were between 76 and 90 in 2004-2006 but extremely poor weather with frequent north-easterly storms in 2007-2008 washed out most breeding attempts and complete censuses were impossible. No terns fledged in 2007 and in 2008 only two Roseates, two Commons and one Arctic Tern chick fledged. The proximity of the nesting islet to the mainland, gives excellent viewing opportunities for the general public. The South Dublin Branch of BirdWatch Ireland has used this potential in a long running public awareness programme

Conservation of Little Terns *Sternula albifrons* at Kilcoole, County Wicklow, 2004-2008

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Conservation action for Little Terns at Kilcoole/Newcastle, County Wicklow was commenced by the IWC in 1985. This has continued with the support of the National Parks and Wildlife Service and the site remains one of the most important for the species in Ireland. With the presence of resident wardens from early May to the end of July, Kilcoole has become increasingly important as a 'safe' refuge on the east coast. Between 2004 and 2008 a mean of 83 pairs nested (range 51-106); in poor years, when egg and chick predators such as Red Foxes and Rooks breach colony 'security', each pair usually makes two nesting attempts per season. Round-the-clock vigilance ('*semper vigilans*') by wardens and novel methods of scaring are needed to protect the colony from such predators. Productivity, expressed as number of chicks fledged per nesting pair was high in three years (1.55-2.20) but was low in 2006 and 2007 (0.21 and 0.60 respectively). Physical factors including spring tides and easterly storms increasingly threaten the colony, though human disturbance has been virtually eliminated except for occasional bouts of vandalism to signs and fences. The support of the local community is highly beneficial and we regularly host local school groups and Brownie packs.

Designating Special Protection Areas (SPAs) for Choughs in the Republic of Ireland

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In the Republic of Ireland a core suite of 14 Chough SPAs were formally designated in November 2006. The designation of 14 Chough SPAs represented a significant departure from the five Important Bird Areas (IBAs) originally earmarked for designation as SPAs. The addition of nine sites more accurately reflects the geographical distribution of Ireland's Chough population and provides statutory protection to approximately 65 % of the breeding population.

County	Location of SPA	Pairs (max. no.) 2002/3
Waterford	Mid-waterford coast	21
Waterford	Helvick Head to Ballyquin	11
Cork	Seven Heads	15
Cork	Galley Head to Duneen Point	11
Cork	Sheep's head to Toe Head*	73
Cork	Beara Peninsula*	54
Kerry	Iveragh Peninsula*	88
Kerry	Dingle Peninsula*	107
Kerry	Kerry Head	30
Clare	Cliffs of Moher	12
Mayo	Clare Island	16
Sligo/Leitrim	Sligo/Leitrim uplands	15
Donegal	West Donegal coast*	58
Donegal	Horn Head to Fanad Head	32
Total no. pairs in SPA		543
Maximum number of pairs as a % of the total Irish breeding population		65 %
Maximum number of pairs as a % of the total NW European breeding population		40 %

* indicates that the SPA was initially an IBA

1. Chough SPAs cover the most densely populated breeding cliffs in the country. Each SPA holds a minimum of 1% of the national population of breeding pairs based on population censuses conducted in 1992 and 2002/03, i.e. a minimum of nine pairs. The five SPAs formerly identified as Chough IBAs hold far in excess of the 1 % threshold.
2. All the chough SPAs, except Sligo/Leitrim are coastal strips extending approximately 300 m inland from the cliff top. The Sligo/Leitrim SPA is a fragmented site encompassing breeding cliffs fringing the upland plateaux of Benbulbin and Truskmore.
3. The decision to use a distance of 300 m from the coast to delineate the inland boundary of chough SPAs was based on data collected from tracking the breeding season movements of 17 focal pairs. On average pairs of Choughs spend 78 % of the time within 300 m of the coast during the breeding season. To take this up to 90 % would have required an extension to the inland boundary to 600 m from the coast. Land use by Choughs within 300 to 600 m from the coast was found to be patchy.
4. A generic distance of 1 km beyond the last breeding pair was applied when selecting end-points to the SPAs. This distance nears the maximum that pairs of Chough were found to travel from the nest during the breeding season and on average pairs of choughs were found to spend 92 % of the time within 1 km of the nest.
5. Adjustments to the SPA boundaries based on habitat quality, Chough distribution and density of use were restricted to the intensively studied IBAs where supplementary information was available.

Chough SPAs: target areas for Chough agri-environment schemes

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The integral relationship between Chough ecology and pastoral agriculture is well documented and, while Choughs forage in a wide range of habitats, a crucial factor identified in many studies and a recurring theme in Chough ecology, is livestock grazing. Livestock maintain the short sward (< 3cm) favoured by Choughs and their dung provides a ready supply of invertebrates.

While Chough SPAs provide statutory protection to the life cycle requirements of the species, the mechanisms for delivering positive conservation benefits are limited within the SPA framework. A minimal list of Notifiable Actions are attached to the Chough SPAs, however these do not extend beyond the regulation of potentially damaging activities.

SPAs will be central in acting as target areas for agri-environment schemes that encourage landowners to manage habitats for Choughs. SPAs targeted for Chough habitat management prescriptions within REPS and NPWS Farm Plans could achieve the stocking rates and grazing regimes that would maintain the short sward over the range habitats required by the species.

NPWS launched a Chough measure within its Farm Plan scheme in 2007. This will be available to landowners within Chough SPAs that are not participating in the alternative agri-environment scheme (REPS). However the scheme will not be applicable within commonages (circa 25 % of the SPAs as a whole) and where the grazing element of the Chough measure conflicts with habitat protection within SACs (circa 37 % of the SPAs as whole carry dual designations). The prescription within the NPWS Chough measure does not specify stocking rates, but requires that a sward height of 2-3 cm to be maintained over 40 % of the farm within the Chough SPA. This sward height is to be applied within 40 % each of the priority Chough habitats specified, including dry heath, grasslands (unimproved, maritime grassland, semi-improved & improved) and earth banks.

Monitoring of Greenland White-fronted Geese *Anser albifrons flavirostris* in Ireland

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²National Parks and Wildlife Service (DoEHLG), Wildfowl Reserve, North Slobland, Wexford

Annual censuses of Greenland White-fronted Geese have continued to show a decline of the population on their wintering grounds in recent years. A progressive contraction northward of the southern edge of the Greenland White-fronted Geese wintering range is continuing, almost eliminating flocks occupying traditional sites in Counties. Kerry, Cork, Laois. Roscommon and parts of Clare. Its causes are still unconfirmed but most probably relate to the increasing Canada Goose and more recently Snow Goose populations now breeding in Western Greenland. At present Greenland White-fronted Geese are given statutory or voluntary protection throughout their winter range and for much of the summer in Greenland. Since 2006 White-fronted Geese have been in receipt of total protection in Iceland.

Lead in Mute *Cygnus olor* and Whooper swans *Cygnus cygnus* in Ireland: trends and patterns

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This study focuses on patterns of lead poisoning in some Mute and Whooper Swan populations in Ireland, Iceland and UK. Blood lead trends were investigated in the Mute swan at Cork Lough, County Cork. Despite a marked decrease in levels over the last two decades, some elevated levels still occur. Blood lead levels ranged from 0.04

to 27.66µmol/l (Biology and Env. Vol *In Press*). Continued use of lead in angling activity is thought to be a major contributing factor as well as exposure to 'old' lead. The immunologic effects of lead were measured for the first time in wild Mute swans using cell surface markers. Leukocyte populations were distinguished and B-lymphocyte populations identified ranging from 5 – 13%. Although a clear relationship between lymphocytes and blood lead levels could not be established, the novel use of Mute swan B-lymphocytes as an indicator of contamination provides a basis for further work. The cryopreservation method of storage was investigated and fresh samples were found to be 43% more viable cells than the frozen samples. Lack of knowledge of lead levels of the Icelandic Whooper swan on its wintering and breeding sites was addressed in this study. Blood lead levels were generally below 1.21µmol/l, which is indicative of elevated levels. However, some elevated levels were detected on the wintering grounds and were up to 19.6µmol/l. The most likely source of lead contamination is spent gunshot. Ireland, which hosts over 60% of the flyway population, has a particular responsibility for their conservation and protection (Journal of Zoology: 276, 21-27). The Flamingo swan is described for the first time in this study and is unique in Mute swans. A pink colouration of the feathers is widespread in Ireland, 80 – 90% in some flocks, generally occurring in eutrophic sites. Colouration occurs mostly on the remiges and retrices. The presence of carotenoids has lead to the suggestion that alga maybe colonising the feather surface leading to the colouration. The pattern of occurrence and epidemiology of this pink coloration is described.

The 'flamingo swan': a new feather condition in the Mute Swan *Cygnus olor* and a possible indicator of eutrophic water

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The 'flamingo swan' in *Cygnus olor* is described for the first time. This is a new phenomenon widespread in many populations of Mute swans in Ireland. There are striking similarities in colour to the carotenoids pigmentation some birds acquire through dietary sources. However, the beneficial effects of this colouration, if any in swans, are unclear. We used a range of approaches to investigate the condition. The coloration occurs mostly on the remiges and retrices, but also in patches on other body feathers. In most cases there appears to be a structural degradation of the barbules at the point of colouration of the feather. Waterproofing and the flexibility of the feather appear compromised. Preening activity is thought to play a roll because of the distinctive symmetrical pattern of the colouration, particularity on the wing area. This would support a hypothesis that preening and maintenance functions are spreading the condition. We believe the most likely reason for this new phenomenon is caused by eutrophication of water the swans inhabit. We hypothesise that the feathers of Mute Swans residing in eutrophic water are being coated with an 'algal biofilm'. This biofilm contains a number of phytoplankton which produces carotenoids in the form of a pink/brown pigment on the feather surface. Feather degrading bacteria or microarthropods may then as a consequence form a parasitic relationship also with the Mute swan, feeding on the feather structure and on the phytoplankton which are exploiting the biofilm on the feather surface. The condition or syndrome is described here for the first time and we name it 'flamingo swan'.

Analysis of numbers and spatial distribution of wintering waders and wildfowl in Outer Courtmacsherry Estuary

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Courtmacsherry Estuary supports internationally important numbers of Black-tailed Godwit *Limosa limosa islandica* and nationally important numbers of nine other waterbird species, including Great Northern Diver *Gavia immer*. In order to determine the potential impacts of a proposed marina development adjacent areas of Courtmacsherry Bay were surveyed (essentially east of the narrows and centred on Flaxfort Strand east to Wood Point). The study area was divided into 5 discrete sections to facilitate analysis of the numbers and spatial

distribution of wintering waders and wildfowl. A one-day (full tidal cycle) survey was completed from three vantage points in each of four months (December 2006 to March 2007; 80 counts in all). Patterns of abundance and distribution were examined across sites, months, and tidal cycle and patterns of disturbance were noted. The mudflats north of the navigational channel supported the greatest diversity and number of birds (especially the western side of Flaxfort Strand). The sandier substrates were favoured Bar-tailed godwits *Limosa lapponica* rather than Black-tailed Godwit. The maximum single count of Great Northern Diver for this part of the estuary was 16; just under the national threshold of 20. Site usage by divers mirrored that of earlier studies indicating a degree of site fidelity. A total of 23 separate disturbance events were noted; human disturbance on the shore was the most common type of disturbance followed by water-based activity (fishing boats). These data build on extensive studies undertaken to date by other researchers within the inner estuary.

Little Egret *Egretta garzetta* expansion in Cork

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Little Egret first bred in Ireland on the River Blackwater, Waterford in 1997. Breeding was first recorded in Cork Harbour at Ballyannan Wood in 2000. Discovery of a new colony on Little Island in 2004 prompted the authors to undertake a systematic survey of Cork Harbour; later extended outwards from the harbour. Breeding was confirmed on Fota Island and Rostellan in 2005; the Atlantic Pond, Cork City in 2007 and at Currabinny Wood, Crosshaven in 2008 (juveniles were observed in the estuary as early as 2006) bringing the number of known sites to six, with known breeding pairs in Cork Harbour alone at over 80. There is an old record of a pair breeding at Minane Bridge. Breeding is also suspected at an additional site in the eastern harbour, and at sites such as Kinsale Harbour.

Outside the harbour egrets have been recorded breeding (by authors or others) in Belgooly, Timoleague, Clonakilty, Rosscarbery and Ballymacoda. Coincident with this increase in numbers has been an increased incidence of field feeding. Little Egrets are also now being recorded from small streams and large inland rivers such as the River Bandon and the River Blackwater. The observed use of new habitats and feeding strategies raised the possibility of breeding away from traditional coastal sites; the first inland colony was recorded on the Blackwater near Fermoy in 2007. The influx of large numbers Cattle Egrets *Bubulcus ibis*) to Ireland over the winter raises the possibility of Cattle Egret breeding in Ireland in the near future.

Non-breeding ecology of Hen Harriers *Circus cyaneus* in Ireland

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Despite accounting for up to 7 months of the Hen Harrier's year, the non-breeding side of the bird's ecology has until recently been largely under-studied and unknown in Ireland. Hen Harrier winter surveys were co-ordinated on a regional scale during the winter of 2005/6, and on a national scale in 2006/7 and 2007/8. Volunteers surveyed for suitable roosting habitats and watched for roosting harriers either at dawn or dusk. Using background knowledge of roosting habitats and existing roosts, over 140 possible roost sites were surveyed for occupancy. Of these, 48 sites had roosting Hen Harriers. The majority of roosting harriers were ringtails (as this category is composed of both adult females and juveniles). The pattern of roosting changed as the winter progressed, most roosts were occupied from October to March, with November and February showing peaks in attendance at communal winter roosts. Further habitat analysis was undertaken on roost sites to inform the habitat requirements of the species over winter. Bogs with high heather and *Salix* spp., reedbeds and bracken featured among the most common roosting habitat types. Roosts were typically in lowland locations though this was not a prerequisite. The

winter diet of the Hen Harrier is also being studied through analysis of digestive pellets collected at a range of winter roosts. Possible threats to winter roost sites were established and every site has been found to have at least one associated risk. More than half of Irish winter roosts enjoy no protection in terms of habitat.

Breeding ecology of Hen Harriers *Circus cyaneus* in Ireland

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Hen Harrier is listed on Annex I of the EU Bird's Directive (79/409/EEC), requiring member states to introduce meaningful measures to protect this species and its habitats. Such measures include Special Protection Areas (SPAs), which Ireland has recently (November 2007) designated for six breeding populations. To maximise the efficacy of these SPAs, in-depth knowledge of the Hen Harrier's breeding ecology in Ireland is required. Information on success rates, the factors affecting breeding success rates and ultimately the sustainability of Irish breeding populations. Four important breeding populations (2 SPA, 2 non-SPA) were studied for the breeding seasons of 2007 and 2008. Of 105 nests with confirmed outcomes, 68 (65.4%) were successful and fledged chicks. An index of breeding success as measured by chicks fledged per confirmed nesting attempt averaged 1.63. However the breeding success seem to show some variation during the two years at the Slieve Aughties (0.76 (n=21)) and Ballyhouras (1.04 (n=25)) and those of West Clare (2.09 (n=22)) and Kerry (2.25 (n=36)). Factors influencing these outcomes are to be investigated as part of on-going research. Research on nest site selection has shown that a range of habitats are used for ground-nesting, including heather, bramble, forestry, rushes and gorse. Further data on breeding phenology was collected on data on first egg date, and hatch and fledge dates. Nest cameras were deployed at a selection of nests to provide information on activity at the nests including prey delivery rates, prey type and cause of failure where applicable. The breeding season diet of the Hen Harrier is being studied through analysis of pellets and prey remains collected during the summer months.

Wing tagging of Irish Hen Harrier *Circus cyaneus* chicks

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Information on the fate of Irish Hen Harrier chicks post-fledging is scarce. Do they spend the winter close to their natal areas or do they migrate hundreds of kilometres away? Do they return back to where they were born to breed at maturity, or do they settle in a separate breeding range? A wing tagging scheme has recently been introduced in Ireland (piloted in Kerry, 2006) where chicks have coloured tags attached on the back of their wings just prior to fledging. The colour on the left wing indicates the year the bird was born and tagged (thus enabling aging when subsequently sighted), while the colour on the right wing indicates the provenance of the bird (one of four areas – Kerry, West Clare, Slieve Aughties, Ballyhouras). To date, 112 Hen Harrier chicks have been wing tagged. At least 28 'sets' of re-sightings of tagged birds post-dispersal have been recorded. There appears to be some evidence that birds move towards the south and south-east giving support to the hypothesis that some Irish Hen Harriers travel to the continent for a milder winter. An alternative hypothesis is that of birds are possibly using the major river systems (Shannon and Blackwater) as 'harrier highways' within Ireland. Some of the most notable journeys include a 2007 West Clare bird that travelled to Derry and Donegal within a month of leaving the nest, only to be followed a year later by a 2008 West Clare bird that travelled to Antrim. Other 'long-range' migration within Ireland has included North Kerry birds in East Cork, Waterford and Wexford, as well as Ballyhouras (Cork/Limerick) birds in Galway and Wexford (including the Saltee Islands). To date, at least two individual birds

have been returning to the breeding areas where they were born the year before, both in Kerry. No wing tagged birds have been recorded in breeding ranges outside of their natal areas to date. As this is an on-going project, sightings continue to be sought from the public of both tagged and untagged birds. Please e-mail harriers@environ.ie with any information.

The population dynamics of Dippers *Cinclus cinclus hibernicus* in southern Ireland

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Our studies of population of Dippers are entered its 20th year of continuous data collection in 2008. Our main study area focuses on rivers in east Waterford, east, north and south Cork. Our main objective is to look at long-term population trends in Dipper populations through estimating each of the demographic parameters each year. Breeding parameters (timing of breeding, clutch size and brood size at hatching and fledging) provide the main data, while roost counts and numbers of breeding attempts give us some estimate of population size. We have also calculated nest survival for the nesting, incubation, and fledging period of the breeding cycle. We have found some evidence of earlier breeding, but a full analysis will be underway when we complete 20 years of data collection in 2009. We have found no evidence of a decline in the roosting or breeding populations of Dippers although patterns within and between rivers vary annually. Further analyses are underway to examine the breeding biology at the individual rivers. Blood samples collected and analyzed for total and mitochondrial DNA have revealed some very interesting patterns (Molecular Phylogenetics and Evolution 2008)

Restoration & management of priority habitats and species on the Murrough Wetlands, County Wicklow

O'Sullivan, O. & Wray, J.

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The project site is located in the Murrough, the largest wetland complex on the east coast of Ireland. This EU-LIFE project's primary objective was to restore and manage Annex 1 fen habitats, including the priority habitat Calcareous Fen with *Cladium mariscus* and *Caricion davallianae*. The site was also managed for the Annex 1 water bird species Greenland White-fronted Goose *Anser albifrons flavirostris*, Whooper Swan *Cygnus cygnus*, Kingfisher *Alcedo atthis* and Little Egret *Egretta garzetta* and has been successful in attracting all target bird species. Areas of the site are now included within The Murrough Wetlands pSCI and Kilcoole Marshes SPA. The project has restored approximately 19 hectares of fen habitat, including the priority habitat Calcareous Fen. Within the lifetime of the project, fundamental hydrological control of the entire fen has been achieved, restoring the water table. A total of 2.9 hectares of conifer plantation and an additional 2 hectares of scrub has been removed from the fen, allowing direct restoration and aiding reinstatement of the water table. The instigation of livestock grazing in the fen by Kerry bog ponies has impacted on the species composition of the entire fen. Ongoing scrub removal and livestock grazing will complete the restoration process.

It is anticipated that the project site will continue to support Annex 1 bird species, in increasing numbers and over extended periods of time. In addition, management actions resulted in an increase in a suite of wintering waterfowl species including Greylag Goose *Anser anser* (peak count 200), Teal *Anas crecca* (227), Wigeon *A. penelope* (300), and Snipe *Gallinago gallinago* (93). Scarce passerine breeding species such as Reed Warbler *Acrocephalus scirpaceus* have colonised the site and 'wintering' Water Pipits *Anthus spinoletta* have been recorded on three occasions in 2006. Ringing studies have demonstrated extensive movements of Lesser Redpoll *C. flammea* and Siskin *Carduelis spinus* through the Birch forest. The project promotes positive attitudes towards Natura 2000 designation and the restoration of wetland habitats. An educational programme and provision of visitor facilities, including an observation hide, boardwalk, signage and a circular walk, are underway and will be expanded upon in the coming years.

Were Honey Buzzard *Pernis apivorus*, Hobby *Falco subbuteo* and European Eagle Owl *Bubo bubo* once native to Ireland?

O'Toole, L.

Golden Eagle Trust, Carrowtrasna, Churchill, County Donegal

The Irish Birds of Conservation Concern lists include species that have declined historically by up to 99% since 1800, using the best available historical data. However birds that have declined by 100% i.e. become extinct, prior to or after 1800, are not listed unless there has been recent breeding activity. Gordon D'Arcy's book *Ireland's Lost Birds* documented the historical decline of six native Irish raptors. Of all European birds with populations of fewer than 1,000 pairs, 46% are diurnal birds of prey and nearly a quarter (24%) of all species with populations of fewer than 10,000 pairs are diurnal birds of prey according to David Stroud. As a result of our raptor extinctions, Ireland only has two red listed raptors. So should the Irish Red List or Biodiversity list recognise other extinct native raptors in some format?

Liam Ó Broin's book, *Sparrowhawk A Manual for Hawking* notes that in 1531, Archbishop Comer, Bishop of Armagh presented a cast of Irish hobbies to the king of England, Henry VIII. Hobby is likely to join the Irish amber list as a rare breeder, if not as a once native species, in the near future. A taxidermist, Alfred Sheals, wrote in *Rare Birds of Ulster*, that a male Honey Buzzard shot at Dunmurry, Antrim in 1920 seemed to be breeding there. Unfortunately he gave no details for that view. Could it be possible that the Irish word *Céirseach*, widely used to refer to a female Blackbird in Munster or a Skylark in Scots Gaelic, originated in reference to Honey Buzzard behaviour? As D'Arcy highlighted, names of extinct Irish birds were often transferred to other extant local birds. The word *céir* means wax and *seach* means to plunder or turn upside down, which is a very apt description of their ability to dig out honey comb in search of wasp pupae.

D'Arcy makes reference to the notes by Gwither's submitted to the Dublin Society, circa 1684, including a reference to a "Great Irish Owl", possibly an Eagle Owl. The generic Irish word for Owl is *Ulchabhán*. The noun *Uallach* can mean howling or wailing. *Cabhán* means a cavity or a hollow. So did the word *Ulchabhán* initially describe an owl that was known to howl from a cavity? If so, the word does not lie easily with the screeching Barn Owl or the tree nesting Long-eared Owl. A hooting Eagle Owl is audible up to 1-4 km away and would have had a great impact on the psyche of woods people. It may be appropriate to keep an open mind as regards the real extent of the Irish raptor decline and continue to seek firmer evidence.

The reintroduction of Golden Eagles *Aquila chrysaetos* into the Republic of Ireland

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² Golden Eagle Trust Ltd, 22 Fitzwilliam Square, Dublin 2

This project aims to re-establish a viable Golden Eagle population in the north-west of Ireland. The project is based in Glenveagh National Park, County Donegal and is managed by the Golden Eagle Trust Ltd. In partnership with the NPWS. Scottish Natural Heritage licence the collection of young, from Scottish eyries containing two chicks. We have released 53 birds over 8 years to date (2001-2008) and we aim to release up to 75 birds by extending the release period. Of the 53 birds released between 2001-2007, 5 have been confirmed dead. We believe all five birds died from natural causes. Circumstantial evidence suggests two other birds were persecuted but their corpses were never recovered. We suspect other unrecorded mortality also.

The minimum known first year survival rates in the early part of the project (2001-2003) was 72% (18/25), but dipped in the next three years (2004-2006) to 42% (9/21). This may be due to higher mortality outside of Donegal but may also be due to an increasing degree of dispersal beyond Donegal. We suspect that there are circa 10-22 sub-adult birds dispersed over large parts of the west coast of Ireland (Kerry to Donegal) and also throughout Northern Ireland. In 2007, there were 5 occupied territories including two pairs that laid two eggs each. One of these pairs, hatched two chicks and fledged a single chick in Glenveagh National Park. This pair brought at least 9 Irish Hares, 2 Badger cubs, 2 Red Grouse and a fox cub into the nest during the breeding season. In 2008, there

were 6 territories in Donegal containing 10 birds. One of the new pairs occupies a coastal site and is feeding on rabbits and Fulmars.

Analysis of the Golden Eagle database is now underway, though several interesting findings have already been noted. The remaining priorities are to release a further 15-25 birds, maximise Irish productivity and extend awareness of Golden Eagles beyond Donegal. There are several serious threats facing this small and vulnerable population, including poisoning, loss of quality upland habitat and prey availability, human disturbance and fragmentation of occupied territories through development.

Lapwing *Vanellus vanellus* recovery project Northern Ireland

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The Lapwing is a rapidly declining breeding species in Northern Ireland (NI), and is at the edge of its geographic range in both global and UK contexts. Whilst only 'Amber listed' on the UK Birds of Conservation Concern (BoCC) list, it is 'Red listed' on the Birds of Conservation Concern in Ireland (BoCCI), indicating the seriousness of its conservation status in NI. The species has undergone a marked breeding range contraction in NI. The numbers of pairs declined by 66% in the 12 years between 1987 (5250 pairs) and 1999 (1771). This is a cause of concern and indicates that urgent action is required to reverse this population decline and secure recovery. In recognition of its unfavourable conservation status, the Lapwing is the subject of a Species Action Plan (SAP) in NI, published under the auspices of the NI Biodiversity Strategy, the target of which is to maintain the breeding population at 1997 levels (1,800 pairs). This project is one of 5 regional UK Lapwing recovery projects. As agri-environment schemes in the wider countryside are seen as the primary mechanism for maintenance of the population, this project aims to investigate the effect of the Countryside Management Scheme (CMS) option for Lapwing breeding on grassland, plus advisory, on Lapwing breeding success.

Since 2006, 38 sites are being monitored. Of these, 19 are experimental sites and 18 are control sites.

Experimental sites are farms in CMS with the breeding lapwing option and with pairs present. Control sites are farms not in CMS or not implementing any management prescriptions for Lapwing. During the breeding season 5 visits are conducted on each site to assess numbers of breeding pairs and habitat condition. Assessment of predator densities are carried out throughout the survey period. Advisory work began in autumn 2006 and is carried out on experimental sites only. Advisory contact through visits, phone calls and written correspondence is recorded, so that we can evaluate the level of advice needed to ensure Lapwing prescriptions are being carried out on the ground. Preliminary analysis of the Lapwing option will be carried out after the field season in year 3 (2008) comparing CMS farms to control farms. Specifically we will investigate the role of advisory in maintaining occupancy of nesting territories, and the role of a variety of factors in influencing productivity.

Titmice research in rural Northern Ireland

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Studies of a rural breeding population of Blue *Cyanistes caeruleus*, Coal *Periparus ater* and Great Tits *Parus major* commenced at the University of Ulster in 2000 with 313 nest-boxes set in woodland on the main Coleraine campus, and with 30 additional boxes at each of three discrete mixed- woodland sites located within 5 km to measure fledgling dispersal. This long-term project has studied the population dynamics of the three titmice species following previous research into an urban titmice population by Professor Julian Greenwood in Belfast. The university campus has a mixture of buildings, sports fields and parkland where the deciduous (75%) and coniferous (25%) woodland areas on the 284 acre (115ha) site (approx 90,000 trees predominantly Oak, Beech, Alder, Ash, and Willow; Larch and Lodgepole Pine) provides an abundance of insects supporting the dependent birds and animals.

Current studies at Coleraine have so far led to significant insights into regional differences between rural and urban titmice communities, and has measured variation between the main Coleraine study population and the three smaller woodland study sites. Breeding productivity, nest-box selection (host tree choice, nest-box height and aspect), fledgling survival, predation from Sparrowhawks and Long-eared Owls, longevity, and dispersal have been studied to date, as well as other ongoing aspects of population dynamics.

Sandwich Tern *Sterna sandvicensis* research in County Donegal

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² Drumlougher, Carrigans, County Donegal

In 1985 studies commenced on the breeding productivity of Sandwich Terns *Sterna sandvicensis* at two small colonies in northern County Donegal. One colony was on a low sandy islet situated within Inch Lake on Lough Swilly where the nesting habitat (< 1m asl) was predominantly grass and low vegetation upon a sandy substrate in an area prone to summer flooding. In contrast the habitat at the second colony located at Greer's Island in Mulroy Bay was on a rocky island where the breeding area although changeable between years was on an exposed plateau of tussocky grass (> 4m asl).

The study originally had three primary functions, (1) to ring all the healthy pulli during each breeding season at both colonies, (2) provide experimental patches of different nesting habitats (e.g. shells, fine sand, rough grit, shingle) to establish if there were surface-type preferences between sites and between years, and (3) to measure the terns interactions with a range of other colonial nesting species. (This project is still progressing with Andrew Speer (Conservation Ranger NE Donegal) since 2004 managing the programme of further habitat improvements and site enhancements. A total of 6,485 pulli have been ringed to date since 1986 and the study continues to make a significant contribution towards an understanding of the conservation needs of a key indicator marine species dependent on a steady supply of sandeels and other prey fish.

Bird projects and surveys undertaken by BirdWatch Ireland Fingal Branch

Pierce, S. & BirdWatch Ireland Fingal Branch

13 Shenick Grove, Skerries, County Dublin

The branch was formed in 1986 and since then has co-ordinated ongoing reserve management, monitoring and research into the birds of Fingal, County Dublin. Significant projects include: Rogerstown Estuary 1986-2008/09, Fingal Coast Studies 1990-2008/9, Fingal Coast Breeding Survey 2004. Site Specific Surveys during the last five years include Breeding Birds Survey of Turvey Lands (2004), Breeding Birds Survey of Newbridge House Demesne (2005), Skerries Islands & Rockabill Study 1990-2008, Database Recording for Fingal SPA sites. Fingal Branch has also been involved with the Rockabill Roseate Tern Project in the provision of volunteer wardening, shore based backup, promotion and educational talks and in funding, sourcing and production of nest boxes with Balbriggan Community College for Roseate Terns and more recently Black Guillemots on Rockabill. The branch is involved with volunteer effort and actively supports the following and other projects: Irish Brent Goose Survey, Greylag Goose Survey, Non Estuarine Coastal Waterbird Survey (NEWS), Garden Bird Survey, BTO/Birdwatch Atlas, Hen Harrier Survey.

Forty years of continuous recording at Kilcolman Wildfowl Refuge

Ridgway, M. & Hirst, M.

Kilcolman Wildfowl refuge, Doneraile, County Cork

Next year Kilcolman National Nature Reserve, Buttevant, Co. Cork will celebrate 40 years as a reserve and the start of virtually continuous daily recording of bird numbers, behaviour, breeding activity, migration patterns and changes in status. These are the longest and most detailed set of records for any site in Ireland. Richard and Margaret Ridgway undertook many projects and much research work such as the late Richard Ridgway's long term studies of Whooper Swan migrations, pre-migration call recordings, etc. The value of the records is manifold with regard to research. For instance, a perusal of the recently published list "Birds of Conservation Concern in Ireland 2008-2013" in conjunction with our records show that the following – *with the exception of those italicised* – are all breeding at Kilcolman and in nearly all cases show significant population increases over the last 3 years. The non-breeders are also increasing their presence.

Red List: Black-headed Gull, Lapwing, Shoveler.

Amber List: Coot, *Gadwall*, *Hen Harrier*, House Martin, Kestrel, Linnet, Little Grebe, Pochard, Sand Martin, Snipe, Spotted Flycatcher, Starling, Swallow, Teal, Tufted Duck, Water Rail, *Whooper Swan*, *Wigeon*, Stock Dove.

The on-going implementation of the management plan and the work of the Scientific Advisory Committee will ensure the future of Kilcolman's ornithological research and record keeping.

Status of birds in Ireland: an analysis of birds of conservation concern 2008-2013

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This is the second all-Ireland assessment of Birds of Conservation Concern (BoCCI). The criteria used are based on international conservation status, historic breeding declines, recent population declines, European conservation status, breeding rarity, localised distribution and the international importance of populations.

Using the latest available information from a variety of sources the status of 199 species is reviewed. 25 species were categorised as the most threatened (*Red-listed*), 85 on the *Amber* list (medium concern) and the remainder on the *Green* list. The number of species on both Red and Amber lists has increased since the last review in 1999. We present this contemporary assessment, review changes in species categorisation and discuss changes of particular concern which have been noted in the status of breeding seabirds, wintering waterbirds, breeding waders and lowland farmland birds. The process highlights the need for high quality monitoring information at an all-Ireland scale to further refine and revise the BoCCI list in future.

An ecological survey of Blackrock, County Louth

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Blackrock Tidy Towns Committee, with a grant from the Heritage Council and support from Louth County Council and Louth Heritage Forum, commissioned JR and OJM to carry out an ecological survey of the three square kilometres in which Blackrock lies. The fieldwork for the survey was carried out between late May and mid-September 2006 and concentrated on marine and terrestrial habitats, mammals, birds, fish, reptiles, amphibians, marine macro-invertebrates, some terrestrial invertebrates such as butterflies, terrestrial flora and vegetation, trees and shrubs, etc. Faith Wilson assisted with the mammal and some of the botanical fieldwork. Additional information on geology, soils and climate was obtained from published sources. A major element of the ecological survey was the internationally important concentrations of migratory waterbirds which feed and roost in the Blackrock area of Dundalk Bay, including the Fane River Estuary and Marsh South. The results of the survey have

been published and will be used by Blackrock Tidy Towns Committee as an aid to planning and awareness-raising among the community.

Diet, productivity and bioenergetics of the Common Buzzard *Buteo buteo* in Northern Ireland

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Breeding ecology and diet of the Common Buzzard is not well studied in Ireland. Due to the dearth of small mammals it is likely that diet and breeding parameters may differ considerably from other published studies. Information on the ecology of the buzzard can be used in conservation management (e.g. the conflict with gamebird rearing interests) and to inform wildlife managers. As a high trophic level scavenger, and predator, the buzzard can be used as an indicator of the health of the environment and as a model for the re-introduction of raptors with a similar ecological niche. This study recorded breeding parameters during the 2008 breeding season and examined the diet of buzzards by analysing prey remains and pellets found in and below nests. A combination of both methods was used to calculate diet composition. Through the construction of an energetic model the prey requirements of adults and chicks during the breeding season were calculated. A bomb calorimeter was used to calculate energy content per dry mass of prey items and used in conjunction with results of diet composition we assessed the magnitude of prey consumption. Breeding output was measured at 37 active territories, with most pairs fledging single chicks (48.6%, $n = 18$). The mean number of chicks fledged per successful pair was 1.5 ± 0.22 ($n = 32$). 511 prey items were identified from pellets and remains. Birds were the main prey item identified (26.8%) with passerines comprising the majority of birds (19.4%), in particular Starling *Sturnus vulgaris* (4.5%) and Song Thrush *Turdus philomelos* (2.5%). Small mammals were second most frequent (19.2%) with lagomorphs occurring less frequently (16%). Based on energy requirements and percentage composition it was estimated that 48 starling, 26 song thrush, 11 lagomorphs and 578 small mammals were required by one successful breeding pair during a single breeding season. Although diet preferences may vary locally, this study shows the high dependency of buzzards on avian prey in Ireland. The energetic requirements of the buzzard can be used as a model to assess the potential requirements for successful raptor reintroductions in the future and aid in decision making and policy refinement.

Urban birds-species diversity along an urban to peri-urban gradient

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Point counts and transects have been used in a detailed study of the bird species diversity, numerical abundance and biomass along an urban to peri-urban gradient in Cork City and its suburbs. While bird species diversity increased along the urban to peri-urban gradient a different pattern emerged in relation to biomass- due to the dominance of Feral Pigeons *Columba livia* and members of the Family Corvidae – especially the Rook *Corvus frugilegus* in the city centre communities. A large flock of Pied Wagtails *Motacilla alba* roosts in the city centre during the winter months.

Research and solutions into wildlife and sporting conflicts – Peregrines *Falco peregrinus* and pigeons *Columba livia* var. *domestica* in Northern Ireland

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There have been several research projects and assessments of the conflict between Peregrines and racing pigeon interests many concluding that depredation by Peregrines affects a small proportion of overall racing pigeon populations. However, the Peregrine population in Northern Ireland has declined since the mid 1990s with persecution suggested as the mechanism, at least partly, responsible for this decline. Ecological research on the Northern Ireland peregrine population outlines the dynamics (Northern Ireland Raptor Study Group, unpublished data) and declines in the population and shows that racing pigeons form an important, but localised, component of Peregrine diet (up to 27% of prey numbers) and peregrine behavioural trends. By modelling the energetic requirements of the peregrine population this study estimates the number of pigeons (± 3000) killed annually. However, losses are equivalent to the apparent recruitment of stray racing pigeons into feral pigeon flocks. Potential solutions are discussed e.g. engagement with stakeholders, diversionary feeding and assessing the stability of the peregrine population by modelling. Several of these solutions require additional data in order to make more definitive conclusions. These knowledge gaps are identified (e.g. Peregrine population demographics, racing pigeon availability) to prioritise future research.

Bird aircraft interactions: a field study of the avoidance behaviour of birds to commercial aircraft

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The active avoidance behaviour of birds to aircraft has been documented in previous studies. This study aimed to examine the phenomenon of bird aircraft avoidance behaviour in the context of a number of factors including season, time of day, the aircraft type, phase of flight, size and noise levels, as well as bird species, flock size and the individual's position within the airfield. The results suggest that birds actively avoided aircraft, and that this avoidance behaviour varied depending on a number of factors. The single most important factor in whether or not a bird avoided an aircraft was the aircraft's phase of flight. Birds were far more likely to avoid aircraft on take-off or landing roll than during any other phases of flight. Inter-specific differences in avoidance rate were also found, which could help to explain the discrepancy between local species abundance and strike rate. Another explanation for the difference in rate of avoidance between species may be the habituation to aircraft by resident or local species. In general, resident species appeared to avoid aircraft more frequently than non-resident species. Avoidance rates showed a bimodal distribution, with a higher peak in August and a smaller peak in February, along with particularly low avoidance rates during the winter months between October and December.

A detailed analysis of the avoidance behaviour in birds: avoidance response and distance of avoidance

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The issue of when and how birds choose to avoid aircraft has yet to be fully addressed. Perceiving and reacting appropriately in time to avoid collision are vital for a bird's survival in the manmade environment. The aim of this study, which took place at Dublin Airport, was to examine in detail the nature of bird avoidance responses to aircraft. Using a picture recording method and a nomenclature to describe avoidance behaviour, a clearer view of bird aircraft avoidance was ascertained. The variations in these avoidance responses with phase of flight, species and season were also examined. The results of this study found that the types of avoidance behaviour observed were not unique to any one species, and were indeed common to many. However, inter-specific differences in avoidance response were evident and this may be linked to flight styles and species morphology. The distance between the bird and the aircraft at the time of avoidance varied significantly with phase of flight. While some differences were found in seasonal and interspecific avoidance distances, these were not significant.

Strike risk: the role of species, height and time over runway in determining relative risk of collision

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This study aimed to examine the relationship between the calculated strike risk and actual strike rate. Field data of flight height, time over the runway and frequency of runway crossings were used to estimate strike risk and the results compared to the actual strike rate at Dublin Airport. Categorisation, Triangulation by theodolite and RADAR were used to calculate the birds' flight height, while vantage point surveys were used to determine the length of time birds spent over the runway. The results showed that the majority of birds (64%) crossed the runway below a height of 17 metres. The height of aircraft using the runway at Dublin Airport ranges from 7.5 metres (ATR 42) to 19.4 metres (B747-400), putting the birds crossing at these altitudes at the greatest risk of bird strike. The combination of the height and the time over runway data, gives a clearer picture of the relative risk of strike associated with each species. Over half of Rook *Corvus frugilegus* runway crossings were below 17 metres, and those crossing were relatively slow (5.5 seconds), putting them in danger of a strike for a large proportion of their crossings. The RADAR data showed that the largest proportion of birds crossed the runway zone above 2000 metres (62%) and that the greatest proportion of these high altitude bird flights occurred between 18:00 and 24:00hrs. The Band model (Band *et al.*, 2006), which is used to determine collision risk at wind-farms, was adapted for use in the current study. The results of the Band model estimated that collision rate would be 1.1×10^9 per annum and subsequently calculated an almost 100% avoidance rate. The results of the current study suggest that the use of field observations alone may not be sufficient to determine strike risk, or probabilities of strikes, associated with particular species.

Can a bird strike be diagnosed based on injury pattern? A post mortem examination

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In this study bird-aircraft collision, also known as bird strike, was examined using post-mortem analysis of bird cadavers. Bird necropsy techniques were used to study the trends in injury patterns of aircraft- and road-killed birds with the aim of developing criteria for diagnosis of a bird-strike. Cadavers were collected from airfields and roadsides and post-mortem examination was conducted following standard procedures. Injury patterns were examined at an entire sample level and at the taxonomic level by family. Four causes of death were identified within the sample; aircraft-killed, road-killed, predator-killed and shot. The diagnostic injuries used to arrive at these results were described. The majority of cadavers in all causes of death had significant injury to the ventral surface. The prevalence of ventral injury may be as a result of an active avoidance response immediately prior to impact. This trend of ventral injury prevailed for all but one of the main four bird families in the study. The Hirundinidae had an increased proportion of injury to the head and neck regions. These findings point to differing behavioural responses to oncoming threats between bird taxa. The use of post-mortem analysis of cadavers yields a clearer picture of the nature of a bird-strike and other anthropogenic causes of death in birds as well as identifying varying responses of different avian taxa to the risk of colliding with objects.

Can cause of death be identified using quantitative injury recording? Towards developing a methodology and nomenclature for cadaver analysis

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Cadavers found on or adjacent to airport runways can create problems for airport authorities where no collision has been reported, as the issue of whether or not to categorise this as a bird strike is unclear. This study aimed to quantitatively describe bird cadaver injury and to develop a standardised nomenclature to determine if a particular suite of injuries are symptomatic of aircraft-kill. This was achieved by comparing the injuries of cadavers found on runways to those found on roadways. Building on trauma scoring techniques used in human medicine, a numerical scoring system was used to categorise the injuries of cadavers based on their severity. Multivariate statistical techniques were used to identify and characterise aircraft- and road-killed cadavers based on injury patterns. Although the results of this study did not conclusively separate the aircraft- and road-killed cadavers, they did indicate that modelling of quantitative injury scores has potential for use in determining cause of death. While there are differences in the injury patterns of the two causes of death, no single injury site or suite of injuries was unique to either aircraft- or road-killed birds. In general, groups of injury sites were found to cluster based on body location. Indicator Species Analysis (ISA) illustrated the importance of lower abdominal injuries (*gizzard/proventriculus*, *pancreas*, *intestine* and *cloaca*) in diagnosing aircraft-kill. Species, age, sex and month did not appear to have a significant influence on the observed patterns of injury.

Are some birds more likely to be struck than others? An examination of aircraft and road fatalities

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Previous research on the prediction of strike rate has found that local bird densities are not good predictors of strike risk, suggesting that some birds are more likely to be involved in a collision than others. Species, sex, age or condition related behaviours may mean that some birds are more susceptible to strike than others. Using post-mortem techniques on aircraft- and road-killed bird cadavers, the current study examined the link between the above mentioned parameters and fatality rate. While the profile of species struck in each cause of death is undoubtedly linked to local bird densities, this alone could not predict the strike rate of a species. Rooks, for example, which accounted for over 80% of bird numbers at Dublin Airport, were rarely struck accounting for less than 7% of total fatalities. Strike rates peaked during the summer months when numbers of young fledgling birds are at their highest. These immature birds accounted for a large proportion of the struck sample in a number of species including Black-headed Gull *Chroicocephalus ridibundus*, Swift *Apus apus*, Rook *Corvus frugilegus* and Swallow *Hirundo rustica*, while adult fatalities dominated in the Skylark *Alauda arvensis*, Starling *Sturnus vulgaris* and racing pigeon *Columba livia* var. *domestica*. Interspecific differences in sex ratios were also found within the study sample, with large numbers of male cadavers in Blackbird *Turdus merula* and Skylark *Alauda arvensis* compared to a majority of female cadavers in Black-headed Gull and Rook. Overall, condition of cadavers was poor with low fat and pectoral muscle scores in the majority of the sample. The results of these analyses suggest that not all birds are equally likely to be involved in a strike.

Climate change impacts on phenology: implications for terrestrial ecosystems

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It is now widely acknowledged that recent global changes in climate have notable effects on the timing of periodic biological events (phenology) of plants and animals. The affect is however variable across space and between species. The proposed study will consider climate change impacts on phenology of plants and birds at a local scale in order to clarify the spatial range and variation across species and trophic levels. To do this we are conducting an analysis of the existing phenological data in Ireland. This data will form the bases for the establishment of a range of experiments and models focused on clearly identifying the current and future impacts of climate change on phenology in Ireland. In addition, we intend to establish a phenological network across Ireland to encourage the recording and monitoring of a suite of native and non-native plant species.

Restoration management for Annex I birds at Termoncarragh Lake SPA, Mullet Peninsula, County Mayo; a LIFE-Nature III support funded project

Suddaby, D.

BirdWatch Ireland, c/o Teagasc, Chapel Street, Belmullet, County Mayo

Between 2001 and 2005, habitat conditions for Annex I breeding and wintering birds were created through restoration management on BirdWatch Ireland-owned land and through management agreements with local landowners at the Termoncarragh Lake SPA. Species targeted were Corncrake *Crex crex*, Red-necked Phalarope *Phalaropus lobatus*, Greenland White-fronted *Anser albifrons flavirostris* and Barnacle Goose *Branta leucopsis*. Agreements focused on more pro-active, positive management than is possible under the current range

of agri-environment schemes. The visible achievements were the purchase of 20 ha of meadow grassland, the pool restoration management at Annagh Marsh, the enhancement of grasslands for Corncrake and the grassland management for the wintering geese. These delivered at least two breeding Corncrakes each year, up to 1,200 Barnacle and 52 Greenland White-fronted Geese feeding on the grasslands each winter and despite no Red-necked Phalaropes being recorded the management increased the breeding populations of Lapwing *Vanellus vanellus*, Dunlin *Calidris alpina*, Snipe *Gallinago gallinago* and Redshank *Tringa totanus*. They also enhanced the populations of non-avian species such as the Belted Beauty moth and the Great Yellow Bumblebee, both of which are classified as Nationally Scarce species. In addition, the project successfully expanded the boundaries of the SPA, provided a forum for an effective working partnership, provided habitat enhancement management advisory leaflets, demonstrated how agri-environment prescriptions under REPS can be enhanced, and provided a high and very positive profile among the farming community on the Mullet Peninsula and surrounding area, particularly among landowners within the SPA.

Monitoring and measuring breeding parameters of Lapwing *Vanellus vanellus* and other waders at selected NATURA 2000 sites in N.W. Mayo

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Between 2006 and 2008 this project monitored populations of breeding Lapwing, Dunlin *Calidris alpina*, Redshank *Tringa totanus* and Snipe *Gallinago gallinago* at sites within the Mullet / Blacksod Bay and offshore islands complex. For these species a total of 274 breeding territories were recorded in 2008; a significant increase from 143 found in the last breeding wader survey (1996) and a trend noted since 2006. However the populations on the mainland have declined whilst those on the offshore island, Inishkea North, have increased and now support 65% of the populations each year. In all years and at all sites Lapwing was the commonest species recorded. Investigating their breeding productivity found that the median laying date of first clutches has generally been around 8 April with a second laying period around 6 May. The most protracted period extended from 23 March to 26 May; this was found to relate to habitat usage where the early clutches were laid mostly on the machair and later clutches mostly on the saltmarsh, and may relate to tidal inundations delaying birds from laying. Clutch size did not differ and overall has been 3.8 eggs. Egg sizes, at least at one site, did differ between laying periods; these were likely to have been relays, since replacement eggs tend to be smaller. Differences in hatching rates were evident between the mainland sites and Inishkea North, with hatching estimates of 17% and 65% respectively reflecting the lack of predators on the islands. At the mainland sites, at least 50% of failures were attributable to predation from either Fox *Vulpes vulpes* or Crow *Corvus* sp however the predator pressure varied between sites. At some sites Fox was the primary predator accounting for the loss of up to 60% of clutches. Predation is reflected in the low productivity estimates.

Research of breeding Dunlin *Calidris alpina* ecology associated with machair and upland NATURA 2000 sites in N.W. Mayo

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The key elements of this project are to monitor population levels and breeding performance of Dunlin and gather information on site fidelity and determine their sub-speciation. This was carried out on Inishkea North (machair) and Slieve Fyagh (upland) following preliminary surveys on machair from 2006. At these sites in 2008, a total of 39 breeding territories were on machair and 15 on upland; from these 45 nests were monitored. The median laying date of clutches has generally been around 21 May; clutch size has not differed between sites or years and overall has been 3.8 eggs. Machair egg sizes did not differ between years but were smaller than those in the uplands. In 2008 predation levels on machair were high and thought most likely to have involved Common Gulls *Larus canus*; in previous years predation levels have been low due to protection from breeding terns. In addition,

nearly half of all nests on machair suffered partial clutch depletion compared to low levels in the uplands. This may relate to egg shell colour and thickness and is presently being investigated. Chick hatchling weights were not different but were generally low in comparison to other studies. Brood survival has been poor with low daily chick growth rates and this is reflected in poor productivity levels. To investigate site fidelity adults and chicks have been individually colour ringed; this has shown breeding adults returning to the same site each year and two-years as age of first breeding. From adult biometric data the populations breeding in the uplands relate to the sub-species *C. a. schinzii*; confirmed on machair in 2006 from mitochondrial DNA analysis.

Bird diversity and abundance in different stages of the forest cycle in first and second rotation plantation forests

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Research on first rotation forests has demonstrated that the bird communities of Sitka Spruce *Picea sitchensis* plantations change at different stages of the forest cycle. However, the nature of plantation forest cover in Ireland is changing as afforested areas are reaching the end of the commercial cycle and are frequently replanted for a second rotation following felling. What is not yet clear is how bird communities respond to subsequent rotations, and whether communities or species show different patterns from those in the corresponding stage of the first rotation. Such knowledge is critical to evaluate the contribution of second rotation forests to bird conservation, and to indicate future patterns that may result from an increasing proportion of second rotation forest in the landscape. This is the first study in Irish forests aimed at addressing this question.

We conducted six 10-minute point transects in 20 first rotation and 20 second rotation plantation forests of four different age classes: mature (~50yrs), mid-rotation (~35yrs), thicket (~15yrs) and pre-thicket (<10yrs). Point counts were of 100 meter radius and all birds heard and seen were recorded, along with their distance from the observer. Each site received two visits, with first rotation fieldwork being carried out in 2002 and second rotation in 2007. Density estimates from 2007 were corrected for natural population change using figures derived from the Countryside Bird Survey 1998-2005.

We used *Distance* software to analyse the field data and generate densities of the bird species recorded in the plantations. We then compared the densities and species richness of first and second-rotation forests to determine what effect a second rotation had on bird communities. Preliminary investigations of field data indicate that second rotation plantations consistently harbour a higher total bird density than first rotation plantations. However, species richness did not differ significantly between rotations in any of the forest types.

Assessing the distribution of invasive species via bird of prey pellets

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Invasive species are considered one of the greatest threats to global biodiversity. To understand the impact an invasive species may have on native species, and to implement appropriate management plans to reduce any negative impacts within naive environments, a basic understanding of their distribution is required. In Ireland the expansion of invasive species such as the bank vole *Clethrionomys glareolus* has been monitored regularly via trapping schemes along the breadth of its distribution. With the recent discovery of another new mammal species to Ireland, the Greater White-toothed Shrew *Crocidura russula*, work is being planned to determine the extent of this species distribution. Traditional techniques involve trapping using longworth mammal traps. However, the use of such techniques are labour intensive and expensive. Therefore, to determine the distribution of the Greater White-toothed Shrew a novel method is being employed. Pellets of birds of prey are to be collected and examined for remains of the greater white-toothed shrew. In locating kestrel *Falco tinniculus* and barn owl *Tyto alba* roosts it

is hoped that a rough distribution of this species can be determined. Identifying this species' distribution will allow future monitoring of its distribution to take place and will mean that further research can be carried out to determine whether its presence will ultimately prove positive or negative.

The Irish Chough Research Project - Phase I, pre-Chough SPA designation: August 2002 to August 2005

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Yearlong baseline studies to investigate seasonal distribution, habitat use and breeding season behaviour of Choughs *Pyrrhocorax pyrrhocorax* have been conducted in the five IBAs identified for the species. Chough populations from Baltimore to Toe Head, in north Donegal and on the Inishowen Peninsula were also studied.

IBA study areas

Baseline studies

1. Sheep's Head & Mizen Head Peninsulas	Sept. 2003 to Aug. 2004
2. Beara Peninsula	Sept. 2003 to Aug. 2004
3. Iveragh Peninsula	Aug. 2002 to Aug. 2004
4. Dingle Peninsula	Aug. 2002 to Aug. 2004
5. West Donegal	Sept. 2004 to Aug. 2005

The findings from Phase I can be found in the following *BWI Conservation Reports*:

Thomas G., Gray N. & Newton S. (2003). The distribution and feeding ecology of the Chough in southwest Ireland: August 2002 - August 2003. No. 03/4.

Gray N. & Newton S. (2005). The distribution and feeding ecology of the Chough in County Kerry: September 2003 - August 2004. No. 03/4.

Trewby M., Thomas G. & Newton S. (2005). The distribution and feeding ecology of the Chough in southwest County Cork: September 2003 - August 2004. No. 05/1.

Gray N., Trewby M., Cummins S., Thomas G. & Newton S. (2006). The distribution and feeding ecology of Choughs in County Donegal: September 2004 - August 2005. No. 06/1.

An NPWS Conservation Manual collates all the findings from Phase I and reviews the breeding season censuses (1992 & 2002/03). See Trewby M., Gray N., Cummins S., Thomas G. & Newton S. (submitted 2006). The status and ecology of the Chough *Pyrrhocorax pyrrhocorax* in the Republic of Ireland, 2002-2005.

An additional two-month study of Chough populations in southwest County Mayo was conducted to collect supplementary information to support the designation of the Clare Island Chough SPA. See Trewby M., McGreal E. & Newton S. (2006). Choughs in southwest County Mayo – Killary Harbour to Achill Island. Unpublished *BWI Conservation Report*.

Keywords: Chough, ecology, Important Bird Areas, western Ireland

The Irish Chough Research Project - Phase II, post-Chough SPA designation: January 2008 to January 2010

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In November 2006 a core suite of 14 Chough SPAs were formally designated. Supplementary information to support SPA designation was collected for seven of the SPAs (see The Irish Chough Research Project - Phase I: 2002 to 2005). Phase II of this project aims to emulate the yearlong baseline studies conducted in the Chough IBAs during Phase I and apply the same methodologies within the seven SPAs still requiring supplementary information. These yearlong baseline studies will investigate the seasonal distribution, habitat use and breeding season behaviour Choughs in the areas targeted.

Phase II will be carried out over two years. In Year 1 (2008) yearlong baseline studies will be carried out in the four unstudied Chough SPAs on the south coast – Mid Waterford coast, Helvick Head to Ballyquin, Seven Heads and Galley Head to Duneen Point. In Year 2 (2009) the research effort will concentrate on the remaining Chough SPAs requiring supplementary information – the Sligo/Leitrim uplands, Cliffs of Moher and Kerry Head. As additional objectives the project will develop appropriate agri-environment measures for Choughs and a national monitoring strategy for all 14 Chough SPAs in the Republic of Ireland.

Breeding seabirds on the Skelligs, County Kerry

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Each summer since 1990 short visits have been made (2-4 nights) to Great Skellig, 15 km off the mainland coast of County Kerry in the 3rd or 4th week of June or 1st week of July. The purpose of the visits have primarily been to census the breeding seabirds, monitor productivity of the Kittiwake *Rissa tridactyla* colonies, ring Storm Petrels *Hydrobates pelagicus* and Manx Shearwater *Puffinus puffinus*. As part of an all-Ireland Gannet survey in 2004, Gannets on Little Skellig were successfully photographed from a Cessna. The survey results showed that 29,683 apparently occupied sites (AOSs) were present, a 12% increase at 1.2% p.a. since the last count, in 1994.

Barnacle Goose *Branta leucopsis* census, March 2008

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A full census of Greenland Barnacle Goose *Branta leucopsis* was undertaken between 16 and 18 March 2008 surveying a total of 328 islands and mainland sites along the west and north coasts of Scotland and Ireland. Most sites were surveyed from the air, while several ground-based counts were carried out also. The aerial census in Ireland was undertaken using a Aer Corp Rheims Rocket Cessna 172 and was carried out on two days, 17-18 March 2008. Approximately 11 hours flying was undertaken, surveying sites in a south to north direction along the west coast of Ireland from the Blasket Islands, Co. Kerry to Inishtrahull, Co. Donegal. Weather conditions were good, with good light and visibility and generally light winds throughout. Some 33 sites were found to hold 12,232, which represents 17% of the population, and is an increase of 35% when compared with the last census in 2003. The majority (53%) of the geese present in Ireland were found at two key sites, namely Ballintemple/Lissadell in Sligo and the Inishkea Islands in Mayo. Further information is provided in the current edition of Irish Birds.

Marking and resighting of Greenland White-fronted Geese *Anser albifrons flavirostris*

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A total of 1639 Greenland White-fronted Geese have been caught and ringed on the Wexford Sloblands including 67 elsewhere in Ireland by NPWS since 1983; a further 347 have been caught in their breeding and moulting areas in Western Greenland by the Greenland White-fronted Goose Study Group and 276 have been cannon-netted in Western Iceland. In addition to metal rings, most geese have been marked with white plastic leg bands and orange neck collars inscribed with a unique code legible through a telescope at up to 800 meters (400 m in the case of reading leg bands). Details of age, social relationships with other geese, location, habitat usage and a condition index are collected when marked birds are resighted. The database continues to be collated by Prof. Tony Fox at the National Environmental Research Institute, Kalø, Denmark. This project continues to provide valuable information on aspects of Survival, Site fidelity and Age and first pairing and breeding amongst Greenland White-fronted Geese.

Influence of open space and broad-leaved vegetation on bird communities of upland plantation forests in Ireland

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Open spaces are an important component of forests, enabling them to support gap specialists as well as species present in the wider, non-forest landscape. We sampled the breeding birds of twelve conifer plantations in Ireland, along forest roads, and in a variety of types and sizes of open space. Transects along forest roads revealed that species richness, overall abundance of birds and abundances of several common bird species were positively related to percentage cover of shrubs along road edges. Percentage cover of brash and road width were also positively related to bird numbers. Point counts conducted in a wide range of open space types and configurations showed that cover of broadleaved trees was positively related to bird species richness, and in particular to the number of species associated with broadleaved woodland, at two different scales. No other component of cover or open space was consistently related to bird diversity. However, as open spaces provide the main opportunity for the development of broadleaved trees and shrubs within conifer plantation forests, they can greatly influence the bird diversity they support. We suggest some ways in which the bird assemblages of commercial plantations in Ireland can be enhanced through the management of broadleaved vegetation and open space.

Planting trends and bird diversity of typical afforestation habitats in Ireland

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A programme of afforestation has increased forest cover in Ireland by more than tenfold since the middle of the 20th century, presenting a challenge for biodiversity conservation. This study describes recent planting trends according to habitat, and characterises the bird assemblages of the most commonly afforested habitat types. During the period 1980 to 2005, between 80 and 90 % of afforested sites were located on peats, well-drained mineral soils (typical of improved grassland habitats), and gleys (typical of wet grassland habitats). Towards the end of this period, afforestation rates on peats and gleys were more than twice that on well-drained mineral soils. Birds were surveyed at 27 peatland, wet grassland and improved grassland sites, to quantify the avian diversity of these habitat types. Bird density and species richness were positively related to shrub and tree cover, which was highest in wet grassland and lowest in peatland sites. Wet grassland and peatland supported several species that

were characteristic of these habitats, but no species was characteristic of improved grassland sites. We examine the ways in which choice of afforestation habitat and subsequent management of plantations could optimise effects of plantation establishment on bird diversity in Ireland. This is the first study of its kind for Ireland, a country undergoing rapid forest expansion. It indicates that, in the longer term, birds are likely to benefit most from afforestation in areas of high-productivity grassland with high intensity grazing and relatively low levels of shrub cover.

Habitat selection around nest sites by Hen Harriers *Circus cyaneus* in Ireland

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Hen Harriers are vulnerable across much of their range, and the success of Hen Harrier conservation in Britain and Ireland depends on appropriate habitat management. This study set out to investigate habitat selection by breeding Hen Harriers in the main breeding areas of this species in Ireland. The locations of 190 Hen Harrier nests were identified during the 2000 and 2005 national breeding surveys and used to assess habitat selection. The results indicate that one of the main determinants of Hen Harrier breeding site selection is the avoidance of landscapes with a high proportion of improved grassland. Further improvement of agricultural land in areas managed for Hen Harrier conservation should therefore be avoided. We also show that areas with relatively high levels of cover of both first and second rotation young forest plantations are favoured by breeding Hen Harriers in Ireland, where more traditional upland habitats are often heavily grazed. Relatively high levels of cover of improved grassland and mature forest are tolerated by Hen Harriers in areas where alternative habitat cover is limited. These habitats are not extensively used by Hen Harriers for hunting or nesting, and their influence on breeding success is not yet known. This study provides much needed information on habitat selection by breeding Hen Harriers required to develop sound management strategies for the conservation of this species.

Parental behaviour of nesting Hen Harriers *Circus cyaneus* in Ireland

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The success of nidifugous young depends on parental behaviour at the nest, which can be difficult to observe directly. The aim of this study is to determine how brooding, incubation and provisioning behaviour of breeding Hen Harriers affect nestling development and fledging success, and to investigate the influence of weather and habitat on these aspects of parental care. In 2008 cameras were deployed at 10 Hen Harrier nests in three geographically distinct study areas, and we also intend to deploy cameras at a similar number of nests in 2009 and 2010. Nest success (in terms of fledging at least one young) in 2008 did not differ significantly between nests with and without cameras found in these study areas. Data collected by nest cameras will enable us to better understand how care for the clutch and brood varies between nests and according to aspects of the Hen Harrier's environment. Nest cameras also contribute to a more complete understanding of Hen Harrier nesting ecology, revealing the precise timing of events such as hatching and fledging, and events such as siblicide and parental cannibalism that have not previously been recorded in this species. This increase in understanding will enable more effective conservation management of this species.

Foraging ecology of breeding Hen Harriers *Circus cyaneus* in Ireland

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The aims of this study are to investigate influence of habitat composition at landscape level on foraging behaviour of male Hen Harriers, and to evaluate habitat foraging preferences of these birds in more detail than has previously been possible. We aim to deploy four tags on male Hen Harriers in two study areas in 2009 and 2010. We will tag males provisioning nests where chicks are 2 weeks old or less, as the results of previous studies indicate that this is an optimal time for tagging in terms of minimizing effect of tagging on male behaviour. Tagged males will be closely monitored in order to detect any responses to tag deployment. A protocol for capturing breeding adult Hen Harriers has been trialled successfully, and we will thoroughly trial tags and associated equipment before deploying them on wild birds. We will preferentially select males provisioning nests where cameras have been deployed, bringing added value to the data we collect on male foraging and parental behaviour. Foraging males provide the majority of food received by nesting females and their young, and allow females to devote their time to incubation and brooding. As such, male foraging is key to Hen Harrier breeding success. Understanding how habitats relate to one another in terms of foraging quality, and how the interaction between male foraging behaviour and habitat composition affects Hen Harriers nesting biology and breeding success, is of critical importance in deciding how to manage areas where Hen Harriers breed.

Cape Clear Bird Observatory

Wing, S.

c/o BirdWatch Ireland, PO Box 12, Greystones, County Wicklow

Cape Clear Bird Observatory continues to keep a Daily Log, recording everything seen, including birds, mammals and Lepidoptera. This has been carried out for the last 49 years and this vast dataset was computerised recently, allowing easier analysis. We intend to include weather, observer numbers and percentage of the island covered over the coming winter to improve the statistical value of the database. A new survey, covering the whole island, was 'test run' last year and we will continue this, with the help of volunteers for a five year period.

A new ringing site has been opened near the Post Office in an area of young Sycamores, Alder, Oak and Birch. Early results show that this will be a very productive area and perhaps, subject to BTO approval, a Constant Effort Site.

Seabird monitoring, by way of seawatching from the cliffs, has continued. The results are showing a continued decline in numbers of Manx Shearwater *Puffinus puffinus*, Great Shearwater *P.gravis* and Cory's Shearwaters *Calonectris dimedea*. The opposite appears to be happening on the west coast of Ireland and may indicate a change in food supply or the 'workings' of the Gulf Stream.

The Observatory has increased the number of Courses on Birdwatching. A weekend Beginners course is held every month, a general ecology week is held in June and August and a Seabird and Migration course in September. Next year sees the Observatory's 50th Anniversary and work is in progress to produce an updated version of the Natural History of Cape Clear which will highlight the value of the work carried out at the Observatory.

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