

Shannon Technology and Energy Park (STEP) Power Plant

Appendix A7B.3: Estuarine Bird Report

Shannon LNG Limited

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**Shannon Technology and Energy
Park (STEP)**

Estuarine Bird Report

April 2024

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Project	Shannon Technology and Energy Park (STEP) Estuarine Bird Report	
Client	New Fortress Energy	
Project Ref.	24024	
Report No.	24024.07	
Client Ref.		
Date	Revision	Prepared By
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1. Introduction

1.1 Project Background

DixonBrosnan Environmental Consultants were commissioned by New Fortress Energy to assess the potential impacts for the Proposed Development at the Shannon Technology and Energy Park (STEP) to impact on waterbirds using the lands in the vicinity of the site. The Proposed Development consists of a Power Plant together with associated infrastructure on an approximately 41ha area in the northeast of the overall Tarbert-Ballylongford Landbank which comprises grassland on the southern shores of the Shannon Estuary and is surrounded by a mixture of agricultural land, rural housing, public roads and the Shannon Estuary.

The information in this report was used to help determine the impacts on bird populations and also informed the conclusions of the Environmental Impact Assessment Report (EIAR) for the Proposed Development.

Survey results are discussed in the context of the study area as a whole and in the context of available Irish Wetland Bird Survey (I-WeBS) data, previous waterbird surveys and in relation Special Protection Area (SPA) i.e., River Shannon and River Fergus Estuaries SPA, located to the north of the study area.

This report has been written in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) *Guidelines for Ecological Report Writing* (CIEEM 2017).

1.2 Site Background

The Proposed Development is located on the southern shores of the Shannon Estuary, 4.5km west of Tarbert and 3.5km west of Ballylongford in Co. Kerry (**Figure 1**). The site occupies part of two townlands, Kilcolgan Lower and Ralappane. The Proposed Development site is within a rural/agricultural setting.

The River Shannon and River Fergus Estuaries form the largest estuarine complex in Ireland. The complex spans three counties, Clare (north shore), Limerick and Kerry (southern shoreline). The large intertidal mudflats exposed at low tide and the diversity of other wetland habitats results in an estuarine complex with high value for birds. The value of the site has been recognised at an international level, with some 32,000ha designated as the River Shannon and River Fergus Estuaries SPA (Site Code 4077) under the EU Bird's Directive.

The estuary has been the focus of systematic waterbird monitoring since the early 1980s (Sheppard 1993) and more regularly since the mid 1990's (Crowe 2005). However, regular counts of the estuary are limited because of the extensive efforts required to undertake coordinated counts of such a large site, and one with many areas of limited access. Nonetheless, counts have shown that the Shannon Estuary has held the largest numbers of waterbirds in Ireland (e.g. Colhoun, 2001). Surveys in more recent years show that, for many species, there have been substantial declines in usage by waterbirds (NPWS, 2012b).

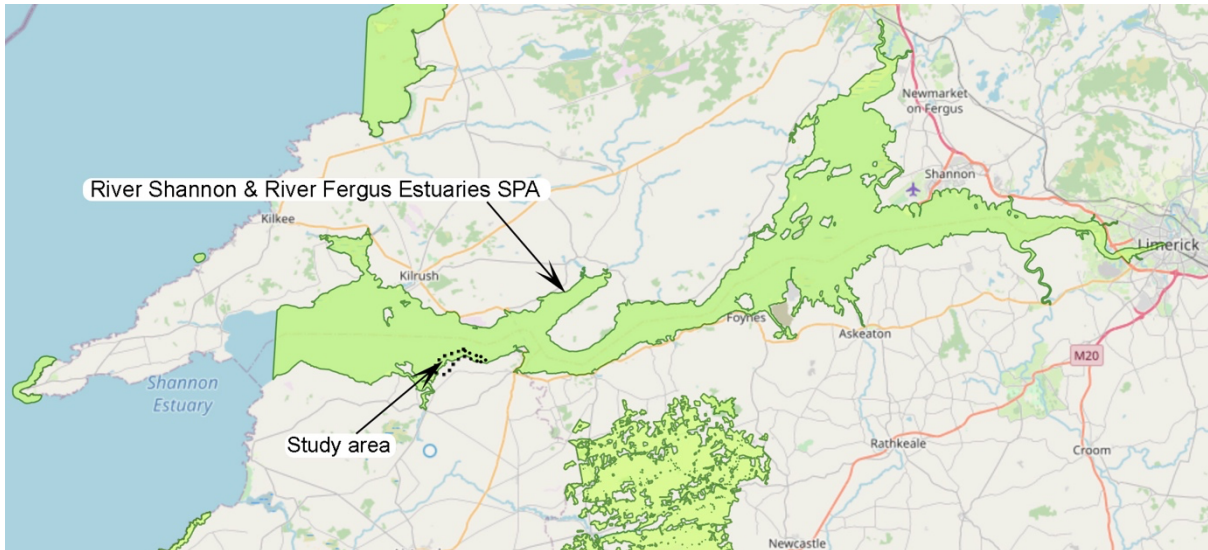


Figure 1. Approximate location of study area within River Shannon & River Fergus Estuaries SPA | Source EPA envision mapping | Not to scale

2. Conservation Legislation and Policy

2.1 European Union Directives

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of endangered species of wild birds. Sites that meet any of the following criteria may be selected as SPAs:

- A site regularly supporting 20,000 waterbirds or 10,000 pairs of seabirds;
- A site regularly supporting 1% or more of the all-Ireland population of an Annex I species;
- A site regularly supporting 1% or more of the biogeographical population of a migratory species;
- A site that is one of the most suitable sites in Ireland for an Annex I species or a migratory species.

In Ireland a programme to identify and designate these SPA sites has been in place since 1985. It is Ireland's typical mild and wet winters that make the wetlands of Ireland such an important resource for over three-quarters of a million of these waterbirds each year. Over 50 species of waterbird migrate here either on passage to more southerly resorts or to spend the entire winter here. They seek out the relatively undisturbed wetland areas for ice-free feeding conditions and for safe roosting opportunities. In some cases, significant proportions of the biogeographic populations of waterbird overwinter here (e.g. Light-bellied Brent Goose, Black-tailed Godwit, Whooper Swan, Greenland White-fronted Goose and Ringed Plover).

Ireland's SPA Network encompasses over 570,000 hectares of marine and terrestrial habitats. The marine areas include some of the productive intertidal zones of our bays and estuaries that provide vital food resources for several wintering wader species including Dunlin a, Knot

and Bar-tailed Godwit. Marine waters adjacent to the breeding seabird colonies and other important areas for sea ducks, divers and grebes are also included in the network.

The majority of the breeding seabirds and wintering waterbirds are considered to be regularly occurring migratory birds; over 60% of 25 Annex I listed species that now occur in Ireland on a regular basis belong to the breeding seabird and wintering waterbird groups. This has in part led to the situation that the majority (> 80%) of Ireland's SPAs are designated for these two bird groups.

2.1.1 Conservation Objectives for the River Shannon and River Fergus Estuaries SPA

The River Shannon and River Fergus Estuaries SPA was selected as a SPA because of the presence of internationally important numbers and/or numbers of all-Ireland importance for a total of 21 species. In addition to the selection and additional conservation interest species, the site was selected as a SPA because it regularly supports over 20,000 waterbirds during the non-breeding season making this a site of international importance. The species listed as SCIs for the River Shannon and River Fergus Estuaries SPA are included in **Table 1**.

The National Parks and Wildlife Service (NPWS) are responsible for the designation of SACs and SPAs in Ireland. The conservation objectives for the River Shannon and River Fergus Estuaries SPA are detailed in:

NPWS (2012a) *Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077. Version 1.0*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Table 1. Features of Interest - River Shannon & River Fergus Estuaries SPA

Species code	Species	Scientific name	Conservation objective
A017	Cormorant	<i>Phalacrocorax carbo</i>	Maintain
A038	Whooper Swan	<i>Cygnus cygnus</i>	Maintain
A046	Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	Maintain
A048	Shelduck	<i>Tadorna tadorna</i>	Maintain
A050	Wigeon	<i>Anas penelope</i>	Maintain
A052	Teal	<i>Anas crecca</i>	Maintain
A054	Pintail	<i>Anas acuta</i>	Maintain
A056	Shoveler	<i>Anas clypeata</i>	Maintain
A062	Scaup	<i>Aythya marila</i>	Maintain
A137	Ringed Plover	<i>Charadrius hiaticula</i>	Maintain
A140	Golden Plover	<i>Pluvialis apricaria</i>	Maintain
A141	Grey Plover	<i>Pluvialis squatarola</i>	Maintain

Species code	Species	Scientific name	Conservation objective
A142	Lapwing	<i>Vanellus vanellus</i>	Maintain
A143	Knot	<i>Calidris canutus</i>	Maintain
A149	Dunlin	<i>Calidris alpina</i>	Maintain
A156	Black-tailed Godwit	<i>Limosa limosa</i>	Maintain
A157	Bar-tailed Godwit	<i>Limosa lapponica</i>	Maintain
A160	Curlew	<i>Numenius arquata</i>	Maintain
A162	Redshank	<i>Tringa totanus</i>	Maintain
A164	Greenshank	<i>Tringa nebularia</i>	Maintain
A179	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Maintain
A999	Wetlands		Maintain

Restore = Restore favourable conservation condition, Maintain = Maintain favourable conservation condition

To acknowledge the importance of Ireland's wetlands to wintering waterbirds, "Wetland and Waterbirds" may be included as a SCI for some SPAs that have been designated for wintering waterbirds and that contain a wetland site of significant importance to one or more of the SCI species. Thus, a further objective is to maintain or restore the favourable conservation condition of the wetland habitat within the River Shannon & River Fergus Estuaries SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

The favourable conservation conditions of these SCIs in the River Shannon and Fergus Estuaries SPA are defined by various attributes and targets, which are shown in **Table 2**. The conservation objectives for the breeding and wintering population of Cormorant is defined and measured by eight attributes and targets. The conservation objectives for each of the remaining 20 wintering populations of qualifying interest species are defined and measured by the same two attributes and targets. The conservation objective for wetland habitat is to maintain its favourable conservation condition in the SPA as a resource for the regularly-occurring migratory waterbirds that utilise it, defined and measured by 1 no. attribute and target (NPWS 2012a).

Table 2. Attributes and targets for the conservation objectives for the wintering populations of in the River Shannon and Fergus Estuaries SPA

Species	Attribute	Measure	Target
Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon,	Population trend	Percentage change	Long term population trend stable or increasing

Species	Attribute	Measure	Target
Teal, Pintail, Shoveler, Scaup, Cormorant, Golden Plover, Grey Plover, Lapwing, Ringed Plover, Curlew, Black-tailed Godwit, Bar-tailed Godwit, Knot, Dunlin, Greenshank, Redshank and Black-headed Gull	Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing and intensity of use of areas used by the each of the SCI species, other than that occurring from natural patterns of variation.
Cormorant	Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
	Productivity rate	Number	No significant decline
	Distribution; breeding colonies	Number; location; area (hectares)	No significant decline
	Prey biomass available	Kilograms	No significant decline
	Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase

Species	Attribute	Measure	Target
	Disturbance at the breeding site	Percentage change	Long term population trend stable or increasing
	Distribution	Range, timing and intensity of use of areas	There should be no significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation

Source: NPWS (2012a).

The selection of species listed as SCIs for the River Shannon & River Fergus Estuaries SPA was based on the following (NPWS 2012a):

- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Whooper Swan. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 118 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Light-bellied Brent Goose. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 494 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Shelduck. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,025 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Wigeon. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,761 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Teal. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,260 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Cormorant . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 245 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Ringed Plover . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 223 individuals.

- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Golden Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 5,664 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 558 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Lapwing. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,126 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Knot . The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,015 individuals.
- During winter the site regularly supports 1% or more of the biogeographic population of Dunlin. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 15,131 individuals.
- During winter the site regularly supports 1% or more of the biogeographical population of Black-tailed Godwit. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,035 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of the Annex I species Bar-tailed Godwit. The mean peak number within the SPA during the baseline period (1995/96 – 1999/00) was 460 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Curlew. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,396 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Greenshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 61 individuals.
- During winter the site regularly supports 1% or more of the all-Ireland population of Redshank. The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 2,645 individuals.

The following species are identified as additional SCIs for the River Shannon and River Fergus Estuaries SPA as they were recorded in numbers of all-Ireland importance during the baseline period (1995/96 – 1999/00):

- Pintail
- Shoveler
- Scaup
- Cormorant (breeding population)

- Black-headed Gull .

The wetland habitats contained within the River Shannon and River Fergus Estuaries SPA are identified to be of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore, the wetland habitats are considered to be an additional SCI.

2.2. Species of Conservation Concern

In addition to species listed in the EU Birds Directive (refer to **Section 2.1**), species of conservation concern in the Irish and European context are also classified under Birds of Conservation Concern Ireland (BoCCI) and Species of European Conservation Concern (SPEC). Both of these assessment processes are used to identify priority species in order that conservation action can be taken to improve species status (Gilbert *et al.* 2021).

BirdWatch Ireland and the Royal Society for the Protection of Birds (RSPB) have listed priority bird species suffering decline in the Irish/European and global context. The Birds of Conservation Concern in Ireland (BoCCI) list classifies birds as Red (high conservation concern) or Amber (medium conservation concern) based on their conservation status and hence conservation priority. All other regularly occurring species are classified as Green List and are not considered threatened. Listed species must meet one or more of the following criteria:

Red List: Their breeding population or range has declined dramatically in recent years, or their breeding population has undergone a significant decline since 1800, or they are of global conservation concern.

Amber List: Their population or range has declined moderately in recent years, or they are rare or sporadically breeding species, or their breeding or wintering population is internationally important and/or localised, or they have an unfavourable conservation status in Europe.

Green List: Do not meet Red or Amber-listing criteria.

Species of European Conservation Concern are assessed by BirdLife International and recognised by the SPEC process:

SPEC 1: Species are those which are of global conservation concern. SPEC 1 species are automatically BoCCI Red-listed and both SPEC 2 and 3 species are Amber-listed except for those that do not breed in Ireland.

SPEC 2: Species are those which have an unfavourable conservation status in Europe (if the population is threatened, declining, depleted from historical levels or is found only in a few locations) and is concentrated in Europe (i.e. more than 50% of the global population occurs in Europe).

SPEC 3: Species are which have an unfavourable conservation status in Europe (as above), but which are not concentrated in Europe.

Species which do not fulfil these criteria are regarded as **non-SPEC** species and of least conservation concern.

3. Baseline Winter Birds Data

3.1 I-WeBS Monitoring of the River Shannon and River Fergus Estuaries SPA

The Selection Species and additional SCI species for the River Shannon and River Fergus Estuaries SPA are listed in **Table 3**, together with population data during the baseline period (1995/96 – 1999/00), the current level of conservation concern of each species in Ireland and the most recent national (all-Ireland) and international (biogeographic) population trends (Lewis *et al.* 2016).

In addition to the SCI species, the River Shannon and River Fergus estuaries supports an additional 19 regularly-occurring waterbird species during the non-breeding season. "Regularly-occurring" has been defined here as recorded presence in 18 or more of the 21 years since I-WeBS surveying began in 1994/95. **Table 4** lists these species and provides baseline data, the current level of conservation concern of each in Ireland and the most recent national (all-Ireland) and international (biogeographic) population trends. The Latin names of species listed in the tables below are included in **Appendix 1**.

Table 3. Special Conservation Interests (SCI) Species and Additional Special Conservation Interests for the River Shannon and River Fergus Estuaries SPA

	Species	Annex I	Baseline Population ^a	BOCCI Category ^b	National 5 year all Ireland trend ^c	Long-term Trend ^d
Special Conservation Interest (SCI)	Bar-tailed Godwit	Yes	460 (n)	Red	-32.6	Intermediate decline
	Black-tailed Godwit		2,035 (i)	Red	22.5	Stable or increasing
	Cormorant		245 (n)	Amber	38.5	Stable or increasing
	Curlew		2,396 (n)	Red	-9.4	Moderate decline
	Dunlin		15,131 (i)	Red	5.9	Moderate decline
	Golden Plover	Yes	5,664 (n)	Red	-17.5	Large decline
	Greenshank		61 (n)	Green	0.9	Stable or increasing
	Grey Plover		558 (n)	Red	- 21.9	Large decline
	Knot		2,015 (n)	Red	0.0	Intermediate decline
	Lapwing		15,126 (n)	Red	- 6.5	Large decline
	Light-bellied brent goose		494 (i)	Amber	-11.2	Stable or increasing
	Redshank		2,645 (n)	Red	-14.0	Stable or increasing
	Ringed Plover		223 (n)	Amber	-4.3	Intermediate decline
	Shelduck		1,025 (n)	Amber	6.3	Stable or increasing
	Teal		2,260 (n)	Amber	1.8	Stable or increasing
	Whooper Swan	Yes	899 (n)	Amber	265.4	Increase
Wigeon		3,761 (n)	Amber	0.9	Intermediate decline	
Additional	Black-headed Gull		2,681 (n)	Amber		
	Cormorant (breeding)		93 pairs (n)	Amber		
	Pintail		62 (n)	Red	-0.8	Intermediate decline
	Scaup		102 (n)	Red	-33.6	Large decline
	Shoveler		107 (n)	Red	-23.0	Intermediate decline

Source: Lewis *et al.* (2016). ^a. All baseline data are from the River Shannon and River Fergus Estuaries conservation objectives supporting document (NPWS 2012b), and relate to the average peak numbers for the period 1995/96 – 1999/2000 with the exception of Whooper Swan (Burke *et al* 2022) and Light-bellied Brent Goose (Robinson *et al.* 2004b). (i) and (n) denote numbers of international and all-Ireland importance at the time of calculation i.e. from Wetlands International (2002) and Crowe *et al.* (2008) respectively. ^b. BOCCI category for the period 2020-2026 (Gilbert *et al.* 2021). ^c I-WeBS Trends Report 1994/95 – 2019/20 <https://birdwatchireland.ie>. ^d I-WeBS Trends Report 1994/95 – 2019/20 <https://birdwatchireland.ie>.

Table 4. Summary data for other regularly occurring species non-SCI species for the River Shannon and River Fergus Estuaries SPA

	Species	Annex I	Baseline Population ^a	BOCCI Category ^b	5 year all Ireland Trend ^c	Current International Trend ^d
Regularly occurring non -SCI Species	Common Gull		525 ‡	Amber		
	Coot		277	Amber	- 10.1	Intermediate decline
	Goldeneye		12 ‡	Red	- 32.5	Large decline
	Great Black-backed Gull		148	Amber		
	Great Crested Grebe		50	Amber	- 39.5	Intermediate decline
	Grey Heron		46	Green	1.0	Stable/increasing
	Greylag Goose		82	Amber	na	na
	Herring Gull		128	Amber		
	Lesser Black-backed Gull		290	Amber		
	Little Egret	Yes	3	Green	34.6	Stable/increasing
	Little Grebe		34	Green	6.1	Stable/increasing
	Mallard		589	Amber	-11.3	Intermediate decline
	Moorhen		47	Green		
	Mute Swan		156	Amber	4.6	Stable/increasing
	Oystercatcher		551	Red	-17.5	Stable/increasing
	Pochard		27	Red	-33.6	Large decline
	Snipe		339	Red		
	Tufted Duck		189	Amber	- 20.7	Intermediate decline
Turnstone		125	Amber	- 33.6	Intermediate decline	

Source: Lewis *et al.* (2016). "Regularly occurring" is defined as having been recorded in 18 of the 21 years from 1994/95–2014/15. ‡ indicates where both ground and aerial counts were used. ^a. All baseline data are from the River Shannon and River Fergus Estuaries conservation objectives supporting document (NPWS 2012b), and relate to the average peak numbers for the period 1995/96 – 1999/2000 with the exception of Whooper Swan (Robinson *et al.* 2004a) and Light-bellied Brent Goose (Robinson *et al.* 2004b). (i) and (n) denote numbers of international and all-Ireland importance at the time of calculation i.e. from Wetlands International (2002) and Crowe *et al.* (2008) respectively. ^b. BOCCI category for the period 2020-2026 (Gilbert *et al.* 2021). ^c I-WeBS Trends Report 1994/95 – 2019/20 <https://birdwatchireland.ie>. ^d I-WeBS Trends Report 1994/95 – 2019/20 <https://birdwatchireland.ie>.

3.2 I-WeBS Monitoring in the Vicinity of Study Area

A review of I-WeBS data shows that the study area and Proposed Development site are located within the I-WeBS subsite 0K492 (Ballylongford Bay (Carrig Isd-Ardmore Pt)). 0K492 is a subsite assessed by aerial surveys only (**Figure 2**). The vantage point locations for winter bird surveys carried out by DixonBrosnan are also indicated below in **Figure 2**.



Figure 2. Location of I-WeBS subsite 0K492 and the location of DixonBrosnan vantage points for Proposed Development site | Source Birdwatch Ireland

The aim of aerial surveys is to complete two full surveys per season. Some 29 aerial subsites have been used overall, and these cover different areas and are coded differently to the ground-based subsites. However, the quality of the counts undertaken during aerial census is limited by many factors, especially at this site which supports large numbers (tens of thousands) of birds of many species. These limitations are discussed elsewhere (Boland & Crowe 2012) and are summarised below:

1. Aerial census only allows a limited timeframe and the counts provided of large flocks are estimates;
2. It is often difficult to discern/identify birds that remain on the ground and that are not flushed by the aircraft;
3. Species occurring in low densities (such as Pintail, Teal, Grey Plover) are overlooked. Aerial counts are more suitable for dispersed and distinguishable species such as Lapwing, Golden Plover and Shelduck whereas small, scarce or skulking species are likely underestimated (e.g. Dunlin, Turnstone, Redshank, Greenshank) (Crowe 2005) and are better covered by ground observations.

A review of the Irish Wetland Bird Survey (I-WeBS) data for the period 2018-2023 season for the subsite 0K492 is detailed in **Table 5** below (Source Birdwatch Ireland).

Table 5. Irish Wetland Bird Survey (I-WeBS) data for the period 2018-2023 for the subsite (aerial) 0K492

Species Name (bold for Annex 1 species)	AllIreland_1%	Flyway_1%	Peak	2018/19	2019/20	2020/21	2021/22	2022/23
Bar-tailed Godwit	170	1500	66					66
Black-headed Gull			150	2	1	14	70	150
Black-tailed Godwit	200	1100	19				19	15
Coot	190	15500	11	3	3	11	8	10
Cormorant	110	1200	16				16	1
Curlew	350	7600	30				28	30
Dunlin	460	13300	2800				925	2800
Gadwall	20	1200	77	32	30	77	5	14
Golden Plover	920	9300	15				7	15
Great Black-backed Gull			2					2
Grey Heron	25	5000	3				3	3
Grey Plover	30	2000	31				26	31
Herring Gull			1				1	
Knot	160	5300	206					206
Lapwing	850	72300	171				23	171
Lesser Black-backed Gull			2				1	2
Little Egret	20	1100	7				7	2
Little Grebe	20	4700	9	6	9	1	9	3
Mallard	280	53000	22	16	19	7	22	17
Moorhen			4		1	1	3	4
Mute Swan	90	100	12		9	6	12	11
Oystercatcher	610	8200	45				29	45
Red-throated Diver	20	3000	7				7	
Redshank	240	2400	425				220	425
Shelduck	100	2500	25				11	25
Shoveler	20	650	35	17	28	35	4	18
Snipe			14				6	14
Teal	360	5000	87	7	6	12	38	87
Tufted Duck	270	8900	26				26	
Whooper Swan	150	340	7				7	7
Wigeon	560	14000	99		35	99	40	70

Source: Birdwatch Ireland 24/02/2024

Of the species recorded, Golden Plover, Bar tailed godwit, Red throated diver, Little egret, Whooper swan are listed on Annex I of the Birds Directive. Wigeon, Black-headed Gull,

Lapwing, Snipe, Redshank, Shoveler, Grey plover, Golden plover, Dunlin, Black tailed godwit, Knot, Oystercatcher, Curlew and Herring gull, are classified as Red Listed species (high conservation concern) by BirdWatch Ireland and the Royal Society for the Protection of Birds (Gilbert *et al.* 2021).

There was one species recorded (Dunlin) during the 2018-2023 survey period in numbers close to or above the figures which would be considered nationally significant (i.e. 1% or more of the all-Ireland population of an Annex I species or 1% or more of the bio-geographical population of a migratory species).

3.3 Other Surveys in the Vicinity of the Study Area

The 2010/11 waterbird survey programme was designed to investigate how waterbirds are distributed across coastal wetland sites during the low tide period. The surveys ran alongside and are complementary to I-WeBS. Following a reconnaissance visit by fieldworkers in September 2010, it was decided to divide the site into two halves, and to count the site over two days on each survey occasion. A programme of four low tide counts (October 20th/21st and November 22nd-24th 2010, plus January 6th/7th and February 18th/19th 2011) and a high tide count (26th/27th January 2011) were completed across the site. A total of up to 66 count sections (subsites) were used, comprising of up to 35 subsites on day one and up to 30 subsites on day two on each survey occasion. It should be noted that the count subsite boundaries and SPA boundaries are not coincident.

The NPWS subsite most relevant to the Proposed Development site is the Carrig Island (OK509) subsite. Six vantage point locations were utilised for estuarine bird surveys carried out by DixonBrosnan. Point A and Point F are located the Carrig Island subsite. It is noted that Point B, Point C, Point E and Point F occur within an area not covered by the 2010/11 I-WeBS survey programme.

Species richness at subsite level varied considerably with a greater proportion of subsites supporting in the range of six to ten species. Ten subsites supported 15 or more species. With regards to the distribution of species throughout the Shannon and Fergus Estuaries, Carrig Island (OK509) had very high numbers of Whooper Swan, Light-bellied Brent Geese, Wigeon, Teal, Golden Plover, Pintail and Lapwing, and high numbers of Shelduck, Cormorant, Ringed Plover, Dunlin, Bar-tailed Godwit, Curlew, Redshank and Black-headed Gull. The subsite received intensive coverage over the survey period. It had the highest waterbird diversity of any subsite, averaging 26 species at low tide (20-30 per day) and 17 at high tide. Peak numbers of Dunlin and Teal exceeded the threshold of all-Ireland importance.

Overall, Carrig Island (OK509) is one of the most important subsites in the Shannon and Fergus Estuary complex, in terms of diversity and numbers of waterbirds present. Both the subtidal and intertidal habitats are of significant importance for waterbirds.

The most detailed survey of the Shannon Estuary was carried out by MKO in 2017/2018 (MKO 2019). This surveyed 87 subsites within the Shannon Estuary, including the Proposed Development site. This survey found the total number of SCI species recorded across all subsites ranged from 20 species in October to 10 species in June. Most of the 21 SCI species were present in all the winter months (October-March) with Pintail and Scaup being the only missing SCI species during these months, while over half of the SCI species remained present during the summer. The mean species richness per subsite varied from 1.7-18.3, and species

richness in the area covering the Proposed Development site was in the lowest category for species richness i.e. Point B, Point C, Point E and Point F (**Figure 4**). One of the highest species richness occurred in the Ballylongford area to the west of the project site, in which Point A and Point D are located. The narrow section of the Lower Shannon between Foynes and Tarbert had generally low species richness, although the small size of the subsites in these areas will have affected the analyses. The subsite species richness was generally correlated with the subsite intertidal area although this was mainly due to low species richness in subsites with less than 50 ha of intertidal habitat (**Figure 3**). The subsite distribution of SCI species richness was strongly correlated with the subsite distribution of total species richness (Spearman's $r = 0.942$, one-side $p < 0.001$, $n = 89$).

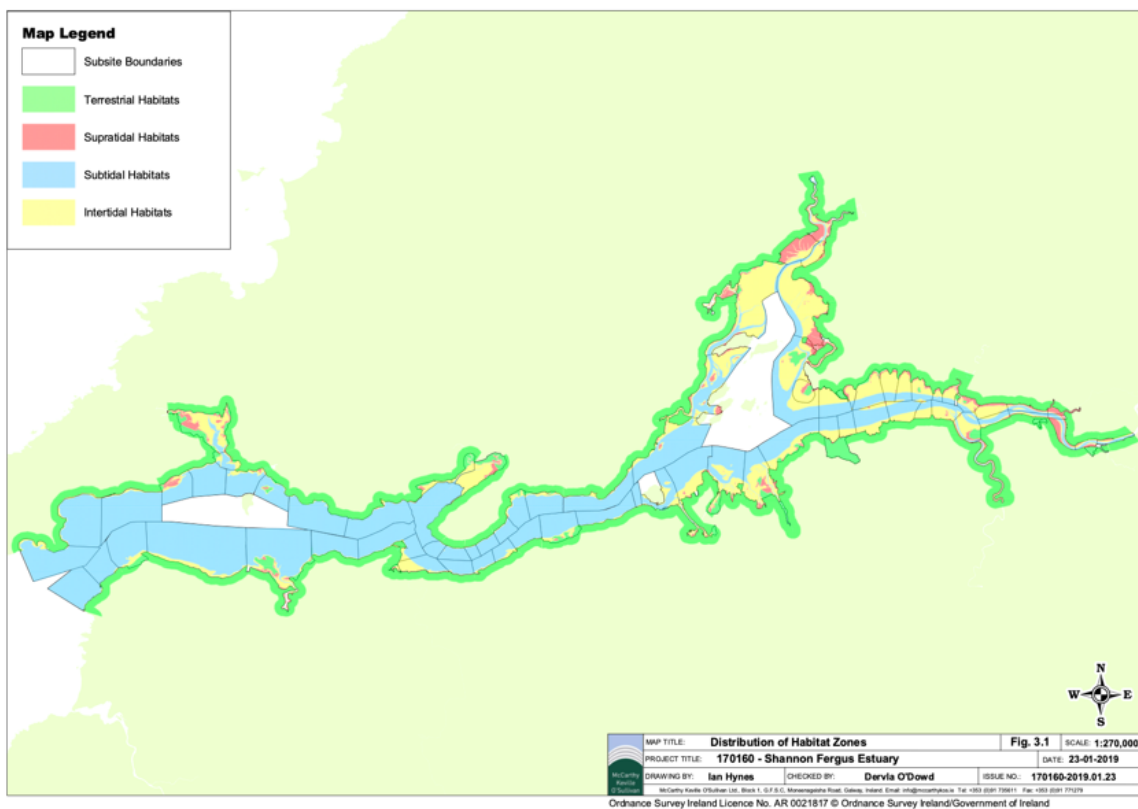


Figure 3. Distribution of habitat zones within the Shannon Estuary (MKO 2019)

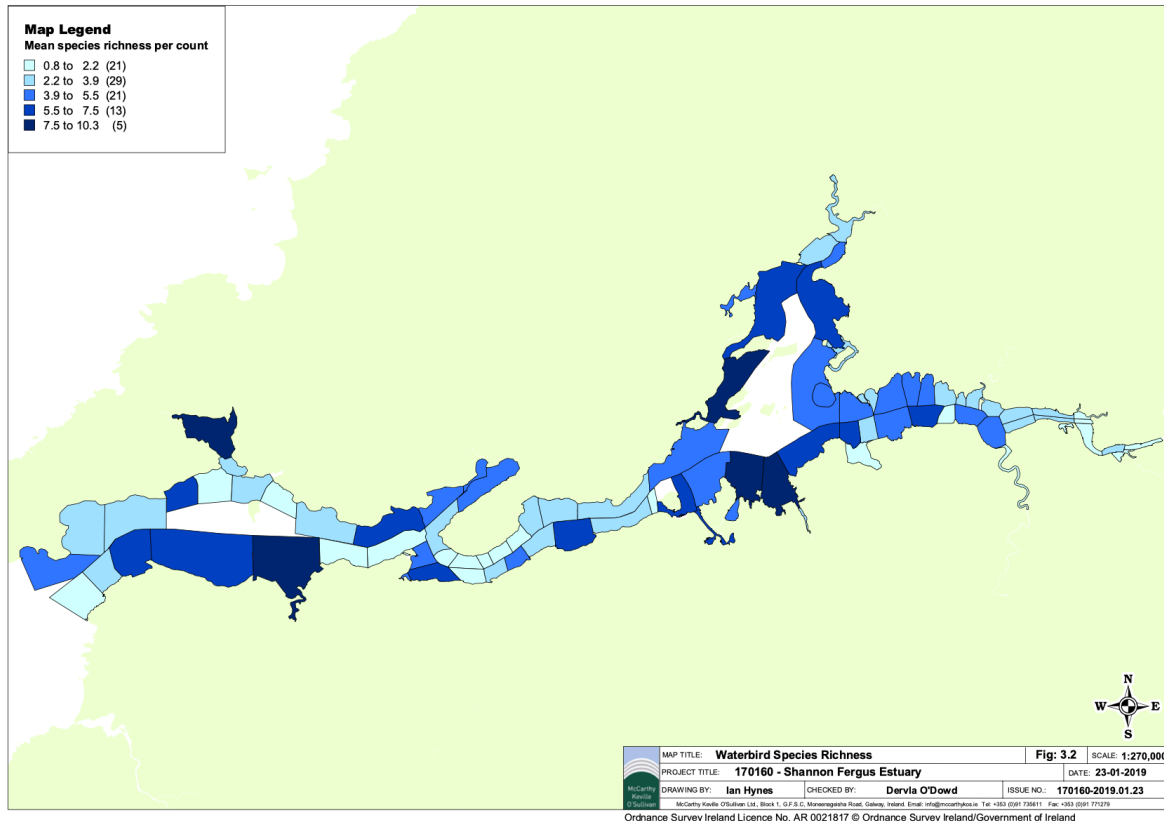


Figure 4. Mean species richness per count (MKO 2019)

3.4 Baseline Winter Bird Surveys – Cork Ecology 2006/2007

Cork Ecology conducted a baseline winter bird assessment of the coastal areas between Knockfinglas Point and Ardmore Point and adjacent land, near Ballylongford, Co. Kerry at the request of DixonBrosnan Environmental Consultants. Full details of this report are included in **Appendix 2**.

Six monthly surveys were conducted between October 2006 and March 2007. On each visit, three counts were made of the coastal waters between Knockfinglas Point and Ardmore Point; a) at the western end of the site, b) from Knockfinglas Point and c) at the eastern end of the site, near Ardmore Point (**Figure 5**). At each point, a 180° scan using a 20x telescope and 8x binoculars was made of the inshore waters and all species of wildfowl, waders and gulls were recorded. All wildfowl, waders and gulls encountered on the beach between Point A and Point B, and in the bay between Point B and Point C were also recorded. Bird identification followed Mullarney *et al* (1999).

It is noted that the Vantage Points used during the 2006/2007 winter bird survey correspond to those used during later 2018-2023 surveys carried out by DixonBrosnan. However an additional survey point at Richard's Rock (west of the Proposed Development area) (Point D) was added during the 2018/2019 surveys and two additional sites east of the study area (Point E, Point F) during summer 2021.

A total of 29 of waterbirds were recorded during the counts over the coastal waters in 2006/2007 (**Table 6**).

Table 6. Peak numbers of wildfowl, waders and gulls recorded during the 2006/2007 winter bird survey (Cork Ecology)

Species*	9/10/2006	9/11/2006	20/12/2006	24/1/2007	22/2/2007	14/3/2007
Black Guillemot	0	3	1	0	1	0
Black-headed Gull	26	6	2	22	0	0
Common Gull	0	1	5	5	0	0
Cormorant	2	0	1	0	0	0
Curlew	6	22	3	78	51	1
Dunlin	1	0	0	250	70	0
Great black-backed Gull	0	0	0	1	0	0
Great Crested Grebe	6	9	13	1	9	1
Great Northern Diver	0	0	2	2	3	2
Grey Heron	1	1	1	0	1	1
Guillemot	0	0	0	0	1	0
Herring Gull	1	0	1	0	0	0
Lapwing	0	0	2	60	2	0
Lesser black-backed Gull	2	0	0	0	0	0
Mallard	0	1	1	0	2	2
Moorhen	0	1	0	0	1	1
Mute Swan	0	0	0	2	0	2
Oystercatcher	1	17	4	11	1	8
Razorbill	0	3	1	0	0	0
Red-breasted Merganser	0	0	1	0	0	0
Red-throated Diver	0	8	5	2	8	1
Redshank	0	0	4	1	1	0
Ringed Plover	5	0	0	20	9	0
Scaup	0	0	0	30	0	0
Shag	0	0	1	0	0	0
Snipe	4	0	3	3	17	0
Teal	0	4	13	8	14	2
Turnstone	4	30	3	5	10	0
Wigeon	0	5	3	6	12	0

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

The highest species diversity of wildfowl, waders and gulls was recorded during the December visit, when 21 species were recorded, compared to 18 species in January and February, 14 in November, 12 in October and 10 in March. No species were recorded in nationally important numbers during the 2006/2007 winter bird surveys (Burke *et al.* 2018).

The majority of sightings of Red-throated Diver, Great Northern Diver and Great Crested Grebe occurred from Point A, and this area usually held low numbers of ducks and waders on the beach.

Grey Heron, Mute Swan, Moorhen and Snipe were regularly recorded on the small lagoon in low numbers and it was noted that Mute Swan and Moorhen are likely to breed there.

In October, the majority of birds were recorded off Point A (66.7 %), at the western end of the site, with small numbers of waders recorded on the beach between Point A and Point B (15.0 %). Few birds were seen offshore in October, with six Great Crested Grebes and one Cormorant recorded up to 800 m from the shore at Point A, with another Cormorant seen flying west from Point B. In November, more than half of all birds recorded were around Point A (36.2 %) and on the beach and lagoon between Point A and B (28.4 %). Numbers of Red-throated Divers increased in November, with five recorded within 1 km of the shore from Point A, and three within 800 m of shore from Point B. Numbers of Great Crested Grebes within 1

km of the shore from Point A also increased. Low numbers of ducks were recorded, mostly from Point A.

A flock of 30 Turnstones was recorded on the Beach between Point A and Point B, and a small flock of Curlews and Oystercatchers were on the shore between Point B and Point C.

Greatest species diversity was recorded on the December survey. Again, the majority of birds were recorded from Point A (73.9 %), with fewer birds recorded on the beach between Points A and B, and from Point B.

Red-throated Divers, Great Northern Divers and Great Crested Grebes were only recorded from Point A, with all birds seen up to 1km from shore. The December total of 13 Great Crested Grebes was the peak count over the six surveys. Small numbers of ducks and waders were also recorded from Point A, with fewer birds seen elsewhere.

Total numbers of wildfowl, waders and gulls were highest in January. The majority of birds were recorded in a high tide roost of primarily Dunlin, Lapwing and Ringed Plover on the beach between Point A and Point B (78.9 %).

Low numbers of Red-throated Divers, Great Northern Divers and Great Crested Grebes and a flock of 30 Scaup was recorded within 500m of the shore from Point A. A survey in February 2005 also recorded 25 Scaup from Point A. Numbers of birds recorded between Point B and Point C were very low.

In February, the majority of wildfowl, waders and gulls were again recorded from Point A (76.5%), with eight Red-throated Divers, three Great Northern Divers and nine Great Crested Grebes all seen offshore. Up to 14 Teal and 12 Wigeon were recorded moving between Point A and Point B, and a flock of 70 Dunlin was seen flying past Point A. Numbers of birds recorded between Point B and Point C were very low.

Lowest numbers of wildfowl, waders and gulls were recorded in March, with no concentrations of birds noted. Half of all birds recorded were found at Point A (29.2 %) and on the beach and lagoon between Point A and B (20.8 %), with the remainder seen at Point B and Point C.

Overall, two Annex I listed species, Red-throated Diver and Great Northern Diver, were recorded in the inshore waters bordering the study area, and one BWI Red-listed species, Curlew, was recorded feeding in fields within the study area regularly throughout the winter months.

Although the Shannon estuary supports internationally important concentrations of wildfowl and waders, no significant concentrations of divers, grebes or ducks were recorded in the inshore waters bordering the proposed site. The majority of divers and grebes were found offshore from Point A, where no development is planned.

Similarly, no significant high tide roost was found within the site, and the area did not support large numbers of feeding wildfowl or waders. A high tide roost of primarily Dunlin, Lapwing and Ringed Plover was noted on the beach east of Point A in January, but no species were recorded in nationally important numbers.

3.5 Baseline Winter Bird Surveys – DixonBrosnan 2011/2012

Bird surveys were carried out by DixonBrosnan Environmental Consultants on three occasions, 26th November 2011, 5th January 2012 and 28th January 2012 (See **Table 7**) from three points on the northern boundary of the Proposed Development (Points A, B and C). Full details of this survey are included in **Appendix 3** of this report. Surveys were carried out using an 8X40 Luger field binoculars and a 20X60 Sahara spotting scope. The first two surveys were carried out from mid tide to high tide and the third survey was carried out from mid tide to low tide.

The Annex I bird species Great Northern Diver and Whooper Swan were recorded from the site. Several Amber and Red listed species were recorded i.e. Cormorant (Amber), Black-headed Gull (Red), Lesser Black Backed Gull (Amber), Lapwing (Red), Curlew (Red), Oystercatcher (Amber) and Redshank (Red). Great Northern Diver was recorded in the area around Knockfinglas point and Whooper Swan was recorded from the lagoon. Notwithstanding the presence of Annex 1 species and red listed species, the numbers recorded were not nationally significant. Of the species recorded, Whooper Swan, Cormorant, Teal, Ringed Plover, Lapwing, Curlew, Redshank and Black-headed Gull are listed as a qualifying interest for the River Shannon and River Fergus estuaries SPA.

Table 7. Peak numbers of wildfowl, waders and gulls recorded during the 2011/2012 winter bird survey

Species*	26/11/2011	05/01/2012	28/01/2012
Black-headed Gull		6	
Common Gull	4	1	5
Common Scoter			2
Cormorant	2	4	1
Curlew	6	24	25
Glaucous Gull	3	4	
Great Black-backed Gull		5	
Great Northern Diver	1		4
Grey Heron	1		
Lapwing	35		
Lesser Black-backed Gull	4	8	
Mallard	5		
Mute swan	2		
Oystercatcher	20	11	45
Redshank	45		31
Ringed Plover			5
Snipe	1		
Teal	1		
Turnstone	9	4	35
Whooper Swan	2	2	

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

4. Estuarine Bird Survey 2018-2023 Location and Study Area

4.1 Location of Study Area

The study area for the 2018-2023 winter bird surveys (October to March) was located approximately 3.1km northeast of Ballylongford Village, Co. Kerry (**Figure 5**). Surveys were carried out from four vantage points on the southern shores of the Shannon Estuary between Richard's Rock and east of Ardmore Point. Initially the survey focused on three points (**Figure 5** Points A, B and C). A fourth survey site, Point D, was added in February of 2019. In 2021 surveys were extended in the summer months (May to July 2021) and two additional survey sites were added to the east of the Proposed Development site. All wildfowl, waders and gulls encountered on the beach between Points A and B (Beach and Lagoon), and in the bay between Points B and C (Bay) were recorded as separate subsites. The survey locations were chosen based on previous winter bird surveys, information gathered during the original site walkover and the location of the Proposed Development site. Boundaries of the count areas were selected primarily to delineate patches of relatively homogenous habitat within the study area in order to compare bird usage of these habitats and spatial areas; but were also selected to be easily perceived by the observer. This was done by use of sight-lines to prominent landmarks such as permanent marker buoys, coastal features and features on the horizon.

The location of these sites, which were chosen due to their location near potentially valuable bird habitat relative to the Proposed Development site, are as follows:

1. Point A - Beach to west of Proposed Development site, approximately 1.5km west of jetty location;
2. Point B - Knockinglas Point within the Proposed Development site boundary, approximately 950m west of proposed jetty location;
3. Point C- Near Ardmore Point to east of Proposed Development site, approximately 300m east of proposed jetty location
4. Point D - At Richard's Rock to west of the Proposed Development site, approximately 2.2km west of proposed jetty location
5. Beach and Lagoon – Area between Point A and Point B
6. Bay Area between Point B and Point C
7. Point E. Located approximately 1.2km east of Proposed Development site
8. Point F. Located approximately 1.8km east of the Proposed Development site



Figure 5. Vantage point locations and subsites for the winter bird counts

4.2 Landscape Overview

The landscape to the south of the study area is rural in nature, with marginal farmland and coniferous forestry adjoining the estuary. The study area overlooks the coastal/intertidal waters of the Shannon Estuary. There are no significant areas of exposed mudflat habitat within the study area. The shoreline bounding the estuary is largely rock, gravel and shingle shore, with no significant areas of mudflat. A small brackish lagoon is located on the western boundary of the study area.

5. Survey Methodology and Results

5.1 Vantage point survey methodology

DixonBrosnan have carried out extensive surveys along the shoreline of the Shannon Estuary in the vicinity of the proposed development site since October 2018. Winter bird surveys were initially undertaken by DixonBrosnan at three vantage points (Point A, Point B and Point C) between October 2018 and March 2020. As detailed in **Section 4.1**, Point D was added in February 2019 and Points E and F in May 2021. Bird surveys continued into the summer months from May 2021 with monthly surveys continuing at all six vantage points between May 2021 and August 2023. Survey details, including time, date and tidal conditions are included in **Table 8**.

The survey methodology was based on that used by the British Trust for Ornithology (BTO), Wetland Bird Survey (WeBS) and also that for the Irish Wetland Bird Survey (I-WeBS), as outlined in Gilbert *et al.* (1998) and the low tide waterbird surveys (Lewis & Tierney 2014). The

estuarine bird survey was undertaken using 8.5×45 binoculars and a Swarovski ATX30-70x95 spotting scope. The vantage point locations for the estuarine bird counts are shown in **Figures 5**.

All waterbirds present within the count areas other than passerines, doves and pigeons were identified to species and their behaviour was also noted. Waterbirds are defined as “birds that are ecologically dependent on wetlands” (Ramsar Convention, 1971) which are a diverse group that includes divers, grebes, swans, geese and ducks, gulls, terns and wading birds. Birds flying over the count area but not utilising the resources within it, were not included in the counts, however notes were made on any substantial movements of birds that were observed. Birds re-locating within a site were not counted twice, however there may be some overlap between the subsites due to their close proximity.

It is important to note that waterbird counts represent a ‘snapshot’ of bird numbers during a count session, so in general and taking into account all potential sources of error, resulting data are regarded to be underestimates of population size.

Table 8. Count times and conditions

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)					
			POINT A	POINT B	POINT C	POINT D	POINT E	POINT F
18/10/2018	12:00	Low 07.15 (2.11m) & High 13.57 (3.71m)	H	H	H	N/A	N/A	N/A
22/11/2018	11:00	Low 10.50 (0.64m) & High 17.02 (4.89m)	L	L	L			
29/11/2018	10:00	Low 16.20 (1.05m) & High 09.58 (4.29m)	H	H	H			
12/12/2018	08:30	Low 14.29 (1.2m) & High 08.27 (4.5m)	H	H	H			
18/12/2018	11:00	Low 07.49 (1.60m) & High 14.11 (4.17m)	H	H	H			
21/01/2019	10:00	Low 11.46 (0.32m) & High 17.59 (5.05m)	L	L	L			
24/01/2019	11:30	Low 14.00 (0.19m) & High 07.45 (5.21m)	L	L	L			
18/02/2019	09:15	Low 10.45 (0.54m) & High 16.59 (4.93m)	L	L	L	L		
20/02/2019	09:30	Low 12.17 (0.00m) & High 06.01 (5.35m)	L	L	L	L		
15/03/2019	10:00	Low 18.12 (1.87m) & High 12.12 (3.92m)	H	H	H	H		
21/03/2019	10:00	Low 11.57 (0.09m) & High 18.13 (5.36m)	L	L	L	L		
21/10/2019	09:30	Low 05.58 (1.6m) & High 12.24 (4.2m)	H	H	H	H		
25/10/2019	09:20	Low 10.22 (1.7m) & High 16.42 (4.2m)	L	L	H	L		
15/11/2019	09:00	Low 13.39 (0.6m) & High 07.40 (5.2m)	L	L	H	L		
19/11/2019	09:15	Low 16.50 (1.5m) & High 10.36 (4.2m)	H	H	H	H		
03/12/2019	09:30	Low 15.40 (1.1m) & High 09.22 (4.7m)	H	H	H	H		
09/12/2019	10:15	Low 09.55 (1.1m) & High 16.11 (4.8m)	L	L	H	L		
22/01/2020	10:00	Low 05:00 (1.7m) & High 11:30 (4.6m)	H	H	H	H		

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)					
			POINT A	POINT B	POINT C	POINT D	POINT E	POINT F
30/01/2020	10:30	Low 09:11 am (1.42m) & High 3:50pm (4.41 m)	L	L	L	L		
23/02/2020	12:25	Low 11.46 (0.73m) & High 5.55pm (4.69m)	L	L	L	L		
24/02/2020	09:00	Low 11.46 am (0.73m) & High 5.55pm	L	L	L	L		
31/03/2020	10:00	Low 5.02pm (0.73m) & High 11.10am	H	H	H	H		
28/05/2021	13:30	Low 01:25 0.1m, High 07:44 5.0m, Low 13:46 0.4m, High 20:07 5.1m	L	L	H	H	L	L
30/06/21		Low 04:17 0.8m, High 10:49 4.2m, Low 16:41 1.2m, High 22:59 4.3m	L	L	L	L	L	L
19/07/21	15:30	High 19 01:19 4.2m, Low 07:28 1.2m, High 14:13 4.2m, Low 20:14 1.3m	H	H	-	L	-	-
20/07/21	17:00	High 02:32 4.2m, Low 08:40 1.2m, High 15:20 4.4m, Low 21:28 1.1m	-	-	L	-	L	L
21/09/21	10.00	Low 00.37 (0.3m) High 19.07 (5.1m)	H	H	H	L	L	L
22/09/21	08.00	Low 13.26 (0.5m) High 19.41 (5m)	L	L	L	L	L	L
26/10/21	10.00	Low (1.27m at 14.59) High (4.49m at 8.55)	H	H	H	H	H	H
27/10/21	10.00	Low (11.25am, 1.09m) High (5.14am, 4.59m)	L	L	L	L	L	L
04/11/21	10.00	Low (1.2m, 11.38am) High (5.4m, 5.18pm)	L	L	L	L	L	L
17/11/21	10.00	Low (11.23am, 1.6m) High (4.53pm, 4.9m)	L	L	L	L	L	L
16/12/21	10.00	Low (9.50, 1.17m) High (16.06, 4.4m)	L	L	L	L	L	L
17/12/21	09.00	Low (10.02, 1m) High (4.28, 4.5m)	L	L	L	L	L	H
12/01/22	10.00	Low (19.22, 1.8m) High (12.58, 3.6m)	H	H	H	H	H	H
13/01/22	10.00	Low (09.00, 3.3m) High (15.00, 4.5m)	H	H	H	L	L	L
22/02/22	10.00	Low(14.37, 0.85m) High (08.26, 4.9m)	H	H	L	L	L	L
23/02/22	09.00	Low (14.37, 0.85m) High (08.26, 4.9m)	H	H	H	H	H	H
18/03/22	10.00	Low (11.22, 0.6m) High (12.34, 4.79m)	L	L	H	H	H	H
19/03/22	10.00	Low (12.28 – 0.37m) High (06.15 5.11m)	H	H	H	L	L	L
21/04/22	10.00	Low (12.59-0.23m) High (19.14-5.18m)	L	L	L	L	L	L
22/04/22	10.15	Low (12.28 – 0.37m) High (06.15 5.11m)	H	H	H	L	L	L
09/05/22	09.15	High 06:01 1.8 Low 12:52 3.5	H	H	H	L	L	L

Date	Start time	Tides	Surveys (L-Low Tide, H-High Tide)					
			POINT A	POINT B	POINT C	POINT D	POINT E	POINT F
27/06/22	13.00	High 11:22 1.1 Low 17:52 4.5	H	H	H	H	H	H
26/07/22	09.30	High 11:03 1.4 Low 17:35 4.4	H	H	H	H	H	H
01/08/22	01.30	Low 11.57 1m High 18.17 4.6m	L	L	L	L	H	H
02/09/22	11.10	Low 4:11 PM 1.18 m High 10:02 AM 4.46 m	H	H	H	L	L	H
18/09/22	11.45	Low 5.24 PM 0.1 m High 11.13 AM 1.6 m	H	H	H	H	H	H
15/10/22	11.50	12.19 high 18.39 low	H	H	H	H	H	H
30/11/22	09.20	12.18high, 07.07 low	L	L	L	L	H	H
29/12/22	12.15	10.03 high, 16.15 low	H	H	H	H	H	
25/01/23	09.15	08.26 high, 15.06 low	H	H	H	H	H	H
27/02/23	10.30	10.17high, 16.11 low	H	H	H	L	L	L
27/03/23	09.00	10.39high, 16.33 low	H	H	H	H	H	H
30/04/23	10.30	08.59 low, 15.29 high	L	L	L	L	L	L
01/05/23	08.20	09.17 low, 15.31 high	L	L	L	LL	L	L
29/06/23	13.30	21.19 high, 15.06 low	L	L	H	L	L	L
25/07/23	11.20	11.20 high, 17.10 low	H	H	H	H	H	H
15/08/23	10.30	High 06:14 4.3 Low 12:09 1.2	H	H	H	L	L	L

5.2 Survey results

The results of estuarine bird surveys between 2018 and 2023 are summarized in **Tables 9-13** below. The conservation status of birds recorded during site surveys is included in **Table 14**.

Table 9. Low Tide - Peak numbers of wildfowl, waders and gulls recorded during the 2018-2021 bird surveys.

Species*	22/1 1/18	21/0 1/19	24/0 1/19	18/0 2/19	20/0 2/19	21/0 3/19	25/1 0/19	15/1 1/19	09/1 2/19	30/0 1/20 20**	23/0 2/20 20	24/0 2/20 20	28/0 5/20 21	30/0 6/20 21	19& 20/0 7/20 21	21/0 9/21	22/0 9/21	27/1 0/21	04/1 1/21	17/1 1/21	16/1 2/21	17/1 /2/2 1
Black Guillemot		1			8	7		1				1	2	1					4	5		
Black-headed Gull	2	3	2				94	6				11						25	85	55	35	55
Common Guillemot												2									1	
Common Gull	1	2			1	1	3	3		40	8	8			3		1	4	15	2		
Cormorant	3	1			1	1	2				4	12	5		2		2	10	3	1	4	12
Curlew	1	12	3	1	5		3	8	1	26	45	29		2			6	6	9	17	15	17
Dunlin						4	1	1			260											
Golden Plover																						
Great Black-backed Gull							2						3	1	2						1	
Great Crested Grebe	1	2	11	1	2		4	1			2	5										
Great Northern Diver	1	2	1	1	3	4		1				11									3	
Greenshank					1		1	1				2								11		
Grey Heron	1	1			1		1								1						1	
Grey Plover																						
Herring Gull			9		1	5	1			1					1		2		2	2	10	15

Species*	22/1 1/18	21/0 1/19	24/0 1/19	18/0 2/19	20/0 2/19	21/0 3/19	25/1 0/19	15/1 1/19	09/1 2/19	30/0 1/20 20**	23/0 2/20 20	24/0 2/20 20	28/0 5/20 21	30/0 6/20 21	19& 20/0 7/20 21	21/0 9/21	22/0 9/21	27/1 0/21	04/1 1/21	17/1 1/21	16/1 2/21	17/1 /2/2 1
Lapwing		11																	1	2		
Lesser Black- backed Gull										1		7	2	2						2		
Light- bellied Brent Geese		11		49	67	11					100									6	50	6
Little Egret	1			1			2	1		1	1		1	1	2					5	2	5
Mallard				2								4		2								
Moorhen						2								1								
Mute Swan				2																		
Oysterca tcher	5	4	6	4	3	3	6	9	8	7	8	4			1		6	13		3	6	8
Pochard																						8
Razorbill												1										
Red- throated Diver	1			1		1	1	1			2	8										
Redshan k						3	4	2			2	2							1			
Ringed Plover				7	22	12		5			2											
Sandwic h Tern														2	3							
Shag	5				1	2								1								
Shelduc k																						
Snipe	5		4			1	1	2		4	1			2								
Teal	1				10																	

Species*	22/1 1/18	21/0 1/19	24/0 1/19	18/0 2/19	20/0 2/19	21/0 3/19	25/1 0/19	15/1 1/19	09/1 2/19	30/0 1/20 20**	23/0 2/20 20	24/0 2/20 20	28/0 5/20 21	30/0 6/20 21	19& 20/0 7/20 21	21/0 9/21	22/0 9/21	27/1 0/21	04/1 1/21	17/1 1/21	16/1 2/21	17/1 /2/2 1	
Turnstone							6	1		3		14	1	1							3		3
Water rail														3									
Whimbrel														6	1								
Wigeon	25	12			2					28	12	26											

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font

Table 10. High Tide - Peak numbers of wildfowl, waders and gulls recorded during the 2018-2021 bird survey.

Species*	18/10/2018	29/11/2018	12/12/2018	18/12/2018	15/03/2019	21/10/2019	19/11/2019	03/12/2019	22/01/20	31/03/20	19&20/07/21	21/09/21	26/10/21
Black Guillemot		2	1				5	1					4
Black-headed Gull	1		123			14	30	46	16				37
Common Guillemot		2	1	3		1							
Common Gull	8	2	14	2		6	1		2		4		6
Common Sandpiper													
Cormorant	1	2	3	3	1	2			2	1	2	2	6
Curlew	10	2	45		7	19	30	2	1				12
Dunlin							1					4	
Golden Plover										24			
Great Black-backed Gull	3	4		1				1			2		
Great Crested Grebe	11	2	1	1		5	4		2		1		
Great Northern Diver		2	3	2	2		3	2	1	1			
Greenshank	1	1	1					4					
Grey Heron					1	1						1	
Grey Plover			6				15	12					
Herring Gull					10	5			3	5	1	1	
Lapwing			3										

Species*	18/10/2018	29/11/2018	12/12/2018	18/12/2018	15/03/2019	21/10/2019	19/11/2019	03/12/2019	22/01/20	31/03/20	19&20/07/21	21/09/21	26/10/21
Lesser Black-backed Gull					14					1	2	10	
Light-bellied Brent Geese													
Little Egret		1				2	1			5	2		
Mallard			2										
Moorhen	1					2				1			
Mute Swan													
Oystercatcher	7	7	5	6		7	12		4	2	3	10	14
Razorbill			1	1									
Red-throated Diver		1	1	2		2	1			1			
Redshank			1		4	5	3						
Ringed Plover						2		24		3			
Sandwich Tern											3		
Shag		2	1	1									
Shelduck					4								
Snipe	3	17	3	8						8			
Teal			1			2							
Turnstone		18	9	7		27	27	11		9			
Water Rail													
Whimbrel											1		

Species*	18/10/2018	29/11/2018	12/12/2018	18/12/2018	15/03/2019	21/10/2019	19/11/2019	03/12/2019	22/01/20	31/03/20	19&20/07/21	21/09/21	26/10/21
Wigeon		6					20						

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font ** Only one survey carried out in March 2020 due to Covid-19 restrictions

Table 11. Peak numbers of wildfowl, waders, gulls and raptors recorded during the 2022 and 2023 bird surveys

Species*	12/01/22	13/01/22	22/02/22	23/02/22	18/03/22	19/03/22	21/04/22	22/04/22	09/05/22	27/06/22	26/07/22	01/08/22	02&18/09/22	15/10/22	30/11/22	29/12/22	25/01/22	27/02/23	27/03/23	30/04/23	01/05/23	29/06/23	25/07/23	15/08/23	
Black Guillemot					1					1															
Black-headed Gull	75	65		20		6		6	4	4	9	4	238		300		80							1	
Chough																									2
Common Guillemot							1																		
Common Gull			5						1	4	9	4													
Common sandpiper												2													
Cormorant	11	4	1	2	1	3			1	2	1	1		5	2	1	1		1			1			1
Curlew	10	25		3	6		30	13	4	4	6	4	21				40	60			1			5	18
Dunlin	1									3															
Great Black-backed Gull								2						4	1										
Great Crested Grebe			3	2									9		2	1									
Great Northern Diver	2	3	2	1	1	3	1										1		1						

Species*	12/01/22	13/01/22	22/02/22	23/02/22	18/03/22	19/03/22	21/04/22	22/04/22	09/05/22	27/06/22	26/07/22	01/08/22	02& 18/09/22	15/10/22	30/11/22	29/12/22	25/01/22	27/02/23	27/03/23	30/04/23	01/05/23	29/06/23	25/07/23	15/08/23
Greenshank	1														1									
Grey Heron					1		1		1	1	1	1						2	1	1			1	1
Grey Plover	1	1																						
Hen harrier										2													1	
Herring Gull	3		13	5	10		2	5			2	2		1	2		8							
Kestrel										1								1						1
Lapwing											4													
Lesser Black-backed Gull									2	2	1	1											1	
Light-bellied Brent Geese					4	40	4	5	12	2							35							
Little Egret	1	1	1						3			2	10	4							1		1	
Mallard				2		2			2			2	17	8		12		6	2		2			
Moorhen									1	3									2					
Mute Swan									2															
Oystercatcher	12	12	26	6	5		2		2		5	3	17	102		1	15	4					3	7
Pochard	1	7			4																			
Razorbill					1	2				2														
Red-throated Diver																				1	2			
Red Breasted Merganser	1																							
Redshank									1					3	14			1						1
Ringed Plover					4				2		1	1										1		
Sandwich Tern											4													
Shag					3																			

Species*	12/01/22	13/01/22	22/02/22	23/02/22	18/03/22	19/03/22	21/04/22	22/04/22	09/05/22	27/06/22	26/07/22	01/08/22	02& 18/09/22	15/10/22	30/11/22	29/12/22	25/01/22	27/02/23	27/03/23	30/04/23	01/05/23	29/06/23	25/07/23	15/08/23
Shelduck						9			2									3						
Snipe										2		3			3		8	1						
Teal															47	48	70	54	34	2				
Tufted duck		14																						
Turnstone																		12	7					
Water Rail																								
Whimbrel																				19	108		1	
White tailed sea eagle																		1						
Wigeon	2				4										11		10	4	4					

Table 12. Peak numbers at each subsite October 2018 to March 2020

Species*	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National ^a	1% International ^a
Black Guillemot	8	1	1	5	1	0	8	-	-
Black-headed Gull	46	64	300	94	45	193	300	-	31,000
Common Guillemot	3	1	1	0	0	0	3	-	-
Common Gull	8	14	7	3	0	2	14	-	16,400
Cormorant	3	3	4	1	0	0	4	110	1200
Curlew	45	10	2	45	0	0	45	350	7600
Dunlin	0	0	0	260	0	0	260	450	13,300
Golden plover	0	0	0	24	0	0	24	920	9,300
Great Black-backed Gull	11	3	4	2	0	1	11	-	3,600
Great Crested Grebe	11	2	1	7	0	0	11	30	6300
Great Northern Diver	3	3	2	2	0	0	3	20	50
Greenshank	4	1	1	1	0	1	4	20	3300
Grey Heron	1	2	0	1	0	1	2	25	5000

Species*	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National ^a	1% International ^a
Grey Plover	12	0	0	15	0	0	15	30	2000
Herring Gull	11	9	0	10	1	0	11	-	14,400
Lapwing	3	0	0	0	0	0	3	850	72,300
Lesser Black-backed Gull	11	1	0	14	1	7	14	-	5,500
Light-bellied Brent Geese	1	0	0	100	0	0	100	350	400
Little Egret	2	1	0	10	1	2	10	20	1,100
Mallard	2	2	2	0	8	0	8	280	53,000
Moorhen	2	0	0	0	0	2	2	-	37,100
Mute Swan	8	0	0	2	0	0	8	90	100
Oystercatcher	7	9	9	98	12	15	98	610	8,200
Razorbill	1	0	1	0	0	0	1	-	-
Red-throated Diver	2	2	2	2	0	1	2	20	3,000
Redshank	1	1	1	14	0	0	14	240	2,400
Ringed Plover	24	1	0	22	0	0	24	120	540
Sandwich Tern	5	0	0	3	0	0	5	-	-

Species*	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National ^a	1% International ^a
Shag	2	0	0	0	0	0	2	-	2,000
Shelduck	5	0	0	4	2	0	5	100	2,500
Snipe	17	8	0	2	8	0	17	-	100,000
Teal	1	2	0	0	0	70	70	360	5000
Turnstone	27	23	7	2	12	0	27	95	1,400
Water Rail	2	0	0	9	0	0	9	0	0
Whimbrel	25	0	1	0	80	1	80	-	-
Wigeon	8	10	12	20	4	0	20	560	1400

Table 13. Peak numbers of wildfowl, waders, gulls and raptors recorded during the May 2021 to August 2023

Species	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National	1% International
Black Guillemot	1	0	5	0	0	0	5	-	-
Black-headed Gull	70	65	300	80	85	193	300	-	31,000
Chough				2			2		
Common Guillemot	0	1	1	1	0	0	1	-	-
Common Gull	6	5	2	9	15	0	15	-	16,400
Common Sandpiper	2	2	0	0	0	0	2	110	11,000
Cormorant	4	12	10	17	3	3	17	110	1,200
Curlew	30	6	10	25	40	6	40	350	7,600
Dunlin	1	0	0	0	0	0	1	450	13,300
Gannett	1	0	0	0	0	0	1	-	-
Great Black-backed Gull	1	2	1	3	0	2	3	-	3,600

Species	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National	1% International
Great Crested Grebe	2	0	0	7	3	0	7	30	6300
Great Northern Diver	3	3	1	2	2	2	3	20	50
Greenshank	0	0	0	11	0	1	11	20	3300
Grey Heron	1	2	1	1	1	1	2	25	5000
Grey Plover	0	0	1	0	0	0	1	30	2000
Herring Gull	10	15	12	9	10	5	15	-	14,400
Kestrel			1				1		
Lapwing	0	0	4	0	0	0	4	850	72,300
Lesser Black-backed Gull	0	2	2	10	4	4	10	-	5,500
Light-bellied Brent Geese	12	40	1	50	0	0	50	350	400
Little Egret	1	3	0	10	0	0	10	20	1,100
Mallard	2	2	0	17	8	12	17	280	53,000
Moorhen	1	0	0	0	0	2	2	-	37,100
Mute Swan	0	0	2	0	0	0	2	90	100
Oystercatcher	13	10	9	98		15	98	610	8,200
Pochard	6	8	0	4	7	7	8		
Razorbill	2	0	0	1	0	0	2	-	-
Red breasted merganser	0	0	0	0	1	0	1	25	860
Redshank	0	1	0	14	1	1	14	240	2,400
Red throated diver			1			1	1		
Ringed Plover	2	4	0	3	1	2	4	120	540
Sandwich tern	0	0	4	0	0	0	4	-	-
Shag	0	0	1	3	0	0	3	-	2,000
Shelduck	0	2	9	2	3	0	9	100	2,500
Snipe	3	0	0	2	8	0	8	-	100,000

Species	Point A	Point B	Point C	Point D	Point E	Point F	Peak number	1% National	1% International
Tufted Duck	10	0	0	0	14	13	14	270	8,900
Teal						70	70		
Turnstone	0	2	1	6	12	0	12	95	1,400
Whimbrel	2	0	1	9	80	0	80		
White tailed sea eagle		1					1		
Wigeon	11	7	10	7	4	0	10	560	14,000

Table 14. Conservation Status of Species Recorded during 2018-2023 site surveys

Species*	Conservation Status**
Black Guillemot	Amber List
Black-headed Gull	Amber List
Chough	Annex I; Amber list
Common Guillemot	Amber List
Common Gull	Amber List
Cormorant	Amber List
Curlew	Red List
Dunlin	Red List
Gannett	Amber list
Golden Plover	Annex I; Red List
Great Black-backed Gull	Green List
Great Crested Grebe	Amber List
Great Northern Diver	Annex I; Amber List
Greenshank	Green List
Grey Heron	Green List
Grey Plover	Red List
Herring Gull	Amber List
Lapwing	Red List
Lesser Black-backed Gull	Amber List
Light-bellied Brent Geese	Amber List
Little Egret	Annex I; Green List
Mallard	Amber List
Moorhen	Green List
Mute Swan	Amber List
Oystercatcher	Red List
Razorbill	Red List
Red breasted Merganser	Amber list
Red-throated Diver	Annex I; Amber List
Redshank	Red List
Ringed Plover	Amber List
Sandwich Tern	Annex I; Amber List
Shag	Amber List
Shelduck	Amber List
Snipe	Red List
Teal	Amber List
Turnstone	Amber List
Water Rail	Green List
Whimbrel	Green List
White tailed sea eagle	Red List

*SCI Species for the River Shannon and River Fergus Estuaries SPA in Bold font; **Gilbert *et al* (2021)

6. Results

6.1 Results Overview

The results of DixonBrosnan estuarine bird surveys are summarised in **Tables 9-13**. A total of 42 bird species were recorded during the 2021-2023 surveys. No species were recorded in nationally important numbers (Burke *et al.* 2018). Four Annex I species were recorded Great Northern Diver, Red-throated Diver, Sandwich Tern, and Little Egret. Eight other Red List species were recorded; Curlew, Dunlin, Grey Plover, Lapwing, Oystercatcher, Razorbill, Redshank and Snipe (**Table 14**). The Red List species Curlew and Snipe were recorded foraging on both intertidal and terrestrial habitats within the study area. Curlew were recorded in wet grassland habitats adjacent to Ralappane point to the west of the proposed development site. Snipe were recorded throughout the survey area including wet grassland and within the Proposed Development site.

During the 2021-2023 surveys 13 of the 21 SCI species for the River Shannon and River Fergus Estuaries SPA were recorded i.e. Cormorant, Wigeon, Teal, Ringed Plover, Grey Plover, Lapwing, Light-bellied Brent Goose, Dunlin, Curlew, Redshank, Greenshank, Shelduck and Black-headed Gull.

Between 2021 and 2023, peak numbers were recorded in November. This was during high tide, when a large flock of Black-headed Gull (300) were recorded foraging and loafing on the water around Point C (30/11/22). During the 2019/2020 survey, peak numbers were recorded in February (22/02/20). This was mainly influenced by a large flock of Dublin (260) and Light-bellied Brent Goose (100) recorded at Point D, loafing on the shoreline within a large mixed flock of waders. It is noted that Point D was not added to the study area until February 2019.

The largest diversity of species was recorded in October and February during both the 2018/2019 and 2019/2020 surveys. Sixteen species recorded during October 2019 and 2020 and 15 and 16 respectively in February 2019 and 2020. During the 2021-2023 survey, the largest species diversity was recorded in May 2022 i.e. 15 species. Peak bird numbers during all years of survey were during winter months. Small numbers of birds were recorded during all summer surveys. However, as with winter surveys the majority of records were at the west of the study area near Point A and Point D.

With the exception of gull, species, peak bird numbers and diversity of birds across all years of survey were recorded at the Robert's Rock (Point D). Here there is a larger area of intertidal foraging habitat, including an area of mudflat exposed at low tide and saltmarsh habitat, habitats which are largely absent from all other survey points.

Adjacent to the Proposed Development site and along the southern shoreline of the Shannon Estuary, intertidal habitats are largely absent (See **Figure 3**). There is some limited foraging for wading birds along the stony shoreline near the site. The deeper waters of the estuary provide foraging grounds for seabirds and divers including Black Guillemot, Common Guillemot, Great Crested Grebe, Red-breasted Merganser, Great-northern Diver and Razorbill. These birds generally occurred in small numbers at both high and low tides.

6.2 Survey Results by Section

Point A is located on the beach to the west of the Proposed Development site boundary. Several divers were recorded foraging in the deeper waters here including Cormorant (peak number 4), Great Crested Grebe (peak number 2) and Great Northern Diver (peak number 3) as well as occasional small numbers of Black Guillemot (peak number 1) and Gannett (peak number 1). The deeper waters bordering this site meant that diving birds were recorded during low and high tide counts. Wading birds were occasionally recorded here foraging along the shoreline or roosting on the upper shore i.e., Oystercatcher (peak number 13), Ringed Plover (peak number 2), Snipe (peak number 3), Curlew (peak number 30), Dunlin (peak number 1). Duck species were also recorded here i.e., Pochard (peak number 6), Wigeon (peak number 11) and Mallard (peak number 2), often roosting near the small stream on the southern boundary of the shoreline. The agricultural fields to the south and west of Point A, (also near Point D), appear to be used regularly by terrestrial foraging Curlew. Three species not recorded during winter surveys were recorded here during summer 2021 i.e., Sandwich Tern, Water Rail and Whimbrel. Small numbers of Sandwich Tern were recorded foraging off Point A (peak number 2) during the June 2021. Six Whimbrel and three Water Rail were recorded foraging along the shoreline in July 2021.

Point B is located at Knockfinglas Point to the west of the proposed development site. Low numbers of gulls, diving birds, and waders were recorded here during both low and high tide surveys. Peak bird numbers at this site were 65 Black-headed Gulls (13/01/22), 40 Light-bellied Brent Goose (19/03/22), 15 Herring Gull (17/12/21) and 12 Cormorant (17/12/21). All other species were recorded in low numbers. SCI wading birds/waterfowl i.e. Curlew (peak number 6), Redshank (Peak number 1), Shelduck (Peak number 2), Wigeon (Peak Number 7) and Ringed Plover (Peak number 4).

Point C is located at Ardmore Point to the east of the Proposed Development site boundary. This overlooks slightly deeper waters than the other survey points with limited intertidal habitats. Gull and divers were regularly recorded at this site, albeit in small numbers. A mixed flock of gulls including 300 Black-headed Gull was recorded in November 2022. Few waders were recorded here, likely due to the limited foraging habitat present; Oystercatcher (peak number 9), Curlew (peak number 10), Lapwing (peak number 4) and Turnstone (peak number 7). Small numbers of duck species i.e. Mallard (peak number 2) and Wigeon (peak number 12), were recorded here at low tide. Small numbers of Sandwich Tern were recorded foraging off Point C in July 2022.

Point D is located at Robert's Rock, approximately 1km southwest of the Proposed Development site boundary. The largest numbers were recorded at Point D, reflecting the diversity of habitats visible from this site, which overlooks the boundary between Ballylongford Creek and the Shannon Estuary. Here there is a larger area of intertidal foraging habitat, including an area of mudflat exposed at low tide and saltmarsh habitat. Wading birds, gulls, ducks and diving birds were recorded at this site. Little Egret was recorded on the saltmarsh habitat. There was a notable difference in bird numbers and diversity recorded here between low and high tide. Small numbers of Sandwich Tern (peak number 3) were recorded foraging near Point D during July 2021.

During the 2021-2023 surveys, wading bird species were recorded from Point D including Curlew (peak number 25), Greenshank (peak number 11), Oystercatcher (peak number 98),

Light-bellied Brent Goose (peak number 50), Redshank (peak number 14), Ringed Plover (peak number 3) and Turnstone (peak number 6) were recorded here. A number of gulls species, the largest numbers being Black-headed Gull (peak number 80), were also recorded here. Diving birds recorded included Cormorant, Great Northern Diver, Great Crested Grebe, and Red-throated Diver. While smaller numbers of birds were recorded here during high tide, bird diversity was still relatively high at Point D during high tide counts.

Point E is located at a shallow inlet of the estuary east of the Proposed Development site boundary, which provides some shelter for feeding birds along the shingle shore. The pasture fields to the immediate south provide soft marshy ground and rushes from which Snipe were recorded (peak number of 8), whilst surrounding fields provide feeding opportunities for Curlew at high tide. The distribution of feeding Curlew in the grass fields (as opposed to marsh/saltmarsh) may be more influenced by the intensity of farming, rather than them displaying a preference for specific locations. For example, 40 Curlew were recorded in a recently reseeded grass field, one field east of the survey point, with a maximum of 60 Curlew in agriculturally improved fields to the southwest. Eighty Whimbrel were recorded during spring passage in a field south of the survey point in May 2023. Offshore birds recorded were few in number and not regularly observed, Loafing birds include some ducks (peak numbers of 8 Mallard and 4 Wigeon) which may have been displaced from a pond near point F. The largest number of estuarine feeding waders observed at the point was 12 Turnstone, 1 Little egret, 1 Redshank and 80 Oystercatcher, and a peak number of 17 Black headed gulls.

Point F, the survey location furthest point east from the Proposed Development site boundary, overlooks shingle beach across the estuary from Moneypoint Power station. It is similar to Point C further west, providing little shelter or feeding habitat and birds moving up/down the estuary were not routinely observed. Frequently a count of zero birds was observed on the estuary. Peak numbers recorded included 15 Oystercatcher, 12 Turnstone, and 12 Little Egret.

The highest number of birds recorded was 193 Black head gulls, but these were on the North side of the estuary, loafing near the power station.

Ducks were frequently recorded from a pond inland here, with peak numbers of 70 Teal, 12 Mallard and 13 Tufted Duck. In October 2022, a flock of 200 goldfinches was recorded at the juxtaposition between farmland to the south and the shore.

7. Discussion

The habitats along the shoreline of the Shannon Estuary to the north of the Proposed Development site have the potential to support a range of waterbird species including those listed as SCIs for the River Shannon and River Fergus Estuaries SPA. The I-WeBS subsite, within which the Proposed Development site is located, is an important subsite for waterbirds, with peak numbers for several species, including Dunlin and Teal, exceeding the threshold of all-Ireland importance. It is noted that the I-WeBS subsite within which the Proposed Development site is located, covers a large area and includes a large area of intertidal mudflats along Ballylongford Creek and the margins of Carrig Island. MKO (2017) separated this area to the east and west of Knockinglas Point into separate subsites. While the subsite to the west of Knockinglas Point has one of the highest species richness and bird densities within the Shannon Estuary, the lands to the east of Knockinglas Point, which include the

Proposed Development site has one of the lowest species richness of any subsite within the estuary.

While the winter bird surveys carried out near the Proposed Development site recorded comparable species diversity to the I-WeBS, NPWS and MKO studies of this area, no nationally important numbers of birds were recorded during 2006/2007, 2011/2012, 2018/2019, 2019/2020, 2020/2021 or 2021/2022. Numbers and diversity of birds recorded during the summer were low at all study areas, but in particular in areas at (Point B and Point C) and to the east of the Proposed Development site (Point E and Point F). In general, due to the lack of suitable mudflat habitat, the numbers of wintering birds within the study area were relatively low.

The study area is dominated by shingle and gravel shores, shingle beach and a gravel-boulder mix shore with limited exposed mudflat at low tide. The stretch of the shore east of Point A to Point E has low value for wading birds and this is reflected in the low numbers and diversity of birds recorded here. Point D, approximately 1km west of the Proposed Development site, is closer to an area of intertidal mudflats north of Ballylongford Creek. Bird numbers and diversity were notably higher at Point D compared to all other survey locations. This would suggest that the habitats to the west of the Proposed Development site are likely to provide the valuable intertidal habitats which are lacking within the study area.

A number of benthic foraging divers were recorded feeding within deeper waters of the study area including Great Northern Diver, Red-throated Diver, Red-breasted Merganser and Great Crested Grebe as well as other piscivorous species such as Cormorant, Shag and Sandwich Tern. The foraging distribution of these birds is highly influenced by water depth and tidal conditions. Many of these species however exhibit a widespread coastal distribution during winter, utilising shallow nearshore waters to a greater degree at certain times (e.g. storms, driving onshore winds).

Although some waterbird species will be faithful to specific habitats within the SPA, many will at times also use habitats situated in proximate areas or in areas ecologically connected e.g. via coastal waters, to the SPA. These areas may be used as alternative high tide roosts, as a foraging resource or, be simply flown over, either on migration or as commuting corridors between feeding and roosting areas. (NPWS 2012b). Both Curlew and Little Egret were noted foraging on the margins of the study area, within terrestrial habitats to the south of the estuary. When tidal mudflats are covered at high water, intertidally-foraging waterbirds are excluded and many will move to nearby fields to feed. Terrestrial foraging is also important when environmental factors (e.g. low temperature) reduce the profitability of intertidal foraging (e.g. Zwarts & Wanink, 1996). The grassland to the west of Point A and near Point D appear to be used regularly by terrestrial foraging waders, in particular Curlew and Snipe. There is no evidence that the terrestrial habitats within the Proposed Development site boundary are regularly used as high tides roosts or terrestrial foraging sites, although Snipe was recorded within the proposed development site during winter and summer surveys.

Different habitats will vary in their sensitivity periods based around function e.g. mudflats are most important during the winter for wintering waterbirds. It must also be taken into account that numerous factors are at play when it comes to numbers and distribution of species within the study area e.g. prey abundance, habitat quality and disturbance factors. As wading bird

distribution is highly correlated with the densities of their prey (Yates *et al.* 1993) it is likely that their distribution is linked to the densities of prey items.

It is noted Cormorant is listed as a breeding and wintering SCI for the River Shannon and River Fergus Estuaries SPA. Breeding bird survey were carried out at the Proposed Development site in 2023 (Refer to Breeding Birds EIAR **Appendix 7B-2 of Volume 4**). No signs of breeding Cormorant were recorded at the Proposed Development site and no trees suitable for use as Cormorant roosts or nesting sites were recorded within the Proposed Development site boundary.

As detailed in **Table 3**, the majority of SCI birds for the Shannon and Fergus Estuaries SPA has suffered declines nationally during the most recent 5-year monitoring period. Some species such as Golden Plover (-17.5%), Grey Plover (-21.9%), Lapwing (-6.5%).

Burke, *et al.* (2018) found that the number of waterbirds wintering in Ireland has declined by 15% over the past five years and 40% since the mid-1990's. Wading bird species, including Dunlin, Golden Plover, Redshank and Knot have been the worst hit, suffering a combined loss of over 100,000 individuals (19%) during the 5 year monitoring period under study (Burke, *et al.* 2018). Oystercatcher, Dunlin, Redshank and Turnstone, four species recorded during the winter bird survey have seen a drop in numbers by more than 20%. However, a number of species detailed in **Table 3**, have stable/increasing populations i.e. Black-tailed Godwit, Cormorant, Greenshank, Light-beillied Brent Goose, Redshank, Shelduck, Teal, Whooper Swan, Great Crested Grebe, Little Egret, Mute Swan and Oystercatcher based on the most recent I-WeBS trends report.

8. Conclusions

A total of 42 bird species were recorded during the 2021 to 2023 estuarine bird surveys. No species were recorded in nationally important numbers (Burke *et al.* 2018). Four Annex I species were recorded Great Northern Diver, Red-throated Diver, Sandwich Tern and Little Egret. Eight other Red List species were recorded; Curlew, Dunlin, Grey Plover, Lapwing, Oystercatcher, Razorbill, Redshank and Snipe. Curlew and Snipe were recorded foraging along the intertidal and terrestrial habitats within the study area. Thirteen of the 21 SCI species for the River Shannon and River Fergus Estuaries SPA were also recorded i.e. Cormorant, Wigeon, Shelduck, Teal, Ringed Plover, Grey Plover, Lapwing, Dunlin, Curlew, Redshank, Greenshank, Light-belled Brent Goose and Black-headed Gull.

Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate certain areas as Special Protection Areas (SPAs) for the protection of endangered species of wild birds based on several criteria (**Section 2** above). The River Shannon and River Fergus Estuaries SPA is of high value for birds and mudflat habitat supports high numbers of wintering birds. Based on the desktop review of data and the results of the bird counts it is concluded that the habitats in proximity to the Proposed Development site i.e. between Knockfinglas Point and Ardmore Point, are of low importance for wintering bird populations.

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Appendices

Appendix 1. Latin names

Species	
Black Guillemot	<i>Cepphus grylle</i>
Black-headed Gull	<i>Chroicocephalus ridibundus</i>
Common Guillemot	<i>Uria aalge</i>
Common Gull	<i>Larus canus</i>
Cormorant	<i>Phalacrocorax carbo</i>
Curlew	<i>Numenius arquata</i>
Dunlin	<i>Calidris alpina</i>
Great Black-backed Gull	<i>Larus marinus</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Great Northern Diver	<i>Gavia immer</i>
Greenshank	<i>Tringa nebularia</i>
Grey Heron	<i>Ardus cineria</i>
Grey Plover	<i>Pluvialis squatarola</i>
Herring Gull	<i>Larus argentatus</i>
Lapwing	<i>Vanellus vanellus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Light-bellied Brent Geese	<i>Branta bernicla</i>
Little Egret	<i>Egretta garzetta</i>
Mallard	<i>Anas platyrhynchos</i>
Moorhen	<i>Gallinula chloropus</i>
Mute Swan	<i>Cygnus olor</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Razorbill	<i>Alca torda</i>
Red-throated Diver	<i>Gavia stellata</i>
Redshank	<i>Tringa tetanus</i>
Ringed Plover	<i>Charadrius hiaticula</i>
Shag	<i>Phalacrocorax aristotelis</i>

Species	
Shelduck	<i>Tadorna tadorna</i>
Snipe	<i>Gallinago gallinago</i>
Teal	<i>Anas crecca</i>
Turnstone	<i>Arenaria interpres</i>
Wigeon	<i>Mareca penelope</i>

Appendix 2. Cork Ecology 2006/2007 Survey

Baseline winter bird surveys
around Knockfinglas Point and Ardmore Point,
Ballylongford, Co. Kerry

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1 Introduction

A baseline winter bird assessment of a coastal site between Knockfinglas Point and Ardmore Point and adjacent land, near Ballylongford, Co. Kerry was carried out at the request of Dixon Brosnan Environmental Consultants, by Colin Barton of Cork Ecology, as part of an Environmental Impact Assessment.

The primary aim of the survey was to assess the bird species likely to occur in the area in winter.

Location

The proposed site is located on the south shore of the Shannon Estuary, between Knockfinglas Point and Ardmore Point. The site consists of mainly rough grazing, with high hedges made up of blackthorn, hawthorn and ash trees. There is a small brackish lagoon outside the site boundary close to the shore at the western end of the site.

Conservation designations

The proposed site borders the Lower Shannon candidate Special Area of Conservation (cSAC) (site code 002165) and Ballylongford proposed Natural Heritage Area (pNHA) (site code 001332). At the present time the intertidal area, which borders the site, is not included within the River Shannon and River Fergus Estuaries Special Protection Area (SPA- site code 004077). However information received from the National Parks and Wildlife Service indicates that this area may be included within the SPA in the future.

Methodology

Six monthly surveys were conducted between October 2006 and March 2007. On each visit, three counts were made of the coastal waters between Knockfinglas Point and Ardmore Point; a) at the western end of the site, b) from Knockfinglas Point and c) at the eastern end of the site, near Ardmore Point (Figure 1). At each point, a 180° scan using a 20x telescope and 8x binoculars was made of the inshore waters and all species of wildfowl, waders and gulls were recorded. All wildfowl, waders and gulls encountered on the beach between Points A and B, and in the bay between Points B and C were also recorded. In addition, the land within the site boundary was walked and all terrestrial species recorded. Bird identification followed Mullarney *et al* (1999).

Weather

The weather during the counts is summarised below (Table 1).

Table 1. Weather conditions during counts

Date	State of tide	Weather conditions
9/10/2006	High, falling	Sunny, calm, 3/8 cloud, good visibility, sea state 2
9/11/2006	High, falling	Sunny, calm, 1/8 cloud, excellent visibility, sea state 1
20/12/2006	Low, rising	Sunny, calm, excellent visibility, sea state 1
24/1/2007	High, falling	Sunny, light north wind force 1, good visibility, sea state 1
22/2/2007	High, falling	Sunny, South wind force 2-3, 6/8 cloud, good visibility, sea state 1
14/3/2007	Low, rising	Sunny spells, SW wind force 4, good visibility, dry, Sea state 3

Figure 1 – Count areas along the coast of the proposed development



2 Results

2.1 Wildfowl, waders and gulls

A total of 60 species of birds were recorded during the winter surveys, with 29 of these recorded during the 3 point counts over the coastal water (Table 1).

Table 2.1 Peak numbers of wildfowl, waders and gulls around the site

Species	9/10/2006	9/11/2006	20/12/2006	24/1/2007	22/2/2007	14/3/2007
Red-throated Diver	0	8	5	2	8	1
Great Northern Diver	0	0	2	2	3	2
Great Crested Grebe	6	9	13	1	9	1
Cormorant	2	0	1	0	0	0
Shag	0	0	1	0	0	0
Grey Heron	1	1	1	0	1	1
Mute Swan	0	0	0	2	0	2
Mallard	0	1	1	0	2	2
Wigeon	0	5	3	6	12	0
Teal	0	4	13	8	14	2
Scaup	0	0	0	30	0	0
Red-breasted Merganser	0	0	1	0	0	0
Moorhen	0	1	0	0	1	1
Oystercatcher	1	17	4	11	1	8
Ringed Plover	5	0	0	20	9	0
Lapwing	0	0	2	60	2	0
Turnstone	4	30	3	5	10	0
Dunlin	1	0	0	250	70	0
Redshank	0	0	4	1	1	0
Curlew	6	22	3	78	51	1
Snipe	4	0	3	3	17	0
Black-headed Gull	26	6	2	22	0	0
Common Gull	0	1	5	5	0	0
Herring Gull	1	0	1	0	0	0
Lesser black-backed Gull	2	0	0	0	0	0
Great black-backed Gull	0	0	0	1	0	0
Black Guillemot	0	3	1	0	1	0
Guillemot	0	0	0	0	1	0

Razorbill	0	3	1	0	0	0
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Highest species diversity of wildfowl, waders and gulls was recorded during the December visit, when 21 species were recorded, compared to 18 species in January and February, 14 in November, 12 in October and 10 in March. No species were recorded in nationally important numbers (Crowe 2005).

Monthly summaries

Tables 2.2 to 2.7 show monthly counts of wildfowl, waders and gulls along the coastal boundary of the site (Figure 1).

In October, the majority of birds were recorded off Point A (66.7%), at the western end of the site, with small numbers of waders recorded on the beach between Point A and B (15.0%) (Table 2.2).

Few birds were seen offshore in October, with six Great Crested Grebes and one Cormorant recorded up to 800 m from shore from Point A, with another Cormorant seen flying west from Point B.

Table 2.2 October area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Great Crested Grebe	6				
Cormorant	1		1		
Grey Heron	1				
Oystercatcher		1			
Ringed Plover	1	4	5		
Turnstone	1	3			
Dunlin	1				
Curlew	1	1	1	2	1
Black-headed Gull	26				
Herring Gull					1
Lesser black-backed Gull	2				
Total number of birds	40	9	7	2	2
Percentage of birds in each area	66.7 %	15.0 %	11.7 %	3.3 %	3.3 %

In November, more than half of all birds recorded were around Point A (36.2 %) and on the beach and lagoon between Point A and B (28.4 %) (Table 2.3).

Numbers of Red-throated Divers increased in November, with five recorded within 1 km of the shore from Point A, and three within 800 m of shore from Point B. Numbers of Great Crested Grebes within 1 km of the shore from Point A also increased. Low numbers of ducks were recorded, mostly from Point A.

A flock of 30 Turnstones was recorded on the Beach between Points A and B, and a small flock of Curlews and Oystercatchers were on the shore between Points B & C.

Table 2.3 November area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	5		3		
Great Crested Grebe	9				
Grey Heron	1				
Mallard	2				
Wigeon	5				
Teal	2	2		4	
Moorhen		1			
Oystercatcher	7			6	4
Turnstone		30			
Curlew	2			20	
Black-headed Gull	3			2	1
Common Gull	1				
Black Guillemot	3				
Razorbill	2		1		
Total number of birds	42	33	4	32	5
Percentage of birds in each area	36.2 %	28.4 %	3.4 %	27.6 %	4.3 %

Greatest species diversity was recorded on the December survey. Again the majority of birds were recorded from Point A (73.9 %), with fewer birds recorded on the beach between Points A and B, and from Point B (Table 2.4).

Red-throated Divers, Great Northern Divers and Great Crested Grebes were only recorded from Point A, with all birds seen up to 1 km from shore. The December total of 13 Great Crested Grebes was the peak count over the 6 surveys. Small numbers of ducks and waders were also recorded from Point A, with fewer birds seen elsewhere.

Table 2.4 December area counts - Rising tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	5				
Great Northern Diver	2				
Great Crested Grebe	13				
Cormorant	1				
Shag	1				
Grey Heron	1				
Mallard		1			
Wigeon	3				
Teal	13				
Red-breasted Merganser	1				
Oystercatcher	4				
Lapwing	2				
Turnstone		2	1		
Redshank		4			
Curlew	1			2	
Snipe		2			
Black-headed Gull			2		
Common Gull	1		4		
Herring Gull	1				
Black Guillemot	1				
Razorbill	1				
Total number of birds	51	9	7	2	0
Percentage of birds in each area	73.9 %	13.0 %	10.1 %	2.9 %	0 %

Total numbers of wildfowl, waders and gulls were highest in January. The majority of birds were recorded in a high tide roost of primarily Dunlin, Lapwing and Ringed Plover on the beach between Points A and B (78.9 %) (Table 2.5).

Low numbers of Red-throated Divers, Great Northern Divers and Great Crested Grebes and a flock of 30 Scaup was recorded within 500 m of the shore from Point A. A survey in February 2005 also recorded 25 Scaup from Point A. Numbers of birds recorded between Point B and Point C were very low.

Table 2.5 January area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	2				
Great Northern Diver	2				
Great Crested Grebe	1				
Mute Swan		2			
Mallard					
Wigeon	2		5		6
Teal	2		8		
Scaup	30				
Oystercatcher		5	3		3
Ringed Plover		20			
Lapwing		60			
Turnstone		4	1		
Dunlin		250			
Redshank		1			
Snipe		3			
Black-headed Gull	20		2		
Common Gull	2		1		2
Total number of birds	61	345	20	0	11
Percentage of birds in each area	14.0 %	78.9 %	4.6 %	0 %	2.5 %

In addition, a flock of 78 Curlew were feeding on several grassy fields within the proposed site in January.

In February, the majority of wildfowl, waders and gulls were again recorded from Point A (76.5 %), with 8 Red-throated Divers, 3 Great Northern Divers and 9 Great Crested Grebes all seen offshore (Table 2.6). Up to 14 Teal and 12 Wigeon were recorded moving between Point A and Point B, and a flock of 70 Dunlin was seen flying past Point A. Numbers of birds recorded between Point B and Point C were very low.

Table 2.6 February area counts - Falling tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver	8				
Great Northern Diver	3				
Great Crested Grebe	9				
Grey Heron		1			
Mallard			2		
Wigeon	10		2		
Teal	10		14		
Moorhen		1			
Oystercatcher	1				
Lapwing	2				
Turnstone		1	9		
Dunlin	70				
Redshank		1			
Snipe		3			
Black Guillemot	1				
Guillemot					1
Total number of birds	114	7	27	0	1
Percentage of birds in each area	76.5 %	4.7 %	18.1 %	0 %	0.7 %

Lowest numbers of wildfowl, waders and gulls were recorded in March, with no concentrations of birds noted (Table 2.7). Half of all birds recorded were found at Point A (29.2 %) and on the beach and lagoon between Point A and B (20.8 %), with the remainder seen at Points B and C.

Table 2.7 March area counts - Rising tide

Species	Point A	Beach & Lagoon	Point B	Bay between B & C	Point C
Red-throated Diver			1		
Great Northern Diver	1				1
Great Crested Grebe	1				
Grey Heron		1			
Mute Swan		1			
Mallard	2	2			2
Teal			2		
Moorhen		1			
Oystercatcher	2		3		3
Curlew	1				
Total number of birds	7	5	6	0	6
Percentage of birds in each area	29.2 %	20.8 %	25.0 %	0 %	25.0 %

Main areas for wildfowl, waders and gulls (see Figure 1)

Point A –Western end of site

The majority of sightings of Red-throated Diver, Great Northern Diver and Great Crested Grebe occurred from Point A, and this area usually held low numbers of ducks and waders on the beach.

Beach and Lagoon between Point A and B

This area usually held low numbers of species such as Turnstone, Oystercatcher and Ringed Plover and was occasionally used as a high tide roost e.g. in January. Grey Heron, Mute Swan, Moorhen and Snipe were regularly recorded on the small lagoon in low numbers and it is likely that Mute Swan and Moorhen breed here.

Point B - Knockfinglas Point

Divers were occasionally recorded from Point B, with low numbers of ducks and waders also seen.

Bay between Point B and Point C

Low numbers of ducks and waders were occasionally recorded along the shore of the bay between Point B and Point C.

Point C – Ardmore Point

Low numbers of ducks and waders were occasionally recorded off Point C, with one Great Northern Diver recorded in March.

2.2 Terrestrial species

The remaining 31 species were found within the site boundary, mostly along the hedgerows bordering fields (Table 2.8). Common species were those recorded on at least four visits, regular species were those recorded on two or three visits, and occasional species were only recorded on one visit.

Table 2.8 Terrestrial bird species recorded within the site

Species	Status	Species	Status
Sparrowhawk	Occasional	Blue Tit	Regular
Pheasant	Regular	Great Tit	Regular
Skylark	Regular	Magpie	Regular
Meadow Pipit	Common	Jackdaw	Occasional
Rock Pipit	Regular	Rook	Regular
Pied Wagtail	Common	Hooded Crow	Common
Wren	Common	Raven	Occasional
Duncock	Common	Starling	Occasional
Robin	Common	Chaffinch	Common
Stonechat	Common	Greenfinch	Regular
Blackbird	Common	Goldfinch	Regular
Song Thrush	Common	Linnet	Occasional
Redwing	Regular	Redpoll	Occasional
Golderest	Regular	Bullfinch	Occasional
Long-tailed Tit	Occasional	Reed Bunting	Common
Coal Tit	Regular		

Other species that were not recorded during winter but which could be expected to occur were Kestrel, Wood Pigeon and Fieldfare.

2.3 Breeding Birds

As the main focus of this study was on distribution of wildfowl, waders and gulls in the coastal areas of the site in winter, a specific breeding bird survey was not conducted. However, site visits during the summer months recorded a pair of Mute Swans breeding on the lagoon with Moorhen also present. A small colony of Sand Martins was recorded near the location of the proposed materials jetty. Evidence of Swallows nesting in disused farm buildings on site was also found.

The majority of terrestrial species recorded during the winter survey are likely to breed in and around the site, with the exception of Redwing, which is a winter visitor to Ireland. Other species likely to breed within the site include Sedge Warbler, Whitethroat, Blackcap, Chiffchaff and Willow Warbler.

Historical breeding data of species of conservation concern

Corncrake, Curlew, Barn Owl and Yellowhammer were recorded as breeding species in the 10 km grid square (R04) containing the proposed development in the 1976 Breeding Birds Atlas (Sharrock 1976). The New Atlas of Breeding Birds recorded Grey Partridge and Curlew breeding in the 10 km grid square (Gibbons *et al* 1993). Since the New Atlas, numbers of Grey Partridge have further declined, and the only population of wild Grey Partridge remaining in Ireland is found in County Offaly (Buckley 2005).

The proposed site does not contain suitable habitat for breeding Curlew.

A national survey of breeding hen harriers in Ireland in 2005, recorded no evidence of breeding Hen Harriers in the 10 km grid square containing the proposed development (Barton *et al* 2007).

3 Status of birds of conservation concern

BirdWatch Ireland (BWI) have compiled a list identifying bird species of high, medium and low conservation priority in Ireland, based on several criteria (Newton *et al* 1999). There are 18 species currently included on the Red List, which signifies species of high conservation concern. Rare and vulnerable bird species are also listed on Annex I of the E.U. Birds Directive (79/409/EEC).

One red-listed species, Curlew, was recorded within the proposed site. A flock of up to 78 Curlew were recorded feeding on several grassy fields within the proposed site throughout the winter. The nationally important threshold for this species has been set at 660 birds (Crowe 2005). Curlews are red-listed as there has been a greater than 50 % decline in the Irish breeding population in the last 25 years (Newton *et al* 1999).

Two species, Red-throated Diver and Great Northern Diver, recorded during the winter surveys are listed on Annex I of the EU Birds Directive (79/409/EEC). Both species were regularly recorded in

low numbers from Point A. The numbers recorded did not exceed the nationally important threshold of 20 birds set for both these species (Crowe 2005).

A total of 15 species of wildfowl, waders and gulls recorded during the winter surveys are on the BWI Amber list (Table 3.1). Amber-listed species are those which have undergone less severe declines, or are rare breeding species, or have a localised distribution or an unfavourable European conservation status (Newton *et al* 1999).

Table 3.1 Amber-listed species recorded during winter surveys (after Newton *et al* 1999)

Species	Moderate decline in Irish Breeding Population or range	Rare breeding species	> 50 % of breeding/wintering population found in fewer than 10 sites	Unfavourable conservation status in Europe
Red-throated Diver		X		X
Great Crested Grebe			X (breeding & wintering)	
Cormorant			X (breeding)	
Wigeon		X		
Teal	X (range)			
Scaup		X	X (wintering)	X
Red-breasted Merganser			X (wintering)	
Dunlin			X (wintering)	X
Snipe	X (population)			
Redshank	X (population)		X (wintering)	X
Black-headed Gull			X (breeding)	
Common Gull				X
Guillemot			X (breeding)	
Razorbill			X (breeding)	
Black Guillemot				X

In addition, five amber-listed terrestrial species (Skylark, Stonechat, Swallow, Sand martin and Redpoll) were also recorded during the surveys. Skylark is Amber-listed as there has been a moderate decline in the breeding population in Ireland over the previous 25 years. Stonechat is on the Amber list as its conservation status in Europe is deemed to be unfavourable. Redpoll is Amber-listed as there has been a moderate decline in the breeding range in Ireland over the previous 25 years (Newton *et al* 1999).

Both Swallow and Sand Martin were recorded breeding within the site in the summer months. Both species are on the Amber list as they have an unfavourable conservation status in Europe (Newton *et al* 1999).

4 Potential Impacts of the proposed development

4.1 Habitat loss

It is likely that the majority of impacts, including habitat loss, fragmentation and modification, will be direct impacts occurring during the construction phase. It is likely that the majority of hedgerows, scrub areas and disused farm buildings within the construction area of the site will be lost during the course of construction. This will result in loss of connectivity with the wider environment, as well as loss of habitat for animals and birds. In addition, it is likely that the cliffs supporting a small sand martin colony will have to be removed. Mitigations to reduce these impacts are given in Section 5.

4.2 Disturbance

Disturbance during the construction phase may potentially impact on some bird species in the site. In particular, there may be impacts arising from proposed onshore blasting operations. Blasting will be largely confined to the eastern side of the site there will probably be some temporary disturbance of birds in areas close to the eastern section of the site.

It should be noted that evidence of birds habituating to loud and sudden noises has been well documented. After an initial period of disturbance, it could be expected that wildlife in the area would become habituated to blasting noise from the site. Most birds soon learn that these sounds present no danger to them and remain on site despite their continued usage. Mitigation measures to minimise disturbance are outlined in section 5.

4.3 Impacts on birds of conservation concern

From a species conservation viewpoint, the most significant impact arising from the proposed development would be the loss of individuals of a rare species. Two Annex I listed species, Red-throated Diver and Great Northern Diver, were recorded in the inshore waters bordering the proposed site, and one BWI Red-listed species, Curlew, was recorded feeding in fields within the proposed site regularly throughout the winter months.

Depending on the timing of the construction phase, the construction of the two jetties is likely to cause disturbance to species such as Red-throated Diver and Great Northern Diver in the immediate vicinity. However, the majority of sightings of these species were from Point A (Figure 1), to the west of Knockinglas Point, where no development is proposed. Any disturbance from the construction phase is likely to be short term.

The proposed site would no longer be suitable habitat for wintering Curlew following construction of the development. However numbers of Curlew recorded on the site (maximum count of 78 birds in January) were not significant as they were well below the nationally important threshold of 660 birds (Crowe 2005). Alternative suitable fields for wintering Curlew are present in the surrounding landscape. Mitigation measures to minimise disturbance are outlined in section 5.

4.4 Impacts on the cSAC and pNHA

The proposed site borders the Lower Shannon candidate Special Area of Conservation (cSAC) (site code 002165) and Ballylongford proposed Natural Heritage Area (pNHA) (site code 001332). It is also possible that the intertidal area adjoining the site may be included in the River Shannon and River Fergus Estuaries Special Protection Area (SPA- site code 004077) in the future.

Overall, the Shannon and Fergus Estuaries site is the most important coastal wetland in Ireland and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration of international importance. In addition, it also supports internationally important numbers of three species, Dunlin, Black-tailed Godwit and Redshank, with a further 16 species occurring in numbers of national importance (NPWS 2005).

Although the Shannon estuary supports internationally important concentrations of wildfowl and waders, no significant concentrations of divers, grebes or ducks were recorded in the inshore waters bordering the proposed site. The majority of divers and grebes were found offshore from Point A, where no development is planned.

Similarly, no significant high tide roost was found within the site, and the area did not support large numbers of feeding wildfowl or waders. A high tide roost of primarily Dunlin, Lapwing and Ringed Plover was noted on the beach east of Point A in January, but no species was recorded in nationally important numbers. No development is planned for this area of beach and although there may be some disturbance to the area during construction, any disturbance is likely to be temporary. It is noted that the sections of the Shannon estuary, which adjoin the site, do not support high numbers of breeding waders or waterfowl and therefore any blasting operations are likely to result in temporary displacement of feeding birds.

Blasting will be largely confined to the eastern side of the site and thus will be a considerable distance from the terrestrial sections of the cSAC and pNHA of high ecological value which border the western part of the site. However there may be some limited disturbance of birds in the scrub habitat, included within the cSAC, which adjoins the eastern site boundary. This scrub habitat is not of particularly high value for birds.

5 Mitigation or Remedial Measures

5.1 Construction mitigation

General measures

The zone of works will be fenced off from the outset to prevent ingress into areas that require protection. No work will take place outside the lands made available for construction, and all materials and liquids associated with the work will be stored in a manner that will not result in pollution or habitat deterioration.

Particular care will be taken at the boundary between the development site and the cSAC and pNHA so that construction activities do not cause damage to habitats in this area. Consultation will be undertaken with National Parks & Wildlife Service with regard to the nature of proposed works along this boundary.

Where possible, boundary hedges will be retained and enhanced. Any trees or hedgerows scheduled for retention will be protected from damaging construction activities by the erection of appropriate fencing. NRA guidelines on the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b). Where practicable, the boundary landscape planting should be predominantly of Irish native species that reflect the existing vegetation of the area. These should be derived from local native-origin stock (NB; the terms 'native' and 'native origin' have specific technical meanings as defined by Flora Locale, 2003). Suitable native species would include Hawthorn and Blackthorn, with occasional Ash standards planted at intervals. Spinose shrub and tree species, such as Hawthorn, Blackthorn and Gorse, develop into good stock-proof barriers

According to the Wildlife (Amendment) Act 2000, it is an offence to destroy any vegetation growing in any hedge or ditch between March and August inclusive, due to adverse impacts on nesting birds, although this is waived in the "*development or preparation of sites on which any building or other structure is intended to be provided*". However, the removal of hedgerows and scrub during construction will be carried out as much as possible between September and February. Again, although this is not a road construction project, the NRA guidelines for the protection of trees and hedgerows should be followed (NRA, 2006b).

Specific measures

The cSAC and pNHA bordering the development area are, by definition, nationally important for their habitats and the species they support. ***It is essential*** that all construction staff, including all sub-contracted workers, be notified of the boundaries of the cSAC and pNHA and be made aware that no construction waste of any kind (rubble, soil, etc.) is to be deposited in these protected areas and that care must be taken with liquids or other materials to avoid spillage.

A Construction Environmental Management Plan will be prepared and implemented for the duration of the construction phase of the project. This will have particular emphasis on the protection of the cSAC and pNHA which adjoin the site.

As there is a stream running from the proposed site into the cSAC and pNHA to the sea, it is critically important that construction activities do not result in pollution of this watercourse, either through siltation, which interferes with water flow, vegetation growth and aquatic fauna, or pollution (e.g. chemical).

Landscape planting is recommended adjacent to fencing, particularly along the boundary with the cSAC and pNHA. Any such planting should be carried out as soon as practicable after fence construction, both for screening purposes and ecological reasons. The final landscape plans will be prepared in consultation with a qualified ecologist.

Consideration should be given to habitat creation (e.g. reedbed) around the proposed new pond. This would create breeding habitat for species such as Mute Swan, Moorhen and Sedge Warbler, and foraging habitat for species such as Swallow.

The demolition of the disused farm buildings will not take place in the breeding season as they are used by nesting Swallows. All demolition operations will be carried out between October and March, when birds have finished breeding. Similarly, the removal of the section of cliff that supports a small colony of breeding Sand Martins will be carried out between October and February to avoid disturbance to nesting birds. It is expected that the colony will relocate to an adjacent area of cliffs when breeding birds return.

Although blasting operations are unlikely to have significant impacts on birds a detailed method statement will be drawn up by an ecologist and agreed with the National Parks and Wildlife Service prior to commencement of works. The method statement will specify the timing of blasting operations and the need, if any, for ecological supervision.

Operation mitigation

The landscaping plan will provide for the inclusion of native tree, shrub and grassland species within the development. Landscape planting of the proposed development should indirectly mitigate for the loss of scrub and hedgerow habitats and be designed to interlink with other areas of semi-natural vegetation, including the remaining hedgerows and adjacent grassland.

Pollution safeguards will be put in place, particularly between the development and the cSAC and pNHA, to reduce the risk of potential pollutants from reaching sensitive habitats.

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DixonBrosnan

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Project			
Winter bird survey at Ballylongford November 2011 to February 2012			
Client ARUP			
Project ref	Report no	Client ref	
1256	1256		
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Date	Rev	Status	Prepared by
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1 Introduction

Shannon LNG intend to construct a CHP Plant on a site at Ballylongford, Co. Kerry. DixonBrosnan environmental consultants were commissioned to carry out winter bird surveys during the wintering season of 2011 / 2012. Previously winter bird surveys were carried out at this site by Cork Ecology in 2006/2007 during the preparation of an EIS for a LNG storage terminal. The same methodologies as those employed by Cork Ecology were utilised for bird surveys in 2011/2012

2 Winter bird survey

Bird surveys were carried out on four occasions, 26th November 2011, 5th January 2012, 28th January 2012 and 22nd February 2012 from five locations along the Shannon LNG site at Ballylongford. Surveys were carried out using an 8X40 Luger field binoculars and a 20X60 Sahara spotting scope. The first two surveys were carried out from mid tide to high tide and the last two surveys was carried out from mid tide to low tide. Survey results are detailed in **Table 1, 2, 3 and 4**. The five survey points utilised during the surveys and are shown in **Figure 1**.

The estuarine habitat at this location is not within the boundary of the River Shannon and River Fergus Estuaries SPA 004077; however it is proposed that the SPA will be extended into this area in the future. A list of the bird species listed as features of interest for this SPA is included in **Appendix 1**. The relevance of recorded populations in relation to nationally important populations is detailed in **Appendix 2**.



Figure 1. Winter bird survey observation points.

3. Results

Table 1. Ballylongford bird survey 26-11-2011. Mid tide rising to high tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	10.30	8/8	25kmph W	1-2
Species	Count	Flew over		
Lapwing		35		
Hooded crow	8			
Curlew	6			
Oystercatcher		20		
Mallard		5		
Lesser blackbacked gull	4	2		
Whooper swan		2		
Snipe		1		
Heron	1			
Common Gull	4	8		
Red shank		45		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.45	7/8	30kmph W	1
Species	Count	Flew over		
Mute swan		2		
Teal	1			
Oystercatcher	8			
Hooded crow	2			
Starling		8		
Turnstone	9			
Glaucous gull	3			
Cormorant	2			

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.50	5/8	30kmph W	1
Species	Count	Flew over		
Hooded crow	3			
Common gull	3			
Turnstone	3			
Curlew	2			
Oystercatcher		4		
Great northern diver	1			
Blackheaded gull	3			

Location	Start time	Cloud cover	Wind	Sea state
Bay	14.00	5/8	20kmph W	1
Species	Count	Flew over		
Oystercatcher	6			
Great northern diver	2			
Common gull	3			
Curlew	1			
Lesser blackbacked gull	1	2		
Blackbird	1			
Pheasant	1			

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.10	8/8	25kmph W	1-2
Species	Count	Flew over		
Oystercatcher	4	2		
Lesser blackbacked gull	1	3		
Rook		1		

Table 2. Ballylongford bird survey 5-1-2012. Mid tide rising to high tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	9.45	7/8	25kmph NW	2
Species	Count	Flew over		
Hooded crow	5	1		
Glaucous gull	2			
Greater blackbacked gull	2	5		
Blackheaded gull		15		
Oystercatcher	11			
Lesser blackbacked gull	1	2		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.15	3/8	30kmph NW	2
Species	Count	Flew over		
Whooper swan	2			
Turnstone	4			
Greater blackbacked gull	1	2		
Oystercatcher	16	8		

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.30	3/8	30kmph NW	2
Species	Count	Flew over		
Curlew	2	24		
Lesser blackbacked gull	2	4		
Glaucous gull		4		

Common gull	1	1	
Hooded crow	2	5	
Blackheaded gull		3	

Location	Start time	Cloud cover	Wind	Sea state
Bay	14.00	3/8	30kmph NW	1-2
Species	Count	Flew over		
Oystercatcher	2			
Hooded crow	4			
Lesser blackbacked gull	2	3		
Glaucous gull	1	3		

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.30	5/8	25kmph NW	1-2
Species	Count	Flew over		
Blackheaded gull		6		
Lesser blackbacked gull	1	8		
Glaucous gull		3		
Cormorant		4		

Table 3. Ballylongford bird survey 28-1-2012. Mid tide falling to low tide

Location	Start time	Cloud cover	Wind	Sea state
Point A	9.45	8/8	2-5kmph W	1
Species	Count	Flew over		
Cormorant	1			
Great northern diver	4			
Oystercatcher	2	45		
Redshank		31		
Common gull	2	5		
Hooded crow	9	8		

Location	Start time	Cloud cover	Wind	Sea state
Beach	11.00	6/8	2-5kmph W	1
Species	Count	Flew over		
Curlew		25		
Ringed plover	5	5		
Great northern diver	3			
Oystercatcher	3	16		
Hooded crow	7	2		
Cormorant		1		
Common gull		4		
Common scoter		2		

Location	Start time	Cloud cover	Wind	Sea state
Point B	12.10	7/8	2-5kmph W	1
Species	Count	Flew over		
Great northern diver	1			
Teal	2	4		
Common gull	1	7		
Oyster catcher		9		
Thrush	1			

Location	Start time	Cloud cover	Wind	Sea state
Bay	13.30	8/8	2-5kmph W	1
Species	Count	Flew over		
Turnstone	35			
Oystercatcher	15	4		
Common gull	1	4		
Hooded crow	4	7		

Location	Start time	Cloud cover	Wind	Sea state
Point C	15.00	6/8	2-5kmph W	1
Species	Count	Flew over		
Oystercatcher	6	8		
Teal	4	2		
Cormorant		4		
Common gull		7		

Table 4. Ballylongford bird survey 22-2-2012. Mid tide falling to low tide, to mid tide rising.

Location	Start time	Cloud cover	Wind	Sea state
Point A	09.30	4/8	4-7kmph SW	1
Species	Count	Flew over		
Hooded crow	18	27		
Lesser blackbacked gull		14		
Mute swan		2 (going to pond)		
Skylark*	3			
Turnstone	5			
Blackheaded gull		2		

Location	Start time	Cloud cover	Wind	Sea state
Beach	10.40	4/8	7-12kmph SW	1
Species	Count	Flew over		
Mute swan	2 (on pond)			
Hooded crow	5	8		
Cormorant		3		
Turnstone		7		
Redshank		2		
Common gull		9		
Moorhen	1			

Location	Start time	Cloud cover	Wind	Sea state
Point B	11.45	6/8	20-25kmph SW	1
Species	Count	Flew over		
Raven		1 (from Clare)		
Common gull		6		
Mallard		2		
Cormorant	1	2		
Great crested grebe	1 (moving towards bay)			

Location	Start time	Cloud cover	Wind	Sea state
Bay	12.45	6/8	15 kmph SW	1
Species	Count	Flew over		
Curlew	12			
Teal	4			
Mallard	19			
Great crested grebe	2 (one came from Point B)			
Great northern diver	1			
Cormorant	1			
Hooded crow	2	3		
Common gull		6		

Location	Start time	Cloud cover	Wind	Sea state
Point C	14.00	6/8	17-25 kmph SW	1
Species	Count	Flew over	flocking	
Raven	2			
Great northern diver	1			
Redshank		40		
Turnstone		40		
Mallard		3		
Rock pipet	2			

4. Conservations status of recorded birds.

DixonBrosnan recorded 30 bird species within the estuary, and surrounding environs from the five vantage point locations during the winter of 2011/2012. The species recorded in relation to their conservation status are displayed in **Table 5**. Species that were observed by Cork Ecology in surveys conducted during the winter of 2006/2007 are shown in **Table 6**.

Table 5. Conservation status of species recorded by DixonBrosnan 2011/2012.

Species recorded on site	SPA 004077 Features of Interest	Annex I	BoCCI*
Blackbird			Green
Blackheaded gull	✓		Red
Common Gull			Amber
Common scoter			Red
Cormorant	✓		Amber
Curlew	✓		Red
Glaucous gull			Green
Great crested grebe			Amber
Great northern diver		✓	Green
Greater blackbacked gull			Amber
Heron			Green
Hooded crow			Green
Lapwing	✓		Red
Lesser blackbacked gull			Amber
Mallard			Green
Moorhen			Green
Mute swan			Amber
Oystercatcher			Amber
Pheasant			Green
Raven			Green
Red shank	✓		Red
Ringed plover	✓		Amber
Rock pipet			Green

Rook			Green
Skylark			Amber
Snipe			Amber
Starling			Amber
Teal	✓		Amber
Thrush			Green
Turnstone			Green
Whooper swan	✓	✓	Amber

* categorised by BirdWatch Ireland as Birds of Conservation Concern in Ireland (Lynas *et al.*, 2007). Red List bird species are of high conservation concern and the Amber List species are of medium conservation.

Table 6. Conservation status of species recorded by Cork Ecology 2006/2007.

Species recorded on site	SPA 004077 Features of Interest	Annex I	BoCCI
Black guillemot			Amber
Dunlin		✓	Amber
Guillemot			Amber
Herring gull			Red
Razorbill			Amber
Red-breasted merganser			Green
Red-throated diver		✓	Amber
Scaup	✓		Amber
Shag			Amber
Wigeon	✓		Amber

5 Discussion

The Annex 1 bird species great northern diver and whooper swan were recorded from the site. Though not recorded in the winter of 2011/2012, two other Annex 1 species (dunlin and red-throated diver) were recorded in 2006/2007. Great northern diver was recorded in the area around Knockfinglas Point and whooper swan was recorded from the lagoon.

Several Amber and Red listed species were recorded, most notably, cormorant (Amber), black headed gull (Red), lesser black backed gull (Amber), lapwing (Red), curlew (Red),

common scoter (Red), oystercatcher (Amber), great crested grebe (Amber), and Redshank (Red).

Ten of the twenty-one species listed as features of interest for the River Shannon and River Fergus estuaries SPA 004077 were recorded during surveys although numbers were generally low. No nationally significant populations (See **Appendix 2**) were recorded during surveys in 2006/2007 and 2011/2012.

6. Conclusion

Several species listed as features of interest for the River Shannon and River Fergus estuaries SPA 004077, Bird Directive Annex I species and Red and Amber listed species were recorded during winter surveys. However populations were low and no nationally important numbers were recorded or are likely to occur given lack of high quality feeding habitat in proximity to the site. No significant impacts on important bird populations is envisaged.

Appendix 1.

Features of Interest	Scientific name	NPWS species code
Cormorant	<i>Phalacrocorax carbo</i>	A017
Whooper Swan	<i>Cygnus cygnus</i>	A038
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	A046
Shelduck	<i>Tadorna tadorna</i>	A048
Wigeon	<i>Anas penelope</i>	A050
Teal	<i>Anas crecca</i>	A052
Pintail	<i>Anas acuta</i>	A054
Shoveler	<i>Anas clypeata</i>	A056
Scaup	<i>Aythya marila</i>	A062
Ringed Plover	<i>Charadrius hiaticula</i>	A137
Golden Plover	<i>Pluvialis apricaria</i>	A140
Grey Plover	<i>Pluvialis squatarola</i>	A141
Lapwing	<i>Vanellus vanellus</i>	A142
Knot	<i>Calidris canutus</i>	A143
Dunlin	<i>Calidris alpina</i>	A149
Black-tailed Godwit	<i>Limosa limosa</i>	A156
Bar-tailed Godwit	<i>Limosa lapponica</i>	A157
Curlew	<i>Numenius arquata</i>	A160
Redshank	<i>Tringa totanus</i>	A162
Greenshank	<i>Tringa nebularia</i>	A164
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	A179
Wetlands & Waterbirds []		A999

Appendix 2. Nationally significant population study

Species Observed	Nationally significant populations 1%	Peak recording per day
Great northern diver	N/A	9
Great crested grebe	55	3
Cormorant	140	5
Heron	30	1
Mute swan	110	2
Whooper swan	130	2
Mallard	380	24
Teal	450	28
Common scoter	230	2
Moorhen	N/A	1
Oystercatcher	680	145
Ringed plover	150	10
Lapwing	2100	35
Turnstone	120	52
Curlew	550	26
Snipe	N/A	1
Redshank	310	45
Blackheaded gull	N/A	24
Common gull	N/A	33
Lesser blackbacked gull	N/A	23
Greater blackbacked gull	N/A	10
Glaucous gull	N/A	11
Skylark	N/A	3
Rock pipet	N/A	1
Thrush	N/A	1
Hooded crow	N/A	73
Raven	N/A	3
Starling	N/A	8
Blackbird	N/A	1
Pheasant	N/A	1
Rook	N/A	1

*N/A indicated that data are not available for these species.

Appendix 3. Noise Contour Drawings

