

Dunmanway to Clashavoon 110kV Overhead Line Environmental Reports

Constraints Report – Flora and Fauna

Submission to: ESB International

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1 INTRODUCTION

This section identifies the constraints associated with ecology that exist in the study area associated with the proposed 110kV line from Clashavoon to Dunmanway, Co. Cork. The report was carried out by Dr Patrick Crushell – Consultant Ecologist.

1.1 STUDY AREA

The study area is approximately 520 km² in extent, the area is characterised by an undulating landscape between Cork city and the mountainous region of West Cork. The proposed powerline will commence at the ESB substation at Clashavoon approximately 5km North-east of Macroom town and terminate 27 km to the South at Dunmanway substation which is located 1 km to the East of Dunmanway town.

The study area lies within two main river catchments, the River Lee in the North and the River Bandon in the South. The low-lying lands along these main river valleys are intensively farmed being dominated by improved agricultural grassland. More mountainous terrain occurs throughout the hilly areas between these main river valleys. Habitats that are most common throughout this area include conifer plantation, wet heath, bog and wet grassland.

Following the construction of the River Lee hydroelectric scheme, a large part of the Lee Valley was flooded to form the Inishcarra Reservoirs, which is the major landscape feature in the northern part of the study area.

2 METHODOLOGY AND INFORMATION SOURCES

Areas of scientific and/or conservation interest, as well as the presence of protected plant and animal species within the vicinity of the study area were investigated. This was done primarily by consulting a range of desktop data-sources including published and unpublished information sources. National Parks and Wildlife Service (NPWS) were consulted for relevant ecological information relating to the study area.

3 RESULTS

3.1 RARE AND PROTECTED SPECIES

A number of species listed on Annex II of the EU Habitats Directive are present within the Bandon River SAC including: Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

There are also a number of Annex IV species utilising the study area, including Fox and Badger, both of which are likely to be widespread occupying suitable habitat throughout the study area. Other Irish Red Data mammal species that are known to be present and widespread include Irish Hare and various bat species including Daubenton's Bat and Pipistrelle Bat (recorded within Bandon River SAC).

Inishcarra Reservoirs (including the Gearagh SPA which is a sub-site) supports important wintering bird populations and two of the species which occur regularly, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive (Crowe 2005). Swans, dabbling duck, diving duck and some waders are present and the site provides both feeding and roost sites for the birds. Six species that

occur regularly have populations of national importance. Many of these species are not confined to the site and are known to regularly utilise areas in the surrounding landscape.

The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the Bandon River. A population of Whooper Swans also occurs regularly along the Bandon River, feeding on the grasslands that are present along the floodplain of the River (Robinson et al. 2004; Crowe 2005).

There are also breeding pairs of Hen Harrier *Circus cyaneus*, a species listed under Annex I of the EU Birds Directive, present in the wider Cork area. The focal breeding areas for Hen Harrier are in the Boggeragh Mts, Nagles Mts and Ballyhoura Mts. The birds are known to breed in the upland areas of the Boggeragh Mountains, in the very Northern part of the study area (*personal observation*; Barton et al. 2006), although the area remains un-designated.

There are few rare plant species occurring within the study area; the most notable is the extensive swards of Mudwort (*Limosella aquatica*), a Rare plant listed in the Red Data Book which occur on the mudflats in The Gearagh.

3.2 DESIGNATED AREAS

There are nine designated areas of recognised conservation value within the study area (see Table 1 and Figure 1). The ecological interest of each site is briefly summarized in Table 1. Appendix 1 contains a more detailed ecological description of the two most important sites, the Gearagh SAC / SPA and the Bandon River SAC, both of which have been formally designated as sites of international ecological importance and are centrally located within the study area.

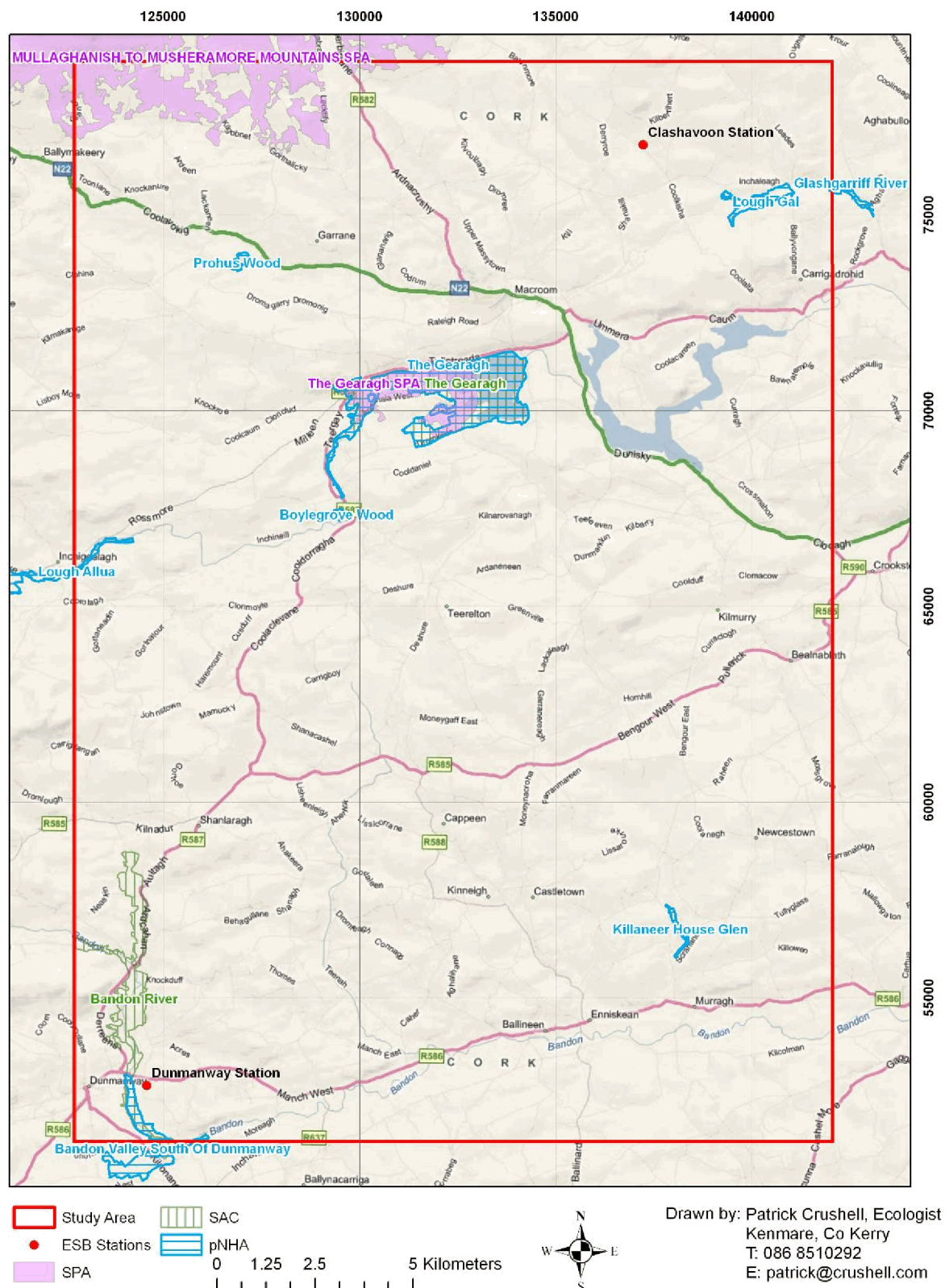


Figure 1: Designated sites that occur within the study area of the proposed 110 kV powerline from Clashavoon to Dunmanway.

Table 1: Designated and proposed designated conservation areas within the study area

Name	Site Code	Designation	Notes
The Gearagh	108	SAC / pNHA / NNR	An inundated woodland site. The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the European Habitats Directive.
The Gearagh	4109	SPA	Overlaps with much of the Gearagh SAC/ pNHA. Site is recognized as being of international importance to wintering waders and wildfowl.
Bandon River	2171	SAC	Located in the South-western part of the study area. Designated as an SAC due to the occurrence of floating river vegetation and alluvial woodland habitat; both of which are listed on Annex 1 of the EU Habitats Directive. In addition, the site is designated due to the presence of both Brook Lamprey (<i>Lampetra planeri</i>) and Freshwater Pearl-mussel (<i>Margaritifera margaritifera</i>).
Bandon Valley South of Dunmanway	1035	pNHA	Sub-site of Bandon River SAC. This site covers the stretch of Bandon River starting 1km downstream of Dunmanaway and running approximately south east for approximately 4km to just below Beakebay Bridge. This site is especially valuable for its woodlands and unmodified river bed, a relatively rare habitat in a European context.
Prohus Wood	1248	pNHA	Prohus Wood consists predominantly of young trees, partly coppiced growing on rocky ground which slopes to the east. The site has not developed much habitat diversity and is developing naturally. Deemed to be of local importance
Glashariff River	1055	pNHA	This site consists of a small stream and wooded river valley. The main woodland types included within the site are dry broad leaved woodland, mixed woodland and commercial forest. The ground flora of the woodland is moderately rich for an upland situation. Otters and Badgers are reported from the site.
Lough Gal	1067	pNHA	Lough Gal is now largely grown over by the fen at Curraghindaveagh. The plant communities include floating fen with some peat development especially in the south-west corner. This site contains unusual habitats for the area. The flora of the lough and surrounding wetlands also appear to be of interest.
Killaneer House Glen	1062	pNHA	Killaneer Glen is a linear wooded stream-valley. The site is damaged by illegal refuse disposal. The site is located in the southern part of the study area.
Lough Allua	1065	pNHA	Lough Allua is of value due to its diversity of habitats and the presence of uncommon plant species. It forms a ribbon lake surrounded by a complex of habitats (wet grassland, bog and heath) along an expanded section of the River Lee. The rare and protected Pale Dog-violet (<i>Viola lactea</i>) is present along the North shore of Lough Allua to the West of Inchigeela. The site extends into the far western part of the study area.

Name	Site Code	Designation	Notes
Mullaghanish Musheramore Mountains SPA	to	SPA	Large upland site comprising a complex of forestry, heath and bog. Overall, the site provides excellent nesting and foraging habitat for breeding Hen Harrier forming an important stronghold for this rare and protected species. The site extends into the north-western part of the study area.
Boylegrove Wood	1854	pNHA	Boylegrove Wood is a small deciduous woodland. To the south of the wood between the woodland and the river is heathland with many rock outcrops which is used for rough grazing.

3.2.1 The Gearagh SAC / NNR / SPA / pNHA

This site is located on the River Lee in County Cork, extending westwards and southwards from the Lee Bridge, which is about 1.5km south of Macroom. It extends for about 7km of river, to Dromcarra Bridge. The Gearagh occupies a wide, flat valley of the River Lee, on a bed of limestone overlain with sand and gravel. This unusual area has formed where the River Lee breaks into a complex network of channels (2 to 6m wide) weaving through a series of wooded islands.

The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the European Habitats Directive. The area has probably been wooded throughout the Post-glacial era (i.e. since the end of the last Ice Age, which ended around 10,000 years ago) and frequent flooding has served to enhance its character. Originally, this area of alluvial woodland extended as far as the Lee Bridge. Unfortunately, in 1954/55, in the eastern part of the Gearagh, extensive tree-felling and flooding were carried out to facilitate the operation of a hydro-electric scheme. Around sixty per-cent of the former woodland was lost. Today, the reservoir covers the area from Lee Bridge to Annahala Bridge and westwards of Illaunmore Island.

The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is a shallow lake or reservoir which is fringed by wet woodland, scrub and grassland that is prone to flooding.

The Gearagh is a Nature Reserve, a Ramsar Convention site and a Council of Europe Biogenetic Reserve. There are no imminent threats to the wintering bird populations, though some disturbance is caused to the birds by illegal shooting. The reservoir created by the past damming activities now attracts important populations of wintering waterfowl, with six of the species having populations of national importance. Also of note is that two of the species which occur regularly, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive. The site has been selected as an SPA due to its importance to wintering waders and wildfowl.

The site has been designated as a SAC due to the presence of three habitats listed on Annex 1 of the EU Habitats Directive (Alluvial forest; floating river vegetation; old sessile oak woods) and one species listed on Annex 2 (Otter (*Lutra lutra*)). See Appendix 1 for more detailed site description as published by NPWS.

3.2.2 Bandon River SAC

The site consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the Bandon takes an easterly course.

The site is important for a number of reasons. It contains a small though very important example of the Annex I priority habitat Alluvial Forest as well as good examples of another Annex I habitat - Floating River Vegetation. The Annex II animal species Otter, Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) occur. The populations of the Mussel are thought to be nationally important. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

The river below Long Bridge is an important inland site in Cork for Mute Swan and approximately 20 individuals are present throughout the year along this stretch. Several hundred Snipe use the site during the winter. Other birds seen regularly within the site are Grey Heron, Cormorant and Mallard, while low numbers of Lapwing and Teal visit during the winter.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Badger, Irish Hare, Daubenton's Bat and Pipistrelle. The two bat species can be seen feeding along the river and roosting under the old bridges.

The site has been selected as a Special Area of Conservation due to the presence of two habitats listed on Annex 1 of the EU Habitats directive ('*Alluvial forests; Floating river vegetation*') and the occurrence of two species listed on Annex 2 of the EU habitats directive, namely Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*). See Appendix 1 for more detailed site description as published by NPWS.

3.3 NON-DESIGNATED SITES

There are a number of sites of known ecological interest within the study area that have not been designated or formally proposed for designation. The locations of these sites are shown on the map presented as Figure 2.

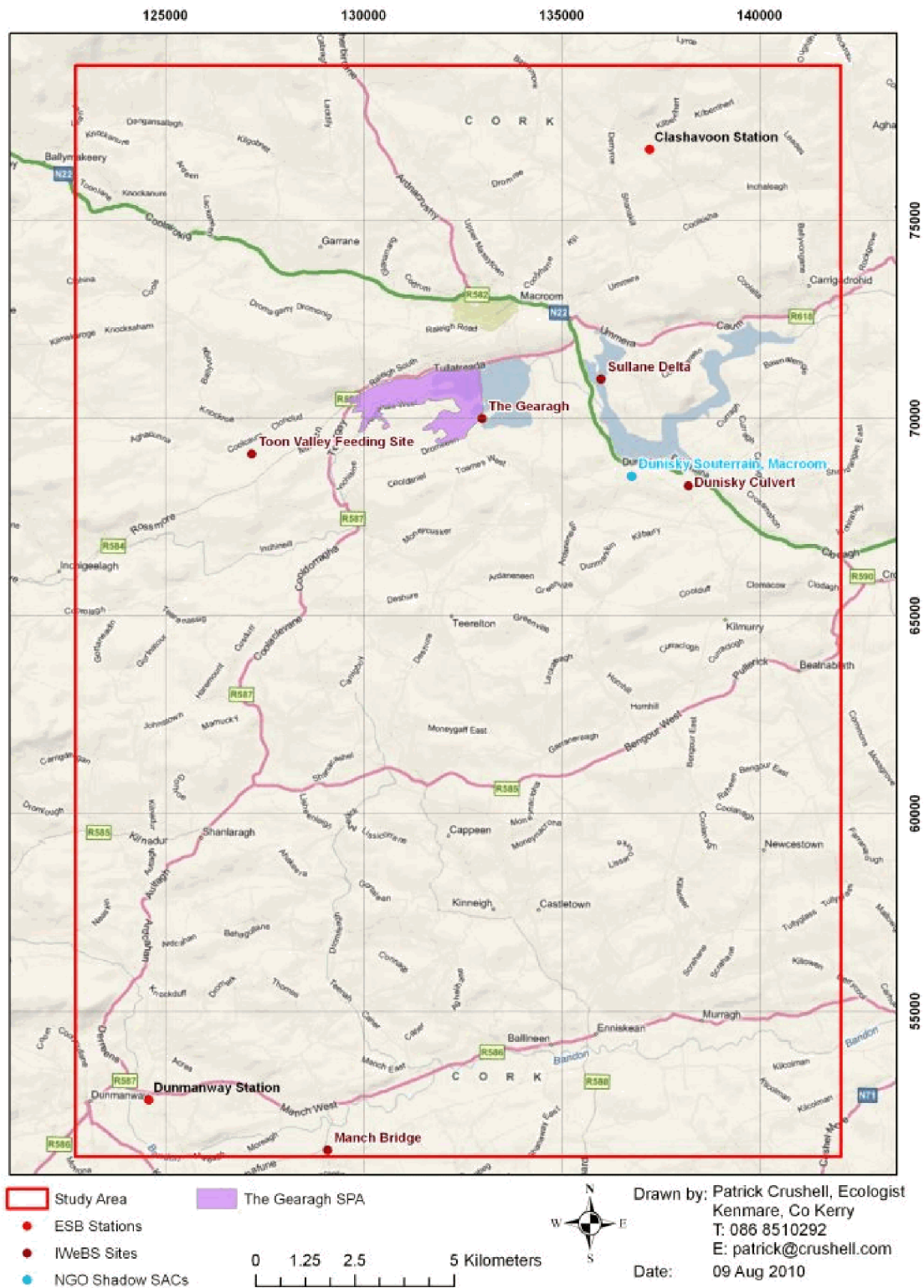


Figure 2: Non-designated sites of ecological interest that occur within the study area of the proposed 110 kV powerline from Clashavoon to Dunmanway.

3.3.1 Toon Valley

This site (Grid Reference: W 272 691) is a regular used as a feeding site by a flock of Whooper Swan that utilise the Gearagh each winter. Birds have been shown to fly between the roost site at the Gearagh and this feeding site on a daily basis during much of the winter season (D. O'Keefe *pers. comm.*; Crushell 2010).

3.3.2 Inishcarra Reservoirs

This extensive wetland site that is of high importance to waders and wildfowl is monitored annually by IWeBS (Irish Winter Bird Survey) (Crowe 2005). Part of the site (The Gearagh) is designated as a Special Protection Area (see above), however much of the site remains un-designated despite its recognition by Birdlife International as an Important Bird Area (IBA) (Hunt et al. 2000). The IBA covers The Gearagh and the upper part of the Inishcarra reservoirs, as far downstream as the Carrigadrohid dam. The site is divided into three main sub-sites, each of which have been shown to regularly hold significant numbers of water birds:

The Gearagh (designated as SPA - see description above)

Sullane Delta (Grid Reference: W 360 710): Significant numbers of Wigeon, Teal, Shoveler, Tufted Duck, Golden Plover, Lapwing and Curlew regularly occur at this sub-site (IWeBS data). During winter 2010, the population of Whooper Swan that occurs at the Gearagh was shown to use this area for part of the winter season. The swans were recorded roosting on the lake and feeding on grassland habitat nearby (Crushell 2010).

Dunisky Culvert (Grid Reference: W 383 685): Significant numbers of Teal, Mallard, Tufted Duck and Curlew regularly occur at this small sub-site (IWeBS data).

3.3.3 Manch Bridge

This sub-site forms part of the Bandon River IWeBS site and is of known importance to Whooper Swans (Crushell 2010). The site is located in the southern part of the study area (see Figure 2).

3.3.4 NGO Shadow list of SAC's

A group of 5 Irish Environmental NGO's published a shadow list of SAC's in 2000 to highlight deficiencies in the government list of SAC's. The NGO's proposed a total of over 500 sites for designation as SAC's, some of which do not have any designation. There are three sites (Bandon River; River Lee and Dunisky Souterrain) proposed by the NGO's for designation within the study area (Dwyer 2000; Crushell 2002). Bandon River has since been formally designated as a SAC; however the other two sites remain un-designated. The River Lee was proposed for the protection of Atlantic Salmon, a species listed on Annex 2 of the EU Habitats Directive. Dunisky Souterrain was proposed for the protection of Lesser Horseshoe Bats, a species listed on Annex 2 of the EU Habitats Directive, which are known to roost at the site (see Table 2).

Similarly in 2000, the Irish Peatland Conservation Council (IPCC) undertook a survey of Irish Fens. A list of wetland sites around the country was published which the IPCC believes merit further survey and possible designation (Crushell 2000). An updated list of fens that warrant further investigation was produced by Foss (2007). None of those sites proposed occur within the study area.

Table 2: Sites proposed by Environmental NGO's for designation as SAC's (Dwyer 2000; Crushell 2002).

Name	Site Code	Designation	Notes
Dunisky Souterrain	NA	NA	Proposed as a site for Lesser Horseshow (1303).
River Lee	NA	NA	Proposed as a site for Atlantic Salmon (1106)
Bandon River	2171	SAC	Formally designated as SAC for two habitats and two species listed on Annex 1 and Annex 2 of Habitats Directive respectively.

3.4 FISHERIES

3.4.1 Bandon River

The River Bandon rises in the Shehy Mountains in west Cork and flows east through Dunmanway, Ballineen, Enniskeane, Bandon and Inishannon to Kinsale Harbour. This is primarily a salmon and sea trout river but there are also plenty of small trout, particularly in the lower reaches. The salmon fishing extends all the way from Inishannon upstream to Desert Bridge and becomes more spread out further up.

There is a good run of spring fish, the peak being in April. The grilse run occurs at the end of June and water levels can be critical for good fishing. There is also a good run in August and September, and this is again dependent on good water quality. The river gets an excellent run of sea trout commencing in early July and lasting through August.

3.4.2 River Lee

The River Lee is a sandstone river rises in a mountainous region near Gauganberra in west Cork and flows 98km due east and throughout the city of Cork. It and its tributaries, the Sullane and Laney, drain a catchment area of 780 square kms. The Lee and some of the tributaries rise high in the mountains before reaching of alternating moorland and small farms. The valleys are now flooded as a result of the erection for two dams for hydroelectric power stations in 1956. The resulting elongated reservoirs stretch for a distance of approximately 26 kms and have had a significant impact on river fishing from Inishcarra Dam to Macroom and above.

The erection of dams appears to have interfered greatly with the free passage of fish, particularly salmon, and it is alleged that while some salmon make it through the fish pass very few smolts survive to go back to sea. In order to supplement the smolt run, the Electricity Supply Board built a hatchery at Carrigrohid and is committed to stocking 136,000 smolts annually into the river. Salmon fishing is now confined to an 13km stretch of river, reaching from Inishcarra Dam to the centre of Cork City.

The progeny of the generous stocking programme together with the escapement of wild smolts ensures a very substantial run of both Spring Salmon and grilse to the river.

4 ECOLOGICAL CONSTRAINTS

Following the identification of ecological features within the study area, the main ecological constraints relevant to the proposed overhead powerline include:

- Rare species: The avoidance of habitat that is potentially suitable to rare / protected species is recommended to avoid any potential adverse impacts. The most important areas for protected species have been identified as occurring within designated sites. Species most sensitive to the proposed development would include water bird species that are known to occur within the study area in significant numbers.
- Designated Sites: these sites are of known ecological importance and should, if possible be avoided in order to eliminate the potential for any direct impacts. The designated sites within the study area that are sensitive to indirect impacts would include the Bandon River SAC and the Gearagh SAC / SPA. Any potential deterioration of water quality would impact on the conservation status of either of these sites. Furthermore the potential for collision between birds and structures associated with the proposed development present a potential adverse impact on the conservation status of the Gearagh SPA. Appropriate Assessment screening of the project will be undertaken once a route corridor has been selected (see Section 5.1 below).
- Non-designated Sites: The Inishcarra reservoirs and Toon Valley provide important habitats to water birds during winter. Both these sites are of importance to Whooper Swan which is known to be especially vulnerable to overhead powerline collision. Dunisky Souterrain is reported as an important site for Lesser Horseshow Bat, a species listed on Annex 2 of the EU Habitats Directive.
- Fisheries: Important fisheries within the study area depend on water quality being protected throughout the two main river catchments. The main concerns in relation to the fishery areas are during construction and installation of pole-sets along the route: pole-sets can be positioned outside of streams and main channels to avoid direct impacts. The main impacts could arise from fuels, oils and other pollutants and run-off through soil disturbance during construction activity.

5 CONCLUSION

The main ecological constraints of the study area have been identified in the previous sections. The potential impacts of the proposed development in relation to ecology will be identified and appropriately assessed in the preparation of relevant environmental reports required for planning. Cognisance will be taken of the highlighted ecological constraints during the planning and design of the project.

Routing the powerline to avoid the Inishcarra reservoirs (to the North-west or East of the site) would reduce any potential for adverse impacts on this important bird area (see Crushell 2010). However, should the powerline necessitate a crossing of the Inishcarra reservoirs, it would be preferable for it to follow existing powerline infrastructure that traverses the area, as birds would already be accustomed to avoiding such features. However, due to a paucity of baseline data it is not currently possible to highlight the most sensitive areas in the environs of the site. It is therefore recommended that studies on the abundance and movement of water birds in the vicinity of Inishcarra reservoirs be conducted over a further winter season so as to better inform the final ecological impact assessment.

Similarly, should the powerline be routed across the Toon Valley, the most desirable route would proceed West of the feeding site thus avoiding a known flight path regularly used by the birds commuting between the Toon Valley and the Gearagh to the East (see Crushell 2010).

5.1 REQUIREMENT FOR APPROPRIATE ASSESSMENT

Based on the occurrence of three NATURA 2000 sites within the study area (Bandon River SAC and the Gearagh SAC / SPA) screening for Appropriate Assessment will be required. This screening should be undertaken once a preferred route corridor has been chosen and will include further consultation with NPWS. Should significant adverse impacts on the conservation status of any of the NATURA 2000 sites be identified during screening then a full Stage 2 Appropriate Assessment will be required.

6 REFERENCES

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APPENDIX 1

SITE SYNOPSIS

SITE NAME: THE GEARAGH NHA / SAC

SITE CODE: 000108

This site is located on the River Lee in County Cork, extending westwards and southwards from the Lee Bridge, which is about 1.5km south of Macroom. It extends for about 7km of river, to Dromcarra Bridge. The Gearagh occupies a wide, flat valley of the River Lee, on a bed of limestone overlain with sand and gravel. The adjacent valley walls are of Old Red Sandstone. This unusual area has formed where the River Lee breaks into a complex network of channels (2 to 6m wide) weaving through a series of wooded islands.

The alluvial woodland which remains today at the Gearagh is of unique scientific interest, and qualifies as a priority habitat under Annex I of the European Habitats Directive. The area has probably been wooded throughout the Post-glacial era (i.e. since the end of the last Ice Age, which ended around 10,000 years ago) and frequent flooding has served to enhance its character. Originally, this area of alluvial woodland extended as far as the Lee Bridge. Unfortunately, in 1954/55, in the eastern part of the Gearagh, extensive tree-felling and flooding were carried out to facilitate the operation of a hydro-electric scheme. Around sixty per-cent of the former woodland was lost. Today, the reservoir covers the area from Lee Bridge to Annahala Bridge and westwards of Illaunmore Island.

The islands in the Gearagh consist of rather dry alluvium, and support an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). The understorey is of Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*). Willows (*Salix* spp.) and Alder (*Alnus glutinosa*) are largely confined to channel margins and waterlogged areas. The ground flora reflects the damp nature of the woodland. In spring, Ramsons (*Allium ursinum*) and Wood Anemone (*Anemone nemorosa*) are abundant. Later in the year, other species appear, including Bugle (*Ajuga reptans*), Pignut (*Conopodium majus*), Irish Spurge (*Euphorbia hyberna*), Tufted Hairgrass (*Deschampsia caespitosa*), Enchanter's Nightshade (*Circaea lutetiana*) and Meadowsweet (*Filipendula ulmaria*). Plants species of particular interest within the woodland are Wood Club-rush (*Scirpus sylvaticus*), Bird Cherry (*Prunus padus*) and Buckthorn (*Rhamnus catharticus*). These species are scarce in Ireland. The epiphytic bryophyte flora is well developed, as are some lichen communities. Variations in this vegetation occur locally, where drainage is impeded and where tree clearance has occurred. The whole area has a remarkably wild character, with many fallen trees blocking the channels, so that access both by foot and boat is difficult.

Within the reservoir, the former extent of the woodland can still be seen at times of low water: the cut stumps of larger trees remain prominently preserved in place. At least five species of Pondweed (*Potamogeton* spp.) occur in the reservoir, including two species which are uncommon in Ireland (*Potamogeton praelongus* and *P. gramineus*). At low water levels, a diverse ephemeral flora develops on the exposed mud. Species here include Water Purslane (*Lythrum portula*), Knotgrasses (*Polygonum* spp.), Trifid Bur-marigold (*Bidens tripartita*), Marsh Yellow-cress (*Rorippa palustris*) and Six-stamened Waterwort (*Elatine hexandra*).

An oakwood occurs just north of Toon Bridge. Although wooded from ancient times, today the area supports relatively young oaks (*Quercus* sp.) on a southerly slope. Apart from oaks, Silver Birch (*Betula pendula*), Holly (*Ilex aquifolium*), Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*) and Rowan (*Sorbus aucuparia*) are also present. The ground flora is typical of that found in an oakwood, but is relatively species-rich, partly as a result of water seepage down slope. Species present include: Bilberry (*Vaccinium myrtillus*), Great Wood-rush (*Luzula sylvatica*), Hard Fern (*Blechnum spicant*), Buckler Fern (*Dryopteris aemula*), Woodruff (*Galium odoratum*), Wood Melic (*Melica uniflora*), Hairy Wood-rush (*Luzula pilosa*) and Early Purple Orchid (*Orchis mascula*).

Along the Gearagh, the river channels grade into marginal alluvial grassland in places. These grasslands, as well as some semi-improved grasslands within the site, are grazed by wildfowl. An area of cutaway bog and some Gorse (*Ulex* sp.) scrub also occur in the site. Extensive swards of Mudwort (*Limosella aquatica*), a Rare plant listed in the Red Data Book, occur on the mudflats along the reservoir.

Otter, an Annex II species on the European Habitats Directive, is frequent throughout the site.

The Gearagh supports part of an important wintering bird population: the area most utilised by birds extends also east of the site, towards Cork city (Carrigadroighid). At the Gearagh, Whooper Swans are regular (40-110, 1990's), as are Wigeon (640, average max. 1992-1994), Teal (707, average max. 1992-94), Mallard (250 in January 1993) and Tufted Duck (154, average max. 1992-94). Golden Plover utilise the site on occasions (e.g. 2,000 in January 1994), while there is a regular flock of Dunlin (100-200, 1990s) a species unusual at inland sites. A late summering flock of Mute Swan is regular, with numbers between 120 and 250 from 1992 to 1994. Great Crested Grebe and Tufted Duck breed in small numbers, while there is a feral flock of about 50 Greylag Geese.

The wooded part of the Gearagh is largely undisturbed due to the inaccessible nature of the terrain. Cattle graze in some areas, but the impacts of this are very localised. In the past, coppicing was practiced over most of the area. Little felling has occurred since the early 1950's, and the installation of the hydro-electric scheme. The least disturbed part of woodland occurs in the upper reaches of the Gearagh. Tree regeneration is occurring around the reservoir, which may restore some of the lost portion of woodland.

Despite the fact that about half the original area has been destroyed the Gearagh still represents the only extensive alluvial woodland in Ireland or Britain, or indeed Western Europe west of the Rhine. For this reason it is a unique site and has been designated as a Statutory Nature Reserve. The international importance of the site is recognised by its designation both as a Ramsar site and as a Biogenetic Reserve. The reservoir is also a Wildfowl Sanctuary.

SITE NAME: THE GEARAGH SPA

SITE CODE: 004109

The Gearagh, located c. 2 km south-west of Macroom, Co. Cork, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The river valley formerly held an extensive area of alluvial forest but only part of the forest now survives. The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is a shallow lake or reservoir which is fringed by wet woodland, scrub and grassland that is prone to flooding. Alluvial forest occurs on islands. At times of low water, a diverse pioneering plant community develops on the mud.

The alluvial forest is mostly confined to alluvium islands. It consists of an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). The understorey is of Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*). Willows (*Salix* spp.) and Alder (*Alnus glutinosa*) are largely confined to channel margins and waterlogged areas. The ground flora reflects the damp nature of the woodland and includes such species as Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Bugle (*Ajuga reptans*), Pignut (*Conopodium majus*), Irish Spurge (*Euphorbia hyberna*) and Meadowsweet (*Filipendula ulmaria*). Scarce plant species recorded from within the woodland include Wood Club-rush (*Scirpus sylvaticus*), Bird Cherry (*Prunus padus*), Buckthorn (*Rhamnus catharticus*) and Rough Horsetail (*Equisetum hyemale*). The epiphytic bryophyte flora and lichen communities are well-developed.

The reservoir has a varied aquatic plant flora that included at least five species of Pondweed (*Potamogeton* spp.). At low water levels, an ephemeral flora develops on the exposed mud and such species as Water Purslane (*Lythrum portula*), Knotgrasses (*Polygonum* spp.) including the scarce Small Water-pepper (*P. mite*), Marsh Yellow-cress (*Rorippa palustris*) and Six-stamened Waterwort (*Elatine hexandra*) are found here. Extensive swards of Mudwort (*Limosella aquatica*), a plant listed in the Red Data Book, occur on the mudflats. The river channels grade into marginal alluvial grassland in places. These grasslands, as well as some semi-improved grasslands within the site, are grazed by wildfowl.

The Gearagh supports part of an important wintering bird population - the area most utilised by the birds also extends east of the site, towards Cork City (Carrigadrohid). Swans, dabbling duck, diving duck and some waders are present and the site provides both feeding and roost sites for the birds. Six of the species have populations of national importance (all figures are average peaks for the 5 winters 1995/96-1999/00): Mute Swan (192), Wigeon (1,080), Teal (1,194), Shoveler (36), Coot (308) and Golden Plover (1,918). Other species which occur regularly in substantial numbers include Whooper Swan (77), Gadwall (10), Mallard (584), Pochard (126), Tufted Duck (271), Lapwing (1,880) and Curlew (400). Other species which use the site include Goldeneye (23), Cormorant (26) and Grey Heron (12). A feral Greylag Goose flock is present in the area. A few pairs each of Great Crested Grebe and Tufted Duck breed.

The Gearagh is a Nature Reserve, a Ramsar Convention site and a Council of Europe Biogenetic Reserve. There are no imminent threats to the wintering bird populations, though some disturbance is caused to the birds by illegal shooting.

The Gearagh SPA is a unique site due to the presence of remnants of one of the largest stands of alluvial woodland in Ireland or Britain. This habitat is listed, with priority status, on Annex I of the E.U. Habitats Directive. The reservoir created by the past damming activities now attracts important

populations of wintering waterfowl, with six of the species having populations of national importance. Also of note is that two of the species which occur regularly, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive.

SITE SYNOPSIS

SITE NAME: BANDON RIVER

SITE CODE: 002171

The site consists of relatively short adjoining stretches of the Bandon and Caha Rivers. These rivers flow in a southerly direction to the east of Dunmanway, Co. Cork. Towards the southern end of the site the Bandon takes an easterly course. The predominant rock formations are Old Red Sandstone to the north and Carboniferous Slate stretching south of Dunmanway. Soils in the northern section consist of peats, podzols and skeletal soils. The southern section consists of alluvial soils and Brown Podzolics.

The east-west exposure of Old Red Sandstone to the north of Dunmanway displays distinct ridgelines of bare rock with poor pasture and scrub. In this area around Lovers Leap the Bandon River cuts a narrow channel southwards, cascading over a series of rock steps through a narrow valley. Below this and above Long Bridge the river widens and meanders through a fertile floodplain. Immediately south of the Long Bridge the reduced flow gradient and broad, flat valley permit the main channel to split and extend into a network of braided streams forming islands.

The site is important for a number of reasons. It contains a small though very important example of the Annex I priority habitat Alluvial Forest as well as good examples of another Annex I habitat - Floating River Vegetation. The Annex II animal species Otter, Salmon (*Salmo salar*), Brook Lamprey (*Lampetra planeri*) and Freshwater Pearl Mussel (*Margaritifera margaritifera*) occur. The populations of the Mussel are thought to be nationally important. The Kingfisher, listed under Annex I of the E.U. Birds Directive, breeds along the river.

Wet broadleaved semi-natural woodland is found in an undisturbed area of braided river channels and islands below Dunmanway. The river channels are well defined and the islands appear solid. Canopy dominants are Hazel (*Corylus avellana*) (multi-stemmed) and Sessile Oak (*Quercus petraea*), with scattered Downy Birch (*Betula pubescens*), Ash (*Fraxinus excelsior*), Rusty Willow (*Salix cinerea* subsp. *oleifolia*) and Alder (*Alnus glutinosa*). There is a very sparse understorey composed of Whitethorn (*Crataegus monogyna*), Holly (*Ilex aquifolium*) and saplings of Hazel and Sessile Oak. Epiphytes are abundant on trees: Ivy (*Hedera helix*), Honeysuckle (*Lonicera periclymenum*) and bryophyte species such as *Isoetecium myosuroides*. The ground flora is dominated by Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Ivy with abundant/scattered Lesser Celandine (*Ranunculus ficaria*), Wood Sedge (*Carex remota*) and Irish Spurge (*Euphorbia hyberna*). Goldilocks Buttercup (*Ranunculus auricomus*), a very rare plant in Co. Cork, has been recently recorded from this woodland.

Floating river vegetation is found along the length of the river and is dominated by Water-crowfoot (*Ranunculus* spp). Other aquatic plants found include Alternate Water-milfoil (*Myriophyllum alterniflorum*), Broad-leaved Pondweed (*Potamogeton natans*) and four Water-starwort species (*Callitriche* spp.). Mosses present on rocks and attached to tree roots include *Fontinalis antipyretica* in slack flow areas and *Fontinalis squamosa*, *Rhynchostegium riparioides* and *Amblystegium riparium* in moderate flows. The landward fringe of deep pools supports Yellow Water-lily (*Nuphar lutea*), Bogbean (*Menyanthes trifoliata*), Marsh Marigold (*Caltha palustris*), Water Mint (*Mentha aquatica*) and Fool's Water-cress (*Apium nodiflorum*).

Shoreweed (*Littorella uniflora*) and Six-stamened Waterwort (*Elatine hexandra*) are two species of local importance which are found in the river. In moderate current flow below the Long Bridge, the larger stones are covered by the moss *Brachythecium rivulare* and the Liverwort *Chiloscyphus polyanthos* var. *polyanthos*. Boulders covered in *Nostoc* algae are probably of local occurrence in Ireland. The liverwort *Riccardia chamaedryfolia* and the moss *Fissidens crassipes* found under the Long Bridge are considered to be rare in Ireland.

Heath in mosaic with wet grassland, exposed rock, scrub and improved grassland covers up to 30% of the site north of Long Bridge. Typical heath plants growing in association with the rocks are abundant Western Gorse (*Ulex gallii*), Ling Heather (*Calluna vulgaris*), Bell Heather (*Erica cinerea*), Cross-leaved Heath (*E. tetralix*), Tormantil (*Potentilla erecta*), Heath Grass (*Danthonia decumbens*), Stonecrops (*Sedum* spp.), small amounts of St Patrick's Cabbage (*Saxifraga spathularis*) and many lichen species.

Some small areas of woodland occur within the site north of Long Bridge. Tree species such as Sessile Oak, Beech (*Fagus sylvatica*), Scots Pine (*Pinus sylvestris*) and Downy Birch are found with an understorey of Holly, Hazel, Rowan and Rusty Willow. Two Red Data Book plant species have been recorded in the past from within or close to the site - Greater Broomrape (*Orobancha rapum-genistae*), a species that grows on the roots of legumes, and Small White Orchid (*Pseudorchis albida*), a species of upland pastures and heaths that is protected under the Flora Protection Order 1999.

The river below Long Bridge is an important inland site in Cork for Mute Swan and approximately 20 individuals are present throughout the year along this stretch. Several hundred Snipe use the site during the winter. Other birds seen regularly within the site are Grey Heron, Cormorant and Mallard, while low numbers of Lapwing and Teal visit during the winter.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Badger, Irish Hare, Daubenton's Bat and Pipistrelle. The two bat species can be seen feeding along the river and roosting under the old bridges.

Landuse at the site consists mainly of sheep grazing in the northern section and cattle grazing on improved grasslands below Lovers Leap and further south. In the area between Milleenanannig and Bealaboy Bridge land reclamation and drainage is taking place. In the area of exposed rock on the higher terrain above Ardcahan Bridge some land reclamation and forestry is carried out.

This site contains good examples of two habitats listed on Annex I of the E.U. Habitats Directive - alluvial forest and floating river vegetation - and supports populations of four Annex II species - Otter, Salmon, Brook Lamprey and Freshwater Pearl Mussel. The presence of a number of Red Data Book plant and animal species adds further interest to the site.

CLASHAVOON TO DUNMANWAY 110 KV POWERLINE

WHOOPER SWAN (*CYGNUS CYGNUS*) SURVEY

RESULTS OF WINTER SURVEYS 2010 (FEB – APR 2010)

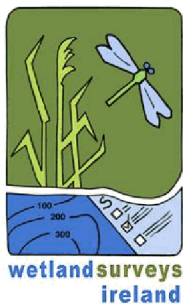
FINAL REPORT



Prepared for

AOS Planning

August 2010



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- Figure 2:** Map showing the location of known Whooper Swan sites in relation to the study area.
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- Figure 4:** Map showing the area constrained by the occurrence of Whooper Swan, following desk based and field based surveys undertaken during 2010.

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- Appendix 1:** The Gearagh SPA (NPWS Site Synopsis)
- Appendix 2:** Plates 1-2

1 INTRODUCTION AND BACKGROUND

Dr Patrick Crushell was commissioned by AOS Planning to assess the abundance and distribution of Whooper Swans (*Cygnus cygnus*) in the study area of a proposed 110 kV overhead powerline from Clashavoon to Dunmanway, Co Cork.

A preliminary ecology report has previously been undertaken for the project by Dr Catherine Farrell on behalf of AOS Planning (Farrell 2007). As part of that study the National Parks and Wildlife Service (NPWS) were consulted. NPWS highlighted the potential for adverse impacts on a Whooper Swan population which is known to utilise parts of the study area.

Whooper Swans are listed on Annex 1 of the EU Birds Directive (EU 79/409/EEC). EU Member states are required to maintain populations of rare and migratory bird species that are listed under Annex 1 by establishing designated areas – Special Protection Areas (SPA's) – for the conservation of these species. Whooper Swans are further protected as they are listed under Annex II of the Berne Convention on the conservation of wildlife and natural habitats; they are also amber listed in 'Birds of Conservation Concern in Ireland' (Newton et al 1999; Lynas et al 2007) as internationally important numbers of Whooper Swan over-winter in Ireland.

Whooper Swans are winter visitors to Ireland, usually arriving from their breeding grounds (Iceland) in October and departing again in March - April. During winter, Whooper Swans occur most commonly on open farmland in proximity to inland wetlands. They commute between roost and feeding sites on a daily basis, flying from their wetland roosts (often open water-bodies) to grasslands at dawn and returning to roost at dusk. During day light hours they feed on open grassland, often moving between different feeding sites.

Collision with powerlines is known to contribute significantly to bird mortality amongst a number of susceptible species especially the larger birds that lack agile flight. Those species most at risk include those species that fly at night, birds flying in flocks, large and heavy birds with high wing loading and poor maneuverability, and birds that fly low and fast. (APLIC 1994). Collision with powerlines is a well known cause of mortality among swans, and in the UK has been the highest reported cause of swan mortality (Birkhead and Perrins 1986; Brazil 2003). Collision risk is highest in those areas where powerlines occur nearby areas used by high numbers of these birds and across regularly used flight paths.

Whooper Swans in particular are susceptible to collision with powerlines due to a number of factors including:

- their large size they have a high wing loading resulting in low agility during flight
- behavior of flying at low altitude (outside of migration flights) during periods of poor visibility. Field feeding behavior means that, each day they fly between roost and feeding sites (or between feeding sites). Many of these flights are undertaken in poor light around dawn or dusk.
- behavior of congregating in flocks reduces visibility and maneuverability

This study involved both a desktop review of existing data on the occurrence of Whooper Swans in the study area together with frequent surveys of known swan sites between February and April 2010. The aim of the study was to determine the distribution of Whooper Swans within the study area and establish regularly used flight lines.

1.1 STUDY AREA

The study area is approximately 520 km² in extent, the area is characterised by an undulating landscape between Cork city and the mountainous region of West Cork. The proposed powerline will commence at the ESB substation at Clashavoon approximately 5km North-east of Macroom town and terminate 27 km to the South at Dunmanway substation which is located 1 km to the East of Dunmanway town (see Figure 1).

The study area lies within two main river catchments, the River Lee in the North and the River Bandon in the South. The low-lying lands along these main river valleys are intensively farmed being dominated by improved agricultural grassland. More mountainous terrain occurs throughout the hilly areas between these main river valleys. Habitats that are most common throughout this area include conifer plantation, wet heath, bog and wet grassland.

Following the construction of the River Lee hydroelectric scheme, a large part of the Lee Valley was flooded to form the Inishcarra Reservoirs which occur in the northern part of the study area. This wetland area is of high value to waders and wildfowl attracting high numbers of many different species each winter. The south-eastern part of the reservoirs, known as the Gearagh has been designated as a Special Protection Area (SPA) for birds. The main habitats of the Gearagh include a shallow lake or reservoir which is fringed by wet alluvial woodland, scrub and grassland prone to flooding. The NPWS synopsis of the site is presented in Appendix 1.



Figure 1: Map showing the extent of the study area and the location of the Clashavoon and Dunmanway ESB stations, Co. Cork.

2 METHODOLOGY

2.1 DESKTOP STUDY

2.1.1 Literature review and consultation

A literature review was carried out to identify previous records of Whooper Swan within the study area and surrounding region. Literature sources consulted are included in the text and listed at the rear of the document. Summary I-WeBS (Irish Wetland Birds Survey) data for Inishcarra Reservoirs for the years 2003-2008 was purchased from BirdWatch Ireland. In addition, consultation was undertaken with BirdWatch Ireland, Irish Whooper Swan Study Group and the National Parks and Wildlife Service. Following the collation of background data, whooper swan sites identified as occurring within the study area were surveyed during the field study.

2.2 FIELD SURVEYS

2.2.1 Counts at feeding sites

Surveys of the Inishcarra Reservoir and the Toon Valley sites were conducted on nine occasions during the period February to April 2010. In addition, other Whooper Swan sites in the surrounding area identified during the desktop study were visited on four occasions during the study period. Survey dates, sites visited and weather conditions on each date are presented in Table 1.

On each field visit counts were conducted during daylight hours from suitable vantage points. All sites were scanned using binoculars and a telescope. Records were made of numbers of Whooper Swans, presence of marked birds (leg-ringed or neck-collared), numbers of other wildfowl or wader species (if present), weather conditions and habitat types. During the course of the study no marked birds were recorded.

Table 1: Survey dates, sites visited and weather conditions.

Date	Sites visited	Weather Conditions
11 Feb 2010	Inishcarra Reservoir Sites; Toon Valley;	No Cloud Cover; Dry; Calm; Good Visibility
12 Feb 2010	Inishcarra Reservoir Sites; Toon Valley;	No Cloud Cover; Dry; Calm; Good Visibility
18 Feb 2010	Inishcarra Reservoir Sites; Toon Valley; Manch Bridge; Ballynacarriga Lake; Argideen River; Lough Allua; Baxter's Bridge	Minimal Cloud Cover; Dry; Calm; Good Visibility
19 Feb 2010	Inishcarra Reservoir Sites; Toon Valley;	Minimal Cloud Cover; Dry; Calm; Good Visibility
1 Mar 2010	Inishcarra Reservoir Sites; Toon Valley;	No Cloud Cover; Dry; Calm; Good Visibility
6 Mar 2010	Inishcarra Reservoir Sites; Toon Valley;	No Cloud Cover; Dry; Calm; Good Visibility
15 Mar 2010	Inishcarra Reservoir Sites; Toon Valley; Manch Bridge; Ballynacarriga Lake; Argideen River; Lough Allua; Baxter's Bridge	Overcast; Dry; Calm; Good Visibility
16 Mar 2010	Inishcarra Reservoir Sites; Toon Valley; Manch Bridge; Ballynacarriga Lake; Argideen River; Lough Allua; Baxter's Bridge	Overcast; Dry; Moderate Wind; Good Visibility
12 Apr 2010	Inishcarra Reservoir Sites; Toon Valley; Manch Bridge; Ballynacarriga Lake; Argideen River; Lough Allua; Baxter's Bridge	Overcast; Dry; Moderate Wind; Good Visibility

Note: Surveying was suspended on 2nd March due to heavy fog.

2.2.2 Dawn and dusk flights

Dawn and dusk watches were conducted at the various sites where Whooper Swans were recorded in order to establish flight lines (and flight behavior) of birds flying between feeding and roost sites (see Table 2).

The location of dusk watches was determined by the presence of feeding birds prior to dusk. Watches were carried out at those sites where the largest flocks were present as dusk approached. Similarly, the location of dawn watches were determined by the presence of roosting birds on the previous evening.

Dawn watches commenced approximately one hour before sun-rise and dusk watches continued until all birds had departed the feeding sites, usually within an hour following sunset.

Table 2: Dawn and dusk watches conducted during the survey period.

Date	Dawn / Dusk	Sites
11 Feb 2010	Dusk	Toon Valley Feeding Site; The Gearagh Roost Site
12 Feb 2010	Dawn	Toon Valley Feeding Site; The Gearagh Roost Site
18 Feb 2010	Dusk	Toon Valley Feeding Site; The Gearagh Feeding and Roost Sites
19 Feb 2010	Dawn	Toon Valley Feeding Site; The Gearagh Feeding and Roost Sites
1 Mar 2010	Dusk	Toon Valley Feeding Site; The Gearagh Roost Site
6 Mar 2010	Dusk	Gearagh
15 Mar 2010	Dusk	Sullane Delta Feeding and Roost Sites
16 Mar 2010	Dawn	Sullane Delta Feeding and Roost Sites

*Dawn surveys on 2nd March were abandoned due to heavy fog; however, swans were recorded (heard) at the Gearagh Roost site at dawn.

3 RESULTS

3.1 DESKTOP STUDY

The desktop study identified Inishcarra Reservoirs as the main Whooper Swan site occurring within the study area (see Table 3; Figure 2).

The site forms an impounded area on the River Lee and includes a number of discrete sub-sites including The Gearagh, Sullane Delta and Dunisky Culvert. The Gearagh is recognised as being of international importance to birds and is designated as a Special Protection Area. The area is of particular importance to wintering birds with nationally important numbers of six species including Golden Plover, a species listed on Annex 1 of the EU Birds Directive. The regular occurrence of a population of Whooper Swan adds to the importance of the site.

During consultation NPWS informed the preliminary ecology study that Whooper Swans which occur at the Gearagh also utilise farmland in the Toon Valley (ca 2.5km upstream of the Gearagh) as a feeding site (Farrell 2007). No reference to the Toon Valley site was found elsewhere during the literature review.

Table 3: Whooper swan sites that occur close-by the study area identified during the desktop study (see Figure 2 for site locations in relation to study area).

Site Name (Main Site)	Sub-sites	National Reference	Grid	*Count Numbers (peak counts)
Inishcarra Reservoirs	Inishcarra Reservoirs (whole Site)	W 330 700		80 (139)
	The Gearagh	W 330 700		59 (72)
	Sullane Delta	W 360 710		22 (67)
	Dunisky Culvert	W 383 685		2 (5)

*Count data refers to mean I-Webs count data for period 2003-2008, with peak counts in parenthesis.

Other sites in the surroundings where Whooper Swans have been recorded include (see Figure 2):

Manch Bridge (along Bandon River in southern part of the study area): Counts of 20-50 birds have been reported from this site (Robinson et al. 2004). Peak count of 68 birds was reported by Crowe (2005).

Ballynacarriga Lake (ca 1 km South of the study area): A peak count of 9 birds has been reported by Crowe (2005).

Lough Allua (ca 3 km west of study area): Cronin et al. (2009) refer to a record of 10 birds at Lough Allua during March 2006. However, Whooper Swans are not regularly recorded at this site (Crowe 2005; NPWS site description).

Near Inchigeela (ca 1 km west of study area): Cronin et al. (2009) refer to a record of 21 birds at a site near Inchigeela during 2005.

Argideen River (5 km south of study area): Counts of 20-50 birds have been reported from this site (Robinson et al. 2004). Peak count of 40 birds was reported by Crowe (2005).

Baxter's Bridge (along Bandon River ca 2 km south-east): Counts of 20-50 birds have been reported from this site (Robinson et al 2004).

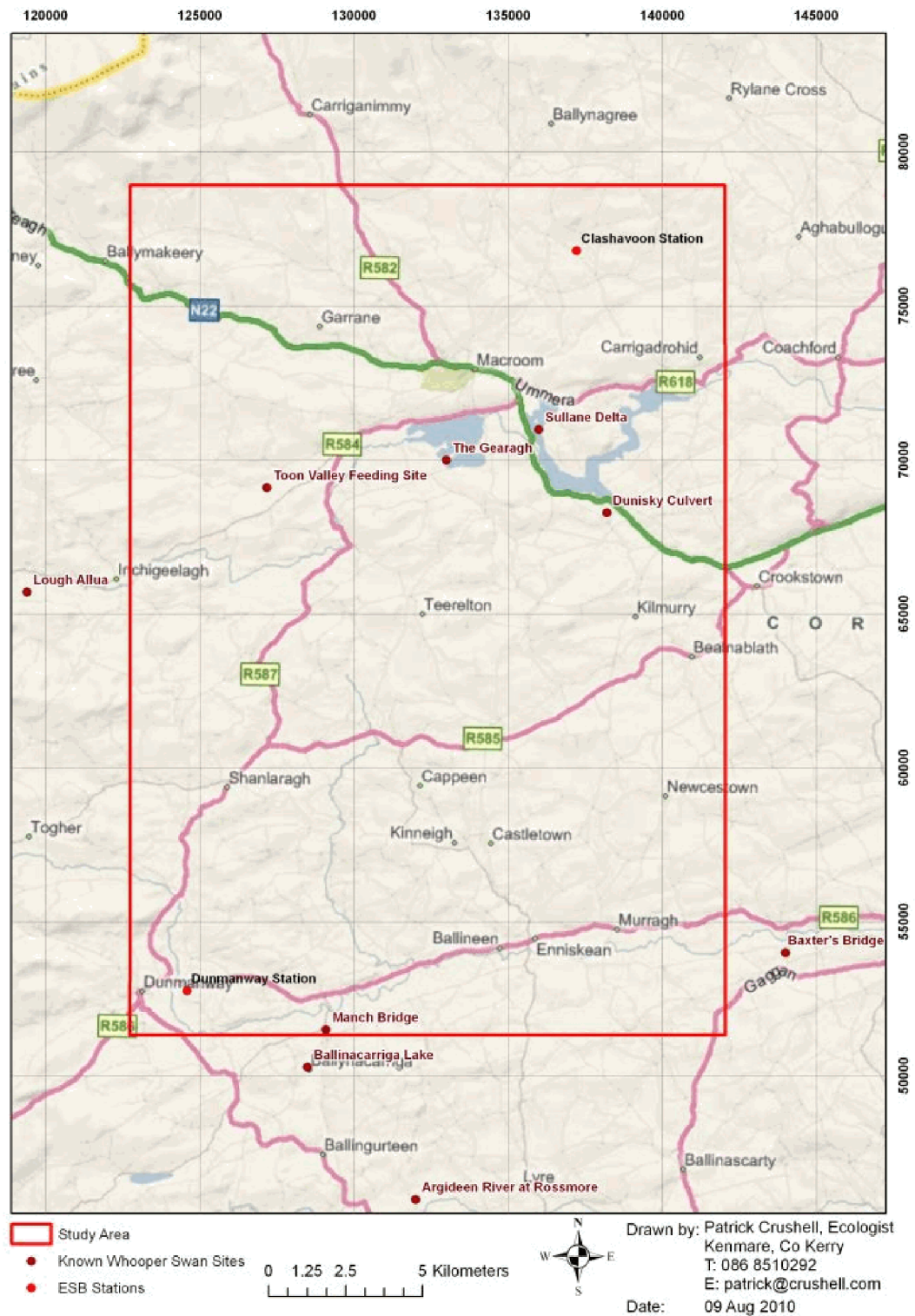


Figure 2: Map showing the location of known Whooper Swan sites in relation to the study area.

3.2 FIELD STUDY

3.2.1 Inishcarra Reservoirs and Toon Valley

Counts were conducted at all sub-sites of Inishcarra Reservoirs and the Toon Valley during each of the nine survey visits (see Table 1 above). Whooper Swans were not recorded at Dunisky Culvert Sub-site or surrounding lands during the survey period. Summary count data from the survey relating to the Inishcarra Reservoir Sub-sites and the Toon Valley are presented in Table 4. The survey results in relation to each site are outlined in the following paragraphs.

3.2.1.1 *The Gearagh*

Counts of feeding sites

Whooper Swans were recorded feeding on grasslands at the Gearagh on three different occasions, numbers ranged from 4-46 individuals. The peak count of 46 was recorded on the 6th of March. Other species that were recorded amongst the Whooper Swans included Mute Swans, Greylag Goose and Curlew. Over the survey period the Whooper Swans were recorded using two different grassland areas as shown in Figure 3 as feeding site 1 and feeding site 2.

Dawn and dusk flights

Short distance flights were recorded between this feeding site and the roost site nearby (see Figure 3).

February 18th - those Whooper Swans recorded at the Gearagh feeding site were observed flying in a single flock to the roost site nearby at dusk (see Figure 3).

February 19th - two Whooper Swans were recorded flying from the Gearagh feeding site to the feeding site in the Toon Valley.

March 6th – all Whooper Swans feeding at the Gearagh were observed flying to the roost site nearby at dusk.

3.2.1.2 *Toon Valley*

Counts of feeding sites

Whooper Swans were recorded feeding on grasslands in the Toon Valley on eight of the nine days that counts were conducted, numbers ranged from 5 to 60 individuals. The peak count of 60 was recorded on both the 11th and 12th of February. No other bird species were recorded amongst the Whooper Swans at this site. The swans were recorded using the same areas throughout the survey period (see Figure 3). The site comprised a large open field of improved agricultural grassland, part of which is prone to flooding from the adjacent Toon River (see Plate 1; 2).

Dawn and dusk flights

Details of all flight records are presented below. In summary, birds were regularly recorded flying at low heights (typically ranging from ca 4-10 metres) between the Toon Valley feeding site and the Gearagh roost site. Most flights occurred in early morning (for an hour after dawn) and late evening (up to one hour after sunset). The flight path recorded generally tracked the same route, following the main river channel that flows from the Toon Valley towards the Gearagh (see Figure 3). On one occasion, a pair of swans was recorded flying between the Gearagh feeding site and the Toon Valley feeding site during daylight.

February 11th - all sixty swans were recorded flying from the Toon Valley feeding site towards the Gearagh in flocks varying in size from 2 to 20 individuals. Most flights took place within an hour of sun-set. The last of which were undertaken after darkness fell.

February 12th - swans were recorded arriving at the Toon Valley site from the Gearagh roost site from 07:50 am (sunrise) until 09:30 am.

February 18th - flock of 6 swans were observed flying to the Gearagh from the direction of Toon Valley at dusk.

March 1st - flock of 22 swans was recorded flying from the Toon Valley feeding site to the roost site at the Gearagh.

3.2.1.3 Sullane Delta

Counts of feeding sites

Whooper Swans were recorded feeding on grasslands adjacent to Sullane Delta (see Figure 3) on two of the nine days that counts were conducted (15th and 16th March), numbers ranged from 44 to 55 individuals. The peak count of 55 was recorded on the 15th March. Mute Swans were recorded amongst the Whooper Swan flock feeding at this location.

Dawn and dusk flights

Whooper Swans were recorded flying the short distance between the roost and feeding site at Sullane Delta during March (see Figure 3). Birds were observed flying over an existing powerline just to the west of the feeding site.

March 15th - Whooper Swans were recorded flying from the grassland site to open water to the East at dusk (07:15pm).

March 16th - Whooper Swans recorded flying from the open water and adjacent shoreline to the grassland site between 7:00 and 8:00 am.

Table 4: Summary of count data recorded at Inishcarra Reservoir and Toon Valley sites during the period February to April 2010.

	Inishcarra Reservoir Sub-sites			Toon Valley	Total
	Gearagh	Sullane Delta	Dunisky Culvert		
11 Feb 2010	0	0	0	60	60
12 Feb 2010	0	0	0	60	60
18 Feb 2010	27	0	0	28	55
19 Feb 2010	28	0	0	28	56
1 Mar 2010	0	0	0	41	41
6 Mar 2010	46	0	0	5	51
15 Mar 2010	0	44	0	5	49
16 Mar 2010	0	55	0	0	55
12 Apr 2010	3	0	0	0	3

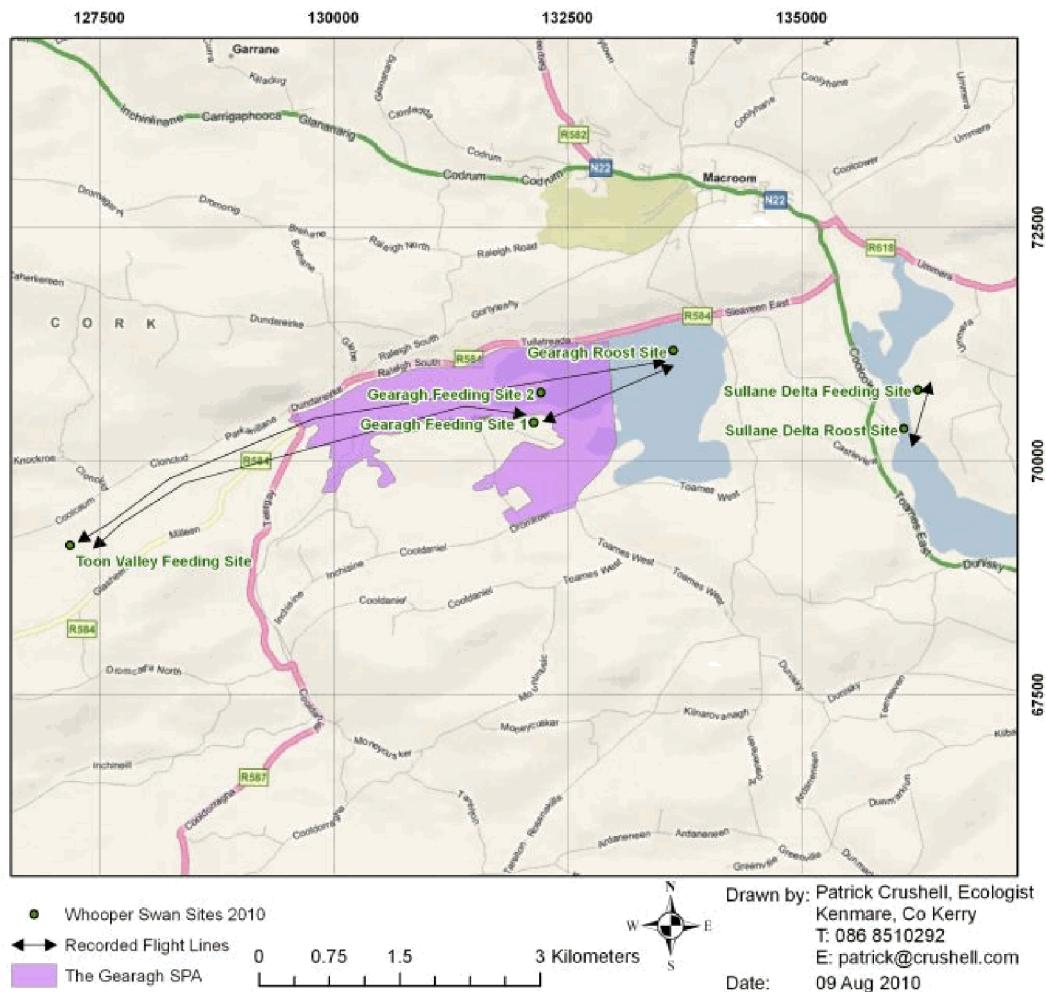


Figure 3: Map showing the location of Whooper Swan feeding and roost sites at Inishcarra Reservoirs and Toon Valley to the West. The main flight lines recorded are also illustrated.

3.2.2 Other Sites

Whooper Swans were recorded feeding on grasslands adjacent to Manch Bridge on two of the four days that counts were conducted (15th and 16th March), with the same number of birds (46) recorded on both days (see Table 5). Whooper Swans were not recorded at any of the other sites surveyed in the surrounding area.

Table 5: Summary of count data recorded at Swan Sites in the surrounding area during the period February to April 2010.

	Manch (Bandon River)	Bridge	Ballynacarriga Lake	Lough Allua	Argideen River	Baxter's (Bandon River)	Bridge
18 Feb 2010	0		0	0	0	0	
15 Mar 2010	46		0	0	0	0	
16 Mar 2010	46		0	0	0	0	
12 Apr 2010	0		0	0	0	0	

4 DISCUSSION

The results of surveys carried out during spring 2010 confirmed the occurrence of a significant population of Whooper Swans at the Inishcarra Reservoirs in the northern part of the study area. Peak counts indicate a population size of sixty birds, which is on par with previous records for the area (Crowe 2005; Robinson et al. 2004). Sites that regularly hold a population in excess of 130 Whooper Swans (1% of national population) are considered to be of national importance (Crowe 2005).

The swans appear to alternate between different feeding and roost sites throughout the season. Grassland areas in the Toon Valley were used most regularly by feeding swans throughout the study period (peak count of 60 swans during February). These birds were recorded roosting at the Gearagh approximately 5 km to the East. The birds were recorded flying between these sites at dawn and dusk (see Figure 3).

During March Whooper Swans (peak count of 55) were recorded feeding and roosting at Sullane Delta, approximately 2.5 km to the East of The Gearagh. It is most likely that this is the same population that was recorded at the Gearagh and Toon Valley earlier in the season (see Table 4). Birds at Sullane Delta were recorded flying between the open water areas and grassland nearby at both dawn and dusk (see Figure 3).

The only other site where Whooper Swans were recorded during the study period was at Manch Bridge, on the River Bandon, where 45 swans were recorded during mid-March. The birds recorded at this location are likely to form a discrete population regularly recorded along the River Bandon (Robinson et al. 2004; Crowe 2005) and are unlikely to be associated with the swans at the Gearagh (ca 20 km to the North) (see Figure 2).

5 POTENTIAL IMPACTS

The potential for adverse impacts on Whooper Swans is greatest in the vicinity of sites where they were recorded feeding and roosting. In addition, collision risk is highest in areas between confirmed roost and feeding sites where swans were regularly recorded flying at low altitude (4-10 metres) and often in poor light conditions.

It is most probable that those feeding sites identified during the current study represent only a subset of feeding sites used by Whooper Swans in the vicinity of the Inishcarra Reservoirs. This is based on the presence of suitable feeding habitat elsewhere in the area, most notably the improved pastures that occur on the hillsides surrounding the Sullane Delta coupled with the fact that Whooper Swans are known to alternate between different roost and feeding sites throughout the season (and between years). Based on

the results of the current study the following sites represent sites within the study area where potential for adverse impacts would be greatest.

Sullane Delta Roost and Feeding Sites

Swans (peak count of 55) utilising these sites were recorded flying between the roost and feeding site at dawn and dusk along the flight path indicated in Figure 3. These flights were undertaken at low altitude (4-10 metres) and often in poor light conditions. It is concluded that negative impacts on the Whooper Swan population are likely to occur should the proposed powerline be routed across this flight path

Toon Valley and the Gearagh

The feeding site in the Toon Valley has been reported by NPWS to have been used regularly in the past by Whooper Swans and was found to be used throughout the study period by up to 60 swans at a time. The birds that utilise this feeding site fly from and to the Gearagh Roost Site at dawn and dusk along the flight path illustrated in Figure 3. These flights occur at low altitude (4-10 metres) and often in darkness, following the main river channel that flows to the Gearagh. It is concluded that significant negative impacts on the Whooper Swan population are likely to occur due to potential collision should the proposed powerline be routed across this flight path.

Manch Bridge

Outside of the Inishcarra Reservoirs, this represents the only site where Whooper Swans were recorded during the current study. The swans that were recorded at this site are also likely to use other feeding sites in the vicinity of the River Bandon. The roost site of the Whooper Swans that were recorded feeding at Manch Bridge was not determined as the main focus of the current study was the population recorded at the Inishcarra Reservoirs site.

6 RECOMMENDATIONS

Based on the results of this study, it is recommended that the area outlined in Figure 4 (*'Constrained by Whooper Swans'*) be avoided by the proposed development. The avoidance of this area should eliminate potentially adverse impacts on Whooper Swans that occur in the vicinity of the Inishcarra reservoirs.

Should it not be possible for the proposed line to avoid this area, it would be most preferable for it to follow existing powerline infrastructure. Furthermore, appropriate mitigation would be required to reduce collision risk with Whooper Swans.

Finally, the current study was carried out during the period February to April 2010, which represented the latter half of the winter season. Whooper Swans are known to alternate between different roost and feeding sites throughout the season (and between years). It is therefore recommended that further surveys be undertaken over an entire winter season (October to April) in order to better inform the impact assessment process.

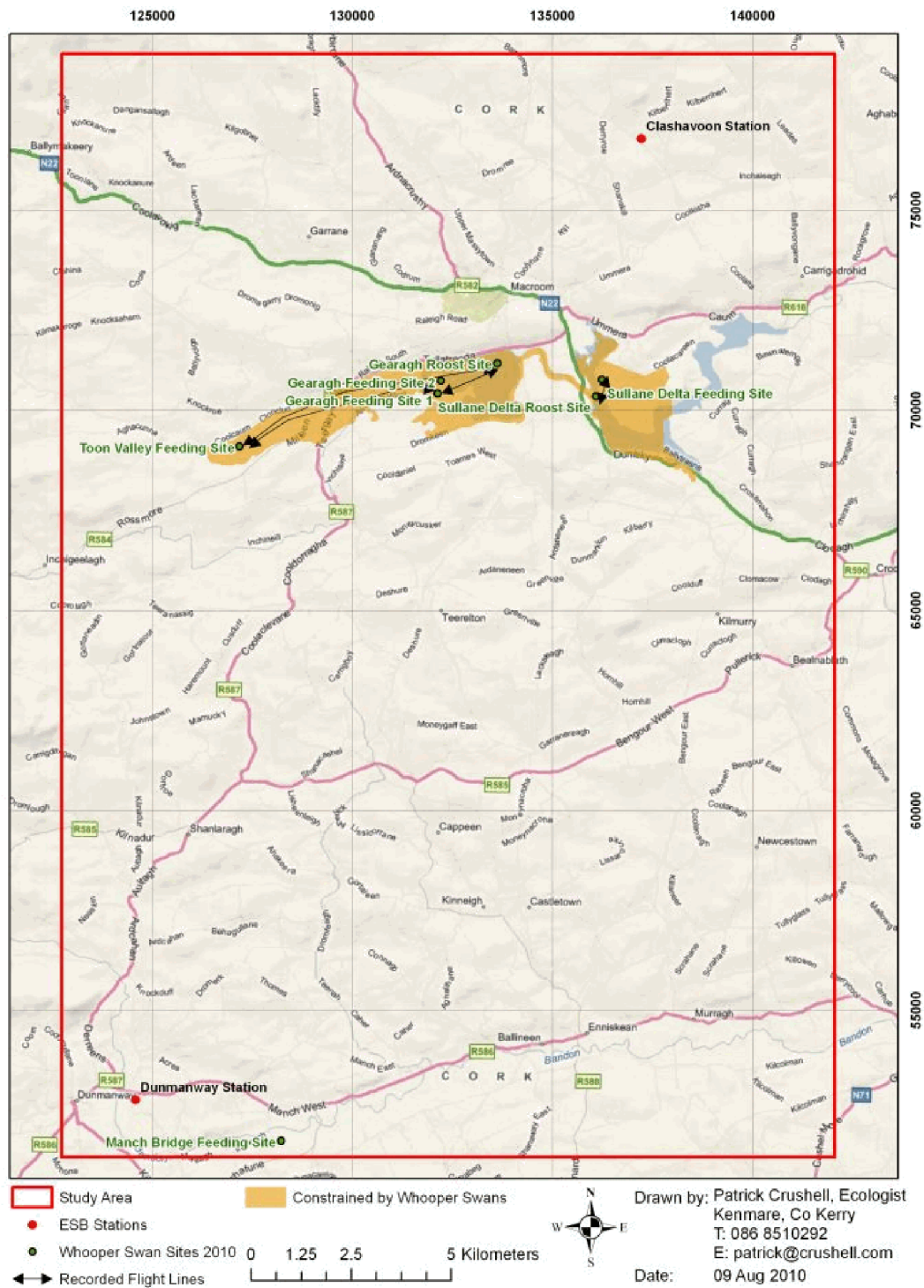


Figure 4: Map showing the area constrained by the occurrence of Whooper Swan, following desk based and field based surveys undertaken during 2010.

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Appendix 1

The Gearagh SPA (NPWS Site Synopsis)

SITE NAME: THE GEARAGH SPA

SITE CODE: 004109

The Gearagh, located c. 2 km south-west of Macroom, Co. Cork, comprises a stretch of the River Lee that was dammed in the 1950s as part of a hydroelectric scheme. The river valley formerly held an extensive area of alluvial forest but only part of the forest now survives. The SPA extends from Annahala bridge westwards to Toon bridge. The principal habitat is a shallow lake or reservoir which is fringed by wet woodland, scrub and grassland that is prone to flooding. Alluvial forest occurs on islands. At times of low water, a diverse pioneering plant community develops on the mud.

The alluvial forest is mostly confined to alluvium islands. It consists of an almost closed canopy of Pedunculate Oak (*Quercus robur*), Ash (*Fraxinus excelsior*) and Birch (*Betula* spp.). The understorey is of Hazel (*Corylus avellana*), Holly (*Ilex aquifolium*) and Hawthorn (*Crataegus monogyna*). Willows (*Salix* spp.) and Alder (*Alnus glutinosa*) are largely confined to channel margins and waterlogged areas. The ground flora reflects the damp nature of the woodland and includes such species as Ramsons (*Allium ursinum*), Wood Anemone (*Anemone nemorosa*), Bugle (*Ajuga reptans*), Pignut (*Conopodium majus*), Irish Spurge (*Euphorbia hybema*) and Meadowsweet (*Filipendula ulmaria*). Scarce plant species recorded from within the woodland include Wood Club-rush (*Scirpus sylvaticus*), Bird Cherry (*Prunus padus*), Buckthorn (*Rhamnus catharticus*) and Rough Horsetail (*Equisetum hyemale*). The epiphytic bryophyte flora and lichen communities are well-developed.

The reservoir has a varied aquatic plant flora that included at least five species of Pondweed (*Potamogeton* spp.). At low water levels, an ephemeral flora develops on the exposed mud and such species as Water Purslane (*Lythrum portula*), Knotgrasses (*Polygonum* spp.) including the scarce Small Water-pepper (*P. mite*), Marsh Yellow-cress (*Rorippa palustris*) and Six-stamened Waterwort (*Elatine hexandra*) are found here. Extensive swards of Mudwort (*Limosella aquatica*), a plant listed in the Red Data Book, occur on the mudflats. The river channels grade into marginal alluvial grassland in places. These grasslands, as well as some semi-improved grasslands within the site, are grazed by wildfowl.

The Gearagh supports part of an important wintering bird population - the area most utilised by the birds also extends east of the site, towards Cork City (Carrigadrohid). Swans, dabbling duck, diving duck and some waders are present and the site provides both feeding and roost sites for the birds. Six of the species have populations of national importance (all figures are average peaks for the 5 winters 1995/96-1999/00): Mute Swan (192), Wigeon (1,080), Teal (1,194), Shoveler (36), Coot (308) and Golden Plover (1,918). Other species which occur regularly in substantial numbers include Whooper Swan (77), Gadwall (10), Mallard (584), Pochard (126), Tufted Duck (271), Lapwing (1,880) and Curlew (400). Other species which use the site include Goldeneye (23), Cormorant (26) and Grey Heron (12). A feral Greylag Goose flock is present in the area. A few pairs each of Great Crested Grebe and Tufted Duck breed.

The Gearagh is a Nature Reserve, a Ramsar Convention site and a Council of Europe Biogenetic Reserve. There are no imminent threats to the wintering bird populations, though some disturbance is caused to the birds by illegal shooting.

The Gearagh SPA is a unique site due to the presence of remnants of one of the largest stands of alluvial woodland in Ireland or Britain. This habitat is listed, with priority status, on Annex I of the E.U. Habitats Directive. The reservoir created by the past damming activities now attracts important populations of wintering waterfowl, with six of the species having populations of national importance. Also of note is that two of the species which occur regularly, Whooper Swan and Golden Plover, are listed on Annex I of the E.U. Birds Directive.

Appendix 2

Plates 1-2



Plate 1 (top): Whooper swan flock feeding at Toon Valley site. Plate 2 (bottom): Close-up of Whooper Swans feeding at Toon Valley feeding site.