

**An Bord Achomharc Um Cheadúnais Dobharshaothraithe
Aquaculture Licences Appeals Board**



Aquaculture and Foreshore Management Division,
Department of Agriculture, Food and the Marine,
National Seafood Centre,
Clonakilty, Co. Cork

Attention Ms. Sinead McSherry,

1 October 2021

Our Ref: AP11/2019

Site Ref: T08/106 B, C&D

Re: Appeal against the decision of the Minister for Agriculture, Food and the Marine to refuse to grant a Licence to Moyasta Oysters for authorisation to cultivate Pacific Oysters using bags and trestles/hanging baskets and trestles on sites T08/106 B, C&D at Querrin, Pounasherry Bay and Cammoge South, Shannon Estuary, Co Clare

Dear Ms. McSherry,

I refer to the above Appeal.

Pursuant to **Section 47(1)(a)** of the Fisheries (Amendment) Act, 1997, as amended, ("the Act"), where the Board is of the opinion that any document, particulars or other information is or are necessary for the purposes of enabling the Board determine the Appeal, it may serve a notice on a party requiring that party to submit to the Board such documents, particulars or other information as are specified in the Notice.

Having considered the appeal and the information provided to it, the Board has determined that further documents, particulars or information are necessary for the purposes of enabling the Board determine these Appeals.

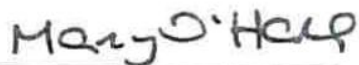
The Board understands DAFM have received updated bird survey data reports for Poulnasherry Bay submitted to them by the Marine Institute in 2021 which contain data on bird surveys up to and including those conducted during the winter of 2020/2021. The Board requests copies of these reports to aid it in determining their appeal. A copy of this request has also been sent to the Marine Institute.

If you require further clarification of the Board's requirements, please contact the Board's Technical Advisor, Dr Ciar O'Toole on 087-4097160 or ciar.otoole@alab.ie.

In accordance with section 47 (1) (a) of the Act, the Board requires this information within **30 days** of receipt of this letter. Please note that if the documents, particulars or other information specified above are not received before the expiration of the period specified above, or such later period as may be agreed by the Board, the Board will, without further reference to you, determine the appeal.

Please also note that a person who refuses or fails to comply with a requirement under section 47 (1)(a) shall be guilty of an offence.

Yours sincerely



Mary O'Hara
Secretary to the Board

Marine Institute

Poulnasherry Bay Waterbird Survey

Winter 2020-21

Bird Survey Report

April 2021

This report considers the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

**INIS Environmental
Consultants Ltd.**

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Shannon Commercial
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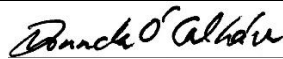

Quality Assurance

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The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent, CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2015) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2018).

Due cognisance has been given at all times to the provisions of the *Wildlife Act (1976)*, the *Wildlife (Amendment) Act (2000)*, the *European Union (Natural Habitats) Regulations (SI 378/2005)*, the *European Communities (Birds and Natural Habitats) Regulations (2011)*, EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the *EU Birds Directive 2009/147/EC* and the *EU Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. In line with Best Practice, any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	Date		Name	Signature
1	09/04/21	Report prepared by:	Dr. Lesley Lewis BSc PhD MCIEEM	
1	13/04/21	Report checked by:	Donncha Ó Catháin BSc MSc	
1	15/04/21	Report signed off by:	Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM	
Title		Poulnasherry Bay Waterbird Survey – Winter 2020-21 Bird Survey Report		

Notice

This report was produced by INIS Environmental Consultants Ltd. (INIS) on behalf of the Marine Institute. for the specific purpose of assessing wintering bird populations in Poulnasherry Bay SPA, Co. Clare, with all reasonable skill, care and due diligence within the terms of the contract with the client, incorporating our terms and conditions and taking account of the resources devoted to it by agreement with the client.

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1. INTRODUCTION

INIS Environmental Consultants Ltd. were contracted to co-ordinate a series of waterbird surveys at Poulnasherry Bay, Co. Clare during the 2020/21 winter season. Following standard methodology used for surveying wintering waterbirds at low tide (Lewis & Tierney, 2014), the surveys included four low tide surveys and a single high tide survey.

This report details the results of the 2020/21 waterbird survey programme. The results are examined and discussed in light of similar surveys undertaken during recent previous winter seasons, and a baseline low tide survey undertaken during 2009/10 as part of the National Parks & Wildlife Service (NPWS) Waterbird Survey Programme (NPWS, 2012).

1.1. Constraints and limitations

There are a number of limitations inherent to field-based surveying. These particularly relate to availability of suitable weather conditions for completing surveys, with good visibility and little wind or rain of paramount importance. As such, when undertaking and completing fieldwork, careful consideration and planning is made to ensure optimal weather conditions during survey periods. The data presented here were all collected in optimal weather conditions.

When counting shorebirds, disturbance can substantially impact on the birds present within small areas if they are able to disperse away from the source of disturbance to adjacent areas of similar habitat but out with the areas where surveying is taking place. Such disturbance may happen in advance of the count taking place or during the survey period. To gauge levels of disturbance Best Practice methods include an assessment of disturbance levels encountered during the recording period. Such an assessment of disturbance allows the likely impact on shorebird numbers and distribution to be determined, particularly when looking at likely response to different disturbance events. Details of recorded disturbance are therefore provided.

Constraints and any limitations to available datasets used for comparative analysis are presented where known.

1.2. Statement of authority

Mr Howard Williams MCIEEM CEnv CBiol MRSB MIFM is Lead Ecologist with Inis and has more than 20 years' experience as a professional ecologist, specialising in birds. Following his degree, he worked as a biologist for the ESB for three years (1997-2000). Mr Williams has completed in excess of 500 separate ecology assessments in Ireland and the UK since 2000. Mr Williams is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM). He is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Chartered Biologist (CBiol) with the Society of Biology. He is also a full member of the Institute of Fisheries Management. Mr Williams is principal ecologist with INIS Environmental Consultants Ltd and currently project manager on all INIS projects in the Republic of Ireland and the UK.

Dr. Lesley Lewis BSc PhD MCIEEM is a specialist waterbird ecologist. Lesley has a first-class honours degree in Zoology and a PhD in waterbird ecology (PhD Title: Ecological disturbance and its effects on estuarine benthic invertebrate communities and their avian predators).

Lesley has run the ecological consultancy 'Limosa Environmental' for the past 17 years. Lesley acts as Project Manager for each contract and over the years has gained considerable experience working on a range of contracts including Environmental Impact Assessments, Ecological Assessments (EclA), Stage I Screening for Appropriate Assessment and Natura Impact Statements (NIS).

In addition, Lesley has worked part-time for BirdWatch Ireland since 2009, and from 2009 to 2014 was contracted to the National Parks and Wildlife Service (NPWS) as a Waterbird Ecologist. In this role, Lesley was responsible for the design and implementation of the NPWS baseline low tide waterbird survey programme and the preparation of site-specific Conservation Objectives for 32 coastal SPA sites. This work culminated in the publication of standard low-tide survey methods for waterbirds (Lewis & Tierney, 2014). After November 2014, Lesley was engaged in a number of BirdWatch Ireland projects including various aspects of the Irish Wetland Bird Survey (I-WeBS), as well as work on forestry birds, seabirds and the Hen Harrier. In 2015 she was assistant project manager on the Seabird4 Survey (survey of cliff-nesting seabirds 2015, NPWS). From September 2017, Lesley took over the project management of both the Irish Wetland Bird Survey (I-WeBS) and the Countryside Bird Survey (CBS).

Mr. Donncha Ó Catháin BSc MSc is Assistant Senior Ecologist with INIS Environmental Consultants Ltd since 2018. Currently, he conducts ornithology surveying for various projects around Ireland, using standardised techniques and methods in line with Best Practice surveys including Low Tide and High Tide waterbird surveys at sites including Poulnasherry and Castlemaine, I-WeBS, breeding and wintering bird surveys, vantage point watches and CBS transects. He is also proficient in GIS and Appropriate Assessment Reporting and Habitat Identification. He is also a trained botanist and has extensive experience of biological sampling and surveying in freshwater environments.

2. EXISTING ENVIRONMENT

2.1. Site description

Poulnasherry Bay (see Figure 2.1.1) forms part of the wider Shannon Estuary which is designated as the River Shannon and River Fergus Estuaries Special Protection Area (SPA Site Code 4077) under the EU Birds Directive 2009/147/EC¹ (see Appendix I for the River Shannon and River Fergus Estuaries SPA Site Synopsis). Poulnasherry Bay is also a designated Shellfish Area under the EU Shellfish Waters Directive.² The *West Shannon Poulnasherry Shellfish Area* covers an area of 7.1 km² and extends from Querrin Point to Baunahard Point, taking in the entirety of Poulnasherry Bay (Co. Clare).



Figure 2.1.1: Location of Poulnasherry Bay, Co. Clare

On foot of a full assessment of oyster culture using bags and trestles in intertidal areas in Poulnasherry Bay as part of the Shannon and Fergus Estuary SPA, it was concluded that disturbance from aquaculture activities allied with other potential stressors on the distribution of some bird species could not be fully discounted. On this basis, a monitoring programme was deemed required to determine the current and ongoing status of waterbird species in the SPA, in light of current licencing decisions. The monitoring programme was required to have a minimum of four low tide surveys, and one high tide survey following standard methodology as used by the National Parks & Wildlife Service (NPWS) Waterbird Survey Programme 2009-2012 (Lewis & Tierney, 2014). This survey programme was therefore undertaken at Poulnasherry Bay during the period October 2018 to March 2019, and subsequently followed by surveys during winter 2019/20 and the current reporting period, winter

¹ the codified version of Council Directive 79/409/EEC (as amended) (Birds Directive).

² Shellfish Waters Directive 2006/113/EC which is implemented in Ireland by the European Communities (Quality of Shellfish Waters) Regulations 2006 (SI No 268 of 2006) and the European Communities (Quality of Shellfish Waters) (Amendment) Regulation 2009 (SI 55 of 2009).

2020/21. This report details the results of the surveys during winter 2020/21 and examines these results in the context of the previous winter surveys, and existing waterbird data for the site and wider Shannon and Fergus estuaries system.

2.2. Poulnasherry Bay waterbirds

The Shannon estuary is a large estuary on the west coast of Ireland where Ireland's longest river, the River Shannon enters the Atlantic Ocean³. The largest estuarine complex in Ireland (Crowe, 2005), the Shannon estuary comprises the tidal reaches of the river between Limerick City and the Atlantic Ocean including the Fergus Estuary (Hickey & Healey, 2005).

The Shannon & Fergus Estuaries SPA covers a total area of 32,261 ha (NPWS, 2012a; NPWS, 2012b) and is of special conservation interest for 21 waterbird species (Table 2.2.1). In addition, the site is selected as a Special Protection Area because it regularly supports over 20,000 waterbirds during the non-breeding season making this a site of international importance.

Table 2.2.1 Waterbird Special Conservation Interest (SCI) species listed for the Shannon & Fergus Estuaries SPA

Species Name	Latin name	Annex I species	BoCCI ^a	Baseline population ^b	Population status at baseline
Whooper Swan	<i>Cygnus cygnus</i>	Yes	A	118	All-Ireland Importance
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>		A	494	International Importance
Shelduck	<i>Tadorna tadorna</i>		A	1,025	All-Ireland Importance
Wigeon	<i>Anas penelope</i>		A	3,761	All-Ireland Importance
Teal	<i>Anas crecca</i>		A	2,260	All-Ireland Importance
Pintail	<i>Anas acuta</i>		R	62	All-Ireland Importance
Shoveler	<i>Anas clypeata</i>		R	107	All-Ireland Importance
Scaup	<i>Aythya marila</i>		A	102	All-Ireland Importance
Cormorant	<i>Phalacrocorax carbo</i>		A	245	All-Ireland Importance
Ringed Plover	<i>Charadrius hiaticula</i>		A	223	All-Ireland Importance
Golden Plover	<i>Pluvialis apricaria</i>	Yes	A	5,664	All-Ireland Importance
Grey Plover	<i>Pluvialis squatarola</i>		A	558	All-Ireland Importance
Lapwing	<i>Vanellus vanellus</i>			15,126	All-Ireland Importance
Knot	<i>Calidris canutus</i>		R	2,015	All-Ireland Importance
Dunlin	<i>Calidris alpina</i>		A	15,131	International Importance
Black-tailed Godwit	<i>Limosa limosa</i>		A	2,035	International Importance
Bar-tailed Godwit	<i>Limosa lapponica</i>	Yes	A	460	All-Ireland Importance
Curlew	<i>Numenius arquata</i>		R	2,396	All-Ireland Importance
Greenshank	<i>Tringa nebularia</i>		A	61	All-Ireland Importance
Redshank	<i>Tringa totanus</i>		R	2,645	All-Ireland Importance
Black-headed Gull	<i>Chroicocephalus ridibundus</i>		R	2,681	All-Ireland Importance

^a After Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013).

^b Five-year peak mean for the period 1995/96-1999/00.

³ <http://www.infomar.ie/surveying/Bays/Shannon.php>

2.2.1. Published status and trends of Poulnasherry Bay waterbirds

Waterbird site trends for the Shannon & Fergus Estuaries SPA were shown in the SPA Conservation Objectives document (NPWS, 2012b). However, these calculations, based on data up to 2010/11, are now considered out-of-date. Lewis *et al.* (2016) prepared a review and assessment of waterbird data for the Shannon & Fergus Estuaries based on I-WeBS data and data from the NPWS Waterbird Survey Programme. This review revealed that subsite count cover during I-WeBS has dropped considerably since 2010/11 largely due to a lack of volunteer counters in the area. Given the limitations in the whole-site data, the review concluded that site totals generated using I-WeBS data largely underestimate the actual number of waterbirds using the Shannon and Fergus site complex. However, where adequate data existed, it was possible to examine trends at a smaller scale (i.e. subsite scale) and subsite trends are likely to be more accurate because they are based on the same count areas and calculated using data from years with the best count coverage (Lewis *et al.* 2016). It was further noted that I-WeBS subsites Poulnasherry Bay (0H498) which is an equivalent area to low tide subsites 0H519 and 0H520 (Poulnasherry inner and outer bay) almost exclusively exhibited negative trends for the period examined, with many waterbirds no longer recorded within these subsites.

3. METHODOLOGIES

3.1. Background to the low tide survey programme

I-WeBS is the primary method by which data are collected for wintering waterbird populations at Irish wetland sites (Lewis *et al.* 2019). These data, largely collected by volunteer field surveyors since the winter season of 1994/95, have underpinned the designation of Special Protection Areas (SPAs), and have enabled the production of waterbird population estimates and trends at national and site level (e.g. Crowe & Holt, 2013; Burke *et al.* 2019). I-WeBS surveys are undertaken primarily on a rising or high tide, when birds are pushed closer to shore or are gathering at roost sites and are easier to count.

While I-WeBS surveys are designed to obtain the most accurate peak counts of waterbirds at a site, they cannot provide information about waterbird abundance or distribution during the low tide period, when many waterbirds are feeding. This gap in knowledge was addressed somewhat in 2009/10, when the National Parks and Wildlife Service (NPWS) initiated a programme of low tide surveys which took place over the three winter seasons of 2009/10, 2010/11 and 2011/12 at 33 coastal SPAs (The NPWS Waterbird Survey Programme). Each SPA site was surveyed in a single winter season and the Shannon & Fergus Estuaries was surveyed in 2010/11. Standard methodology was designed to ensure consistency in data capture and recording at each site (Lewis & Tierney, 2014).

Waterbird surveys at Poulnasherry Bay during the 2020/21 winter season therefore followed the standard methodology developed by the NPWS waterbird survey programme. Similar surveys were also undertaken during the 2018/19 and 2019/20 seasons (Inis Environmental, 2019, 2020). Furthermore, a similar survey across the entire Shannon and Fergus estuarine system was undertaken during the 2017/18 season in relation to the Shannon Integrated Framework Programme (SIFP) (MKOS, 2019).

3.2. Survey design and count area

During the NPWS Waterbird Survey Programme, Poulnasherry Bay was sub-divided into two count subsites: OH519 (Poulnasherry bay outer) and OH520 (Poulnasherry bay inner).

During the waterbird survey programme of 2018/19, it was discovered that subsites OH519 (outer) and OH520 (inner) were wrongly coded/allocated in the subsite map in Appendix 6 of the SPA Conservation Objectives Supporting Document (NPWS, 2012b). The winter bird survey report for 2018/19 (Inis Environmental, 2019) therefore referred to subsites as OH519 (outer) and OH520 (inner).

Since then, it has been discovered that data collection and mapping for the SPA Conservation Objectives Supporting Document use **OH519 (Poulnasherry bay inner)** and **OH520 (Poulnasherry bay outer)**. The easiest way to rectify the error would therefore be to make changes to the text within the SPA Conservation Objectives Supporting Document i.e. the data tables/raw data are correct.

Consequently, we have used **OH519 (Poulnasherry bay inner)** and **OH520 (Poulnasherry bay outer)** going forwards. Care has been taken throughout this report to ensure that data comparison over the various surveys are based on the correct subsite dataset.

As the Poulnasherry Bay Shellfish Area covers a larger area than that covered by subsites OH519 and OH520, additional count areas were included in current monitoring. During their 2017/18 monitoring work MKOS (2019) included additional subsites in the outer bay as follows OH517, OH518, ON025 and ON026. The current monitoring work therefore followed suit (Table 3.2.1, Figure 3.2.1). A further subsite (ON028 Kilrush Marina) was also added.

Optimum dates were chosen in each month when the survey period spanned midday to facilitate travel to/from the site and ensure surveys were carried out in the best weather and light conditions.

Table 3.2.1 Count Subsides of Poulnasherry Bay

Subsite Code	Subsite Name
OH517	Querrin
OH519	Poulnasherry inner bay
OH520	Poulnasherry outer bay
ON025	
ON026	
ON027	Subsite created to encompass OH517 and OH518 combined
ON028	Kilrush Marina



Figure 3.2.1: Count subsites used for the Poulnasherry Bay waterbird surveys. ONO28 (Kilrush Marina) is the small water body immediately north east of ONO25 (marked with a star).

3.3. Field survey methods

The survey period extended two hours either side of low or high tide (depending on the survey being undertaken).

Waterbirds were counted within each count subsite, and the data for each subsite were recorded separately. Waterbird counts were conducted on the 'look-see' basis (Bibby *et al.* 2000) which involves scanning across the survey area and counting all birds seen. Birds were recorded according to their species code following the two-letter coding system used by I-WeBS and developed by the British Trust for Ornithology.

In addition to counts of each species, the behaviour of waterbirds during counts was attributed to one of two categories (foraging or roosting/other) while the position of the birds was recorded as per one of four broad habitat types (intertidal, subtidal, supratidal and terrestrial). Field maps of count subsites were used to map significant flocks of foraging/roosting birds ('flock maps').

Information was also collected which included the presence of activities that could cause disturbance to waterbirds. Following Lewis & Tierney (2014), activity types were categorised as follows:

(1) human, on-foot - shoreline (2) human, on foot – intertidal aquaculture, (3) bait-diggers (4) non-powered watercraft (5) powered watercraft, (6) water-based recreation (e.g. wind-surfers) (7) horse-riding (8) dogs (9) aircraft (10) shooting (11) other (12) winkle pickers (13) aquaculture machinery (14) other vehicles.

When an activity was observed to cause a disturbance, the waterbird species affected were recorded and a letter code system used to indicate the bird's response to the activity as follows:-

W - Weak response, waterbirds move slightly away from the source of the disturbance.

M - Moderate response, waterbirds move away from the source of the disturbance to another part of your subsite; they may return to their original position once the activity ceases.

H - High response, waterbirds fly away to areas outside of your subsite and do not return during the current count session.

The length of the activity was also recorded by adding by the codes **A – D** (see below) and a record was made as to whether the activity was already occurring within the subsite when the count started.

A – short/discrete event.

B – activity occurs for up to 50% of the count period.

C – activity length estimated at >50% but < 100% of the count period.

D – activity continues after the count period has ended.

3.4. Data analysis

3.4.1. General

Field data were collected in notebooks and later transferred by field surveyors into Excel datasheets. At the end of the survey season the Excel datasheets were compiled and validated before being formatted and entered into a MS Access database. From the database, data summaries were produced such as site totals, subsite totals etc.

Waterbird numbers were assessed in relation to the numbers of waterbirds that occur across the wider Shannon and Fergus system and with reference to national and international threshold levels as follows:

- A waterbird species that occurs in numbers that correspond to 1% or more of the individuals in the all-Ireland population of the species is said to occur in numbers of all-Ireland importance. Current population threshold values are published in Burke *et al.* (2019).
- A waterbird species that occurs in numbers that correspond to 1% or more of the individuals in the biogeographic population of the species or subspecies is said to occur in ‘internationally important numbers.’ Current international population threshold values are published by the African-Eurasian Migratory Waterbird Agreement (AEWA) Conservation Status Review 7 (CSR7) (AEWA 2018) (published online at wpe.wetlands.org).

3.4.2. Waterbird distribution

Following the methods used in NPWS (2012) data analyses were undertaken to determine the proportional use of subsites by each waterbird Special Conservation Interest (SCI) species for the River Shannon and River Fergus Estuaries SPA, relative to the whole area surveyed on each survey occasion. This gives an indication of the preferred distribution of each species. Analyses were undertaken on datasets as follows:

- Total numbers (low tide surveys)
- Total numbers (high tide survey)
- Total numbers of foraging birds (low tide surveys)

For each of the analyses listed above and for each survey date completed, subsites were ranked in succession from the highest to the lowest in terms of their relative contribution to each species’ distribution across all subsites surveyed. NPWS (2012b) converted subsite rankings to categories (very high, high, moderate and low) but as the current survey did not cover all of the Shannon & Fergus Estuaries SPA, we simply ranked subsites as 1-7 (low-high) in each analysis.

3.4.3. Trends

Poulnasherry Bay (I-WeBS subsite OH498) received nearly full count coverage during the baseline period used for SPA designation (1995/96 – 1999/00). As this I-WeBS subsite is the same area as the subsites OH519 and OH520 combined, this enabled a comparison between the baseline mean peak

number of waterbirds within Poulnasherry Bay, the peak count recorded during 2010/11 NPWS Waterbird Survey programme and the peak counts from the 2018/19 and 2019/20 surveys.

4. RESULTS

4.1. Survey schedule and conditions

The 2020/21 winter waterbird survey season proceeded unhampered by weather conditions. All surveys were carried out with good weather conditions (Table 4.1.1). Only the inner and outer bay subsites (ON519 and ON520) were counted during the November survey due to an unforeseen logistical issue. This is not seen as a material constraint however and does not affect the findings of this report substantially. While the peripheral subsites were not counted, the inner bay (ON519) which supports the greatest numbers of waterbirds was counted and included in the analysis of results.

Table 4.1.1: *Dates and survey type for the 2020/21 survey programme.*

Date	Survey ^a	Wind	Cloud (%)	Rain	Visibility	Notes
18.10.20	LT1	Breezy	34 - 66	None	Good	No constraints
19.11.20	LT2	Light	34 - 66	None	Good	Partial count
03.12.20	LT3	Light	0 - 33	None	Good	No constraints
10.01.21	HT	Light	67 – 100	None	Good	No constraints
14.02.21	LT4	Light	67 - 100	None	Good	No constraints

^aLT = Low tide; HT = High tide.

4.2. Species assemblage, diversity and occurrence

A total of 34 waterbird species were recorded during the winter 2020/21 surveys (Table 4.2.1). The species list included 15 wildfowl and allies, 14 wader species and five gull species. Table 4.2.1 also lists species Latin names; hereafter species common names are used in this report.

The species list includes four species (Great Northern Diver, Little Egret, Golden Plover and Bar-tailed Godwit) listed on Annex I of the EU Bird's Directive. The species list includes 18 out of the total 21 waterbird species listed as Special Conservation Interests (SCIs) for the Shannon & Fergus Estuaries SPA. Species diversity across the entire survey area peaked in November 2020 (30 species) (Figure 4.2.1).

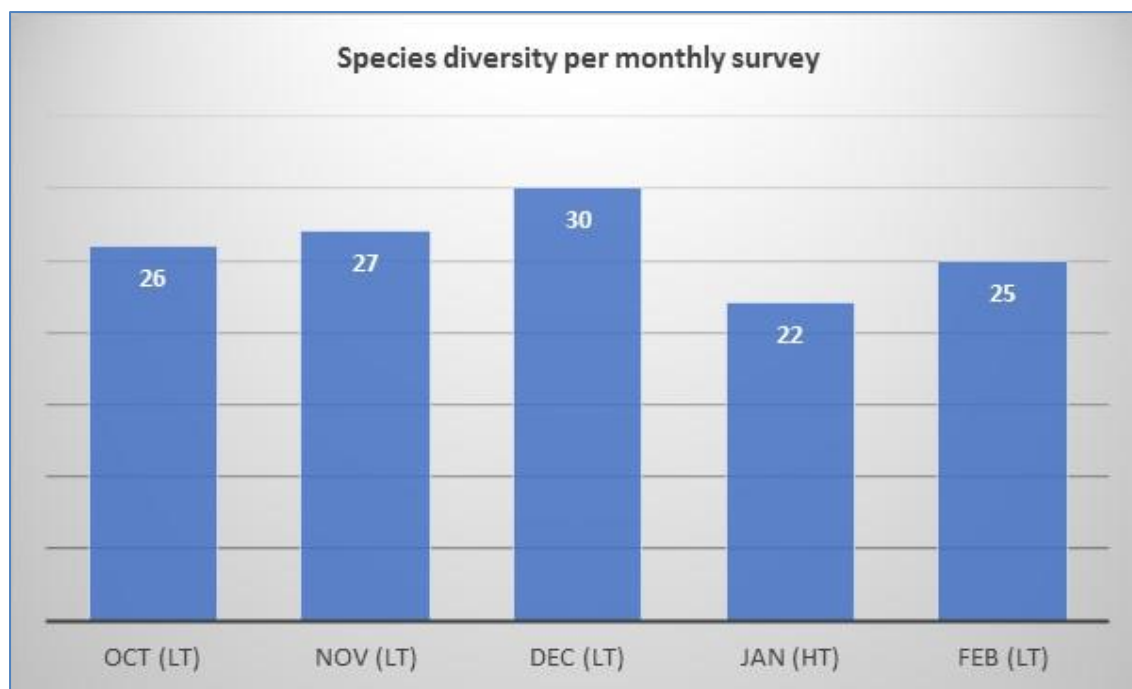


Figure 4.2.1: Overall species diversity during the monthly surveys.

Table 4.2.1: Species recorded during the winter surveys of Poulnasherry Bay 2020/21. A ticked cell means that a species was recorded in the monthly survey. The table also highlights Annex I species (EU Bird's Directive).

Species name	Latin name	Code	Annex I	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	<i>Branta bernicla hrota</i>	PB			✓	✓	✓	✓
Shelduck	<i>Tadorna tadorna</i>	SU			✓	✓	✓	✓
Wigeon	<i>Anas penelope</i>	WN		✓	✓	✓	✓	✓
Teal	<i>Anas crecca</i>	T.		✓	✓	✓	✓	✓
Mallard	<i>Anas platyrhynchos</i>	MA		✓	✓	✓	✓	✓
Pintail	<i>Anas acuta</i>	PT			✓	✓		
Long-tailed Duck	<i>Clangula hyemalis</i>	LN			✓			
Red-breasted Merganser	<i>Mergus serrator</i>	RM			✓	✓		✓
Great Northern Diver	<i>Gavia immer</i>	ND	✓	✓	✓	✓	✓	✓
Little Grebe	<i>Tachybaptus ruficollis</i>	LG				✓		✓
Great Crested Grebe	<i>Podiceps cristatus</i>	GG		✓	✓	✓	✓	✓
Cormorant	<i>Phalacrocorax carbo</i>	CA		✓	✓	✓		✓
Shag	<i>Phalacrocorax aristotelis</i>	SA		✓				
Little Egret	<i>Egretta garzetta</i>	ET	✓	✓	✓	✓	✓	✓
Grey Heron	<i>Ardea cinerea</i>	H.		✓	✓	✓		✓
Oystercatcher	<i>Haematopus ostralegus</i>	OC		✓	✓	✓	✓	✓
Ringed Plover	<i>Charadrius hiaticula</i>	RP		✓	✓	✓		✓
Golden Plover	<i>Pluvialis apricaria</i>	GP	✓	✓				
Grey Plover	<i>Pluvialis squatarola</i>	GV		✓	✓	✓	✓	✓
Lapwing	<i>Vanellus vanellus</i>	L.		✓	✓	✓	✓	✓

Knot	<i>Calidris canutus</i>	KN				√		
Dunlin	<i>Calidris alpina</i>	DN		√	√	√	√	√
Snipe	<i>Gallinago gallinago</i>	SN		√		√	√	√
Black-tailed Godwit	<i>Limosa limosa</i>	BW				√		
Bar-tailed Godwit	<i>Limosa lapponica</i>	BA	√	√	√	√	√	
Curlew	<i>Numenius arquata</i>	CU		√	√	√	√	√
Greenshank	<i>Tringa nebularia</i>	GK		√	√	√	√	√
Redshank	<i>Tringa totanus</i>	RK		√	√	√	√	√
Turnstone	<i>Arenaria interpres</i>	TT		√	√	√	√	√
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	BH		√	√	√	√	√
Common Gull	<i>Larus canus</i>	CM		√	√	√	√	√
Lesser Black-backed Gull	<i>Larus fuscus</i>	LB		4				
Herring Gull	<i>Larus argentatus</i>	HG		√	√	√	√	√
Great Black-backed Gull	<i>Larus marinus</i>	GB		√	√	√	√	

Overall subsite diversity ranged from eight species (both ON026 and ON027) to a maximum 32 species (OH519 Poulnasherry inner bay) (Table 4.2.2, Figure 4.2.2). Poulnasherry outer bay (OH520) supported a total of 21 species. By contrast, species diversity recorded from the NPWS Waterbird Survey Programme in 2011/11 reported a total of 34 species (inner bay) and 15 species (outer bay).

The most widely distributed species were Curlew and Redshank, both recorded within all seven count subsites. Three species occurred within six of the subsites (Great Crested Grebe, Oystercatcher and Greenshank). Six species occurred in only the inner bay (OH519).

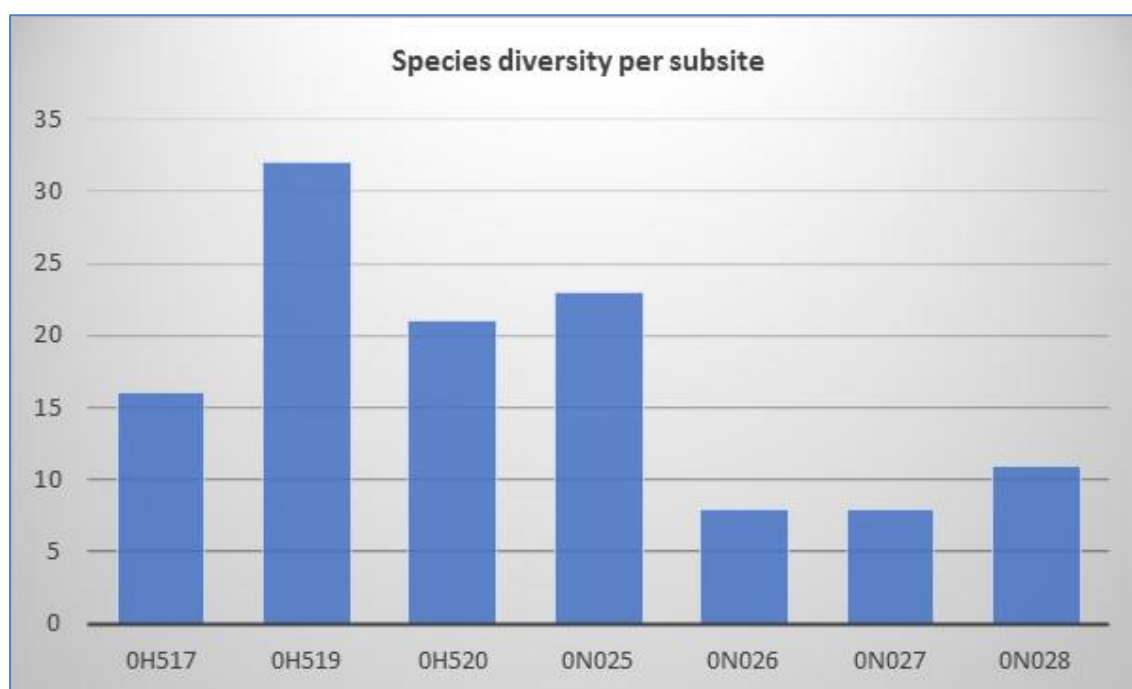


Figure 4.2.2: Species diversity per subsite.

Table 4.2.2: Subsite diversity recorded during the winter surveys of Poulnasherry Bay 2020/21. Numbers refer to the number of surveys in which a species was recorded in each subsite. The table also shows the number of subsites that a species was recorded within overall, plus the percentage occupancy (% of the total number of count subsites).

Species name	OH517	OH519	OH520	ON025	ON026	ON027	ON028	Number of subsites (% occurrence)
Light-bellied Brent Goose	2	4	2	2		1		5 (71)
Shelduck	1	4						2 (29)
Wigeon	3	5		2			1	4 (57)
Teal	4	4		3			2	4 (57)
Mallard	1	5						2 (29)
Pintail		2						1 (14)
Long-tailed Duck		1						1 (14)
Red-breasted Merganser		3						1 (14)
Great Northern Diver		3	5	2	3	1		5 (71)
Little Grebe		2						1 (14)
Great Crested Grebe	1	4	3	2	4	2		6 (86)
Cormorant		2	2	1	1			4 (57)
Shag				1	1			2 (29)
Little Egret		5	2	1				3 (43)
Grey Heron	1	3	2	2		1		5 (71)
Oystercatcher	2	5	4	4		1	3	6 (86)
Ringed Plover		2	1	2	1			4 (57)
Golden Plover			1					1 (14)
Grey Plover		5	1	1				3 (43)
Lapwing	3	4	1	4			4	5 (71)
Knot		1						1 (14)
Dunlin	2	5	2	2				4 (57)
Snipe	1	2		2			1	4 (57)
Black-tailed Godwit		1						1 (14)
Bar-tailed Godwit	1	4	2					3 (43)
Curlew	4	5	5	4	2	3	1	7 (100)
Greenshank	4	5	2	2		1	1	6 (86)
Redshank	4	5	5	4	2	1	2	7 (100)
Turnstone		5	1		1			3 (43)
Black-headed Gull	1	5	4	4			3	5 (71)
Common Gull		4	3	4			1	4 (57)
Lesser Black-backed Gull		1	1	1				3 (43)
Herring Gull		4	2	2			2	4 (57)
Great Black-backed Gull		4		1				2 (29)

Waterbird species diversity was highest in OH519 (Poulnasherry inner bay) during all low tide surveys and the high tide survey (Figure 4.2.3). Note, only OH519 and OH520 were counted in the November low tide survey (LT2).

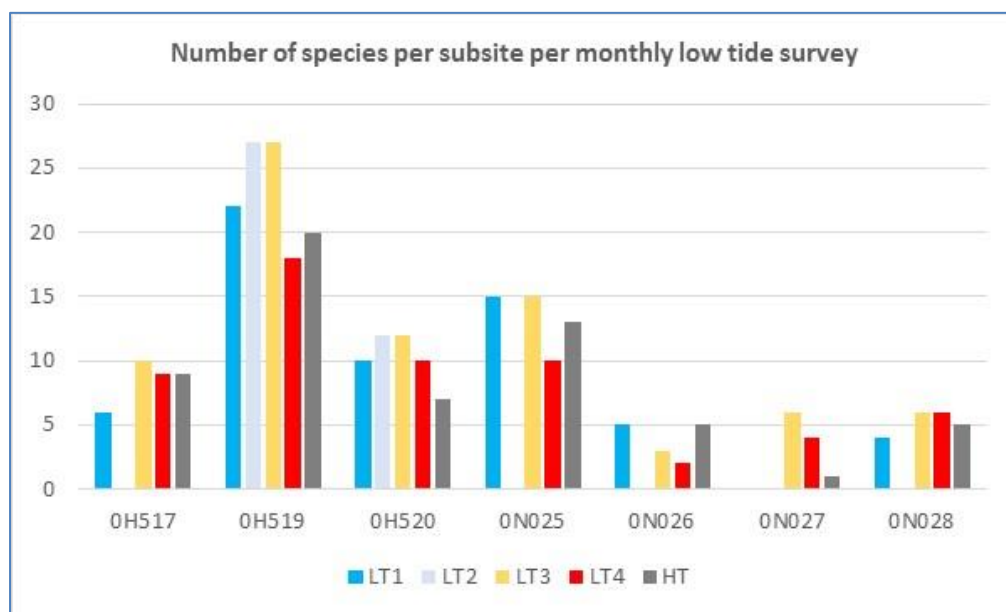


Figure 4.2.3: Monthly species diversity per subsite for low tide counts

4.3. Total numbers of waterbirds

During winter 2020/21, total numbers of waterbirds during low tide surveys (across the entire survey area) ranged widely and peaked at a total 3,771 waterbirds during October 2020 (Table 4.3.1). As the November low tide count only surveyed the inner and outer bay (OH519 and OH520) this count total (1,809) is not comparable with the other monthly totals. In December 2020, numbers had dropped to 2,396 waterbirds and numbers dropped gradually through January (2,187) and February 2021 (1,921). Peak waterbird numbers across the entire survey area have been consistent across the three recent winters at 3,771 (2020/21), 3,757 (2019/20) and 3,314 (2018/19).

Clearly OH519 (inner bay) supports a greater number of waterbirds. During low tide surveys the total numbers of waterbirds in the inner bay (OH519) ranged between 68% and 95% of the total number of waterbirds in the entire count area, while 60% of waterbirds were recorded within OH519 during the high tide survey. The peak count in the inner bay (OH519) (3,021) was similar to that recorded in 2019/20 (3,099) but considerably higher than any count recorded within this same subsite during the 2018/19 survey season, or during the 2010/11 NPWS Waterbird Survey Programme counts. Furthermore, the peak count recorded for the outer bay (OH520) (161 waterbirds) is over double that recorded during the 2010/11 NPWS Waterbird Survey Programme (64 birds)

Table 4.3.1: Total numbers of waterbirds counted within the study area during 2020/21, plus count totals from the 2010/11 Waterbird Survey Programme for OH519 and OH520, and from the waterbird surveys during winter 2018/19 and 2019/20 (*not counted).

Winter	Subsite/Area	Total Numbers of Waterbirds				
		LT1 (Oct)	LT2 (Nov)	LT3 (Dec)	LT4 (Feb)	HT (Jan)
2020/21	Entire Survey area	3,771	1,809	2,396	1,921	2,187
2020/21	OH517	432	*	250	155	180
2020/21	OH519	3,021	1,733	1,643	1,467	1,307
2020/21	OH520	161	76	62	136	113
2020/21	ON025	84	*	376	65	554
2020/21	ON026	8	*	13	4	9
2020/21	ON027	0	*	25	20	1
2020/21	ON028	65	*	27	74	23
2019/20						
2019/20	Entire Survey area	1,756	3,757	915	1,170	1,691
2019/20	OH517	139	284		52	116
2019/20	OH519	1,477	3,099	715	825	1,315
2019/20	OH520	42	118	73	101	22
2019/20	ON025	18	80	25	158	183
2019/20	ON026	26	15	13	1	21
2019/20	ON027	9	17	89	11	10
2019/20	ON028	45	144		32	24
2018/19						
2018/19	Entire Survey area	1,294	3,314	760	547	614
2018/19	OH520	84	102	19	18	19
2018/19	OH519	1,198	1,943	677	511	573
2010/11						
2010/11	OH520	52	32	63	64	44
2010/11	OH519	1,518	1,200	1,440	1,103	761
2010/11	OH519 + OH520	1,570	1,232	1,503	1,167	805

4.4. Species totals

Waterbird species peak counts for the 2020/21 at Poulnasherry Bay are shown in Table 4.4.1. Seven waterbird species were recorded in numbers of national (all-Ireland importance) namely Shelduck, Wigeon, Teal, Pintail, Little Egret, Grey Plover and Dunlin. A peak count of 1,433 Teal during October 2020 was over four times greater than any other count recorded. Notably Dunlin were the most numerous overall and occurred in numbers of national importance during three low tide surveys, and during the high tide survey.

Amongst the wildfowl and allies, Wigeon and Teal were the most numerous species. Amongst the waders, notably Dunlin were the most numerous overall and occurred in numbers of national importance during three low tide surveys, and during the high tide survey.

Table 4.4.1: Waterbird species totals per survey (across entire survey area). 1% Nat and 1% Int are the national and international thresholds respectively, while * denotes numbers of birds of all-Ireland importance (after Burke et al. 2019).

Species name	Code	1%Nat	1%Int	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	PB	350	400		12	42	96	214
Shelduck	SU	100	2500		27	39	77	104*
Wigeon	WN	560	14000	750*	153	408	121	197
Teal	T.	360	5000	1,433*	277	241	60	284
Mallard	MA	280	53000	15	40	12	19	87
Pintail	PT	20	600		71*	7		
Long-tailed Duck	LN				1			
Red-breasted Merganser	RM	25	860		5	4		3
Great Northern Diver	ND	20	50	2	9	7	2	6
Little Grebe	LG	20	4700			1		5
Great Crested Grebe	GG	30	6300	6	3	14	6	4
Cormorant	CA	110	1200	7	9	1		1
Shag	SA	0	0	2				
Little Egret	ET	20	1100	29*	33*	20*	3	3
Grey Heron	H.	25	5000	3	3	6		1
Oystercatcher	OC	610	8200	38	38	51	41	98
Ringed Plover	RP	120	540	54	52	86		56
Golden Plover	GP	920	9300	52				
Grey Plover	GV	30	2000	8	8	27	113*	40*
Lapwing	L.	850	72300	175	102	269	51	13
Knot	KN	160	5300			18		
Dunlin	DN	460	13300	480*	382	691*	888*	807*
Snipe	SN			4		9	2	3
Black-tailed Godwit	BW	200	1100			7		
Bar-tailed Godwit	BA	170	1500	13	6	5	13	
Curlew	CU	350	7600	229	183	246	212	121
Greenshank	GK	20	3300	10	5	12	9	6
Redshank	RK	240	2400	204	145	117	82	35

Turnstone	TT	95	1400	2	8	1	35	70
Black-headed Gull	BH			228	197	21	46	23
Common Gull	CM			4	30	28	34	4
Lesser Black-backed Gull	LB			4				
Herring Gull	HG			18	6	1	8	2
Great Black-backed Gull	GB			1	4	5	3	

4.5. Trends in waterbird numbers

Poulnasherry Bay (I-WeBS subsite OH498) received nearly full I-WeBS count coverage during the baseline period used for SPA designation (1995/96 – 1999/00). As this I-WeBS subsite is the same area as the subsites OH519 and OH520 combined, this enables a comparison between the baseline mean peak number of waterbirds within Poulnasherry Bay, the peak count recorded during 2010/11 NPWS Waterbird Survey Programme, and peak counts from the 2018/19 and 2019/20 winter waterbird surveys.

While a simple comparison of peak numbers is crude, it does provide some indication of the trends in numbers. The results of the comparison as shown in Table 4.5.1 suggest that 15 of the total 21 waterbird SCI species have decreased in number in Poulnasherry Bay since the baseline period (1995/96 – 1999/00) with only Teal appearing to occur in greater or similar numbers. The remaining species are considered stable or too variable in numbers to draw conclusions.

Comparing peak counts recorded in winter 2010/11 with the most recent winter surveys suggests that seven of the 21 species assessed have declined in number, while six species have occurred in greater number recently, with the remaining species showing such variation that no trend is possible to discern.

Graphically comparing the mean peak numbers of waterbird SCI species with peak numbers from surveys 2018/19 – 2020/21 shows lower recent numbers for 15 species and higher numbers for five species (Figure 4.5.1a, Figure 4.5.1b). (Note Whooper Swan is not shown because the baseline number was only one bird).

Table 4.5.1: Baseline data for waterbird SCI species of the Shannon & Fergus Estuaries SPA within Poulnasherry Bay, plus the peak count from the NPWS Waterbird Survey programme 2010/11, and the peak species count from the 2018/19, 2019/20 and 2020/21 winter seasons.

Species	(A) Mean 95/96 - 99/00	(B) Peak count 2010/11	(C) Peak count 2018/19	(D) Peak count 2019/20	(E) Peak count 2020/21	General trend ↑ or ↓ (A) vs (C/D/E)	General trend ↑ or ↓ (B) vs (C/D/E)
Whooper Swan	1	0	0	0	0	n/a	n/a
Light-bellied Brent Goose	539	56	256	179	214	↓	↑
Shelduck	180	196	115	48	104	↓	↓
Wigeon	1,125	61	332	763	750	↓	↑
Teal	176	510	218	274	1,103	↑	Stable/variable
Pintail	57	0	82	51	71	Stable/variable	↑
Shoveler	3	37	6	13	0	Stable/variable	↓
Scaup	22	8	0	0	0	↓	↓
Cormorant	58	12	8	5	9	↓	↓
Ringed Plover	155	28	53	213	54	variable	↑
Golden Plover	1,380	7	80	102	52	↓	↑
Grey Plover	66	37	7	10	113	Stable/variable	Stable/variable
Lapwing	2,522	155	483	238	107	↓	Stable/variable
Knot	164	33	0	26	18	↓	↓
Dunlin	2,300	457	336	921	888	↓	variable
Black-tailed Godwit	16	10	2	4	7	↓	↓
Bar-tailed Godwit	95	16	5	33	13	↓	Stable/variable
Curlew	654	209	146	269	234	↓	Stable/variable
Greenshank	32	13	8	10	6	↓	variable
Redshank	197	153	80	96	145	↓	↓
Black- headed Gull	1,818	42	109	118	213	↓	↑

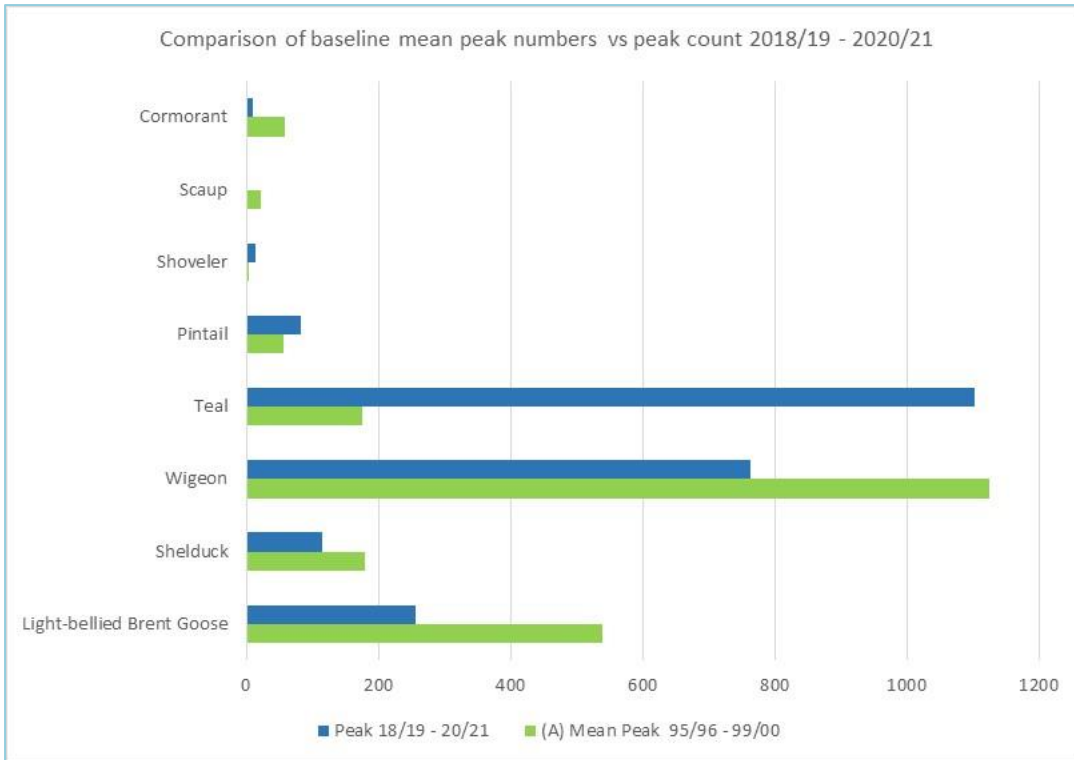


Figure 4.5.1a: Comparison of mean peak numbers with peak numbers from surveys 2018/19 – 2020/21.

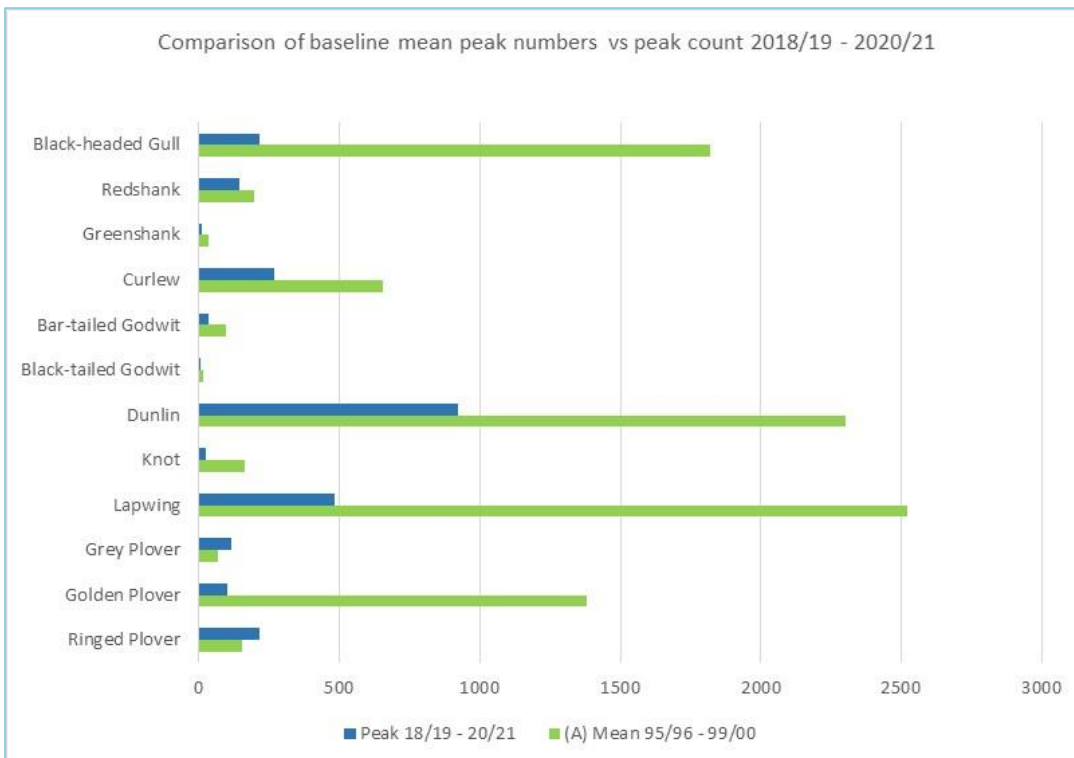


Figure 4.5.1b: Comparison of mean peak numbers with peak numbers from surveys 2018/19 – 2020/21.

4.6. Total waterbird numbers per subsite

Monthly subsite count data are provided in Appendix 2. Numbers of Wigeon, Teal, Little Egret and Dunlin exceeded the threshold for national importance within the inner bay during low tide surveys (OH519). Shelduck were recorded in numbers of national importance within OH519 during the high tide.

4.7. Relative importance of subsites

Based on total numbers across all four low tide surveys, subsite OH519 (Poulnasherry inner bay) was the most important for the majority of waterbird species assessed (Table 4.7.1), with all SCI species except Golden Plover occurring in their largest numbers on at least one occasion in this subsite. The outer bay (OH520) also held peak numbers of Ringed Plover, Golden Plover and Bar-tailed Godwit.

Table 4.7.1: Relative importance of each subsite – subsites are ranked 1-7 based on the total numbers of waterbird SCI species during low tide surveys. The highest rank number from any of the four low tide surveys is shown and the number in brackets is the number of surveys that a species was recorded in that subsite. Blank cells mean that a species was not recorded in that subsite.

Species	OH517	OH519	OH520	ON025	ON026	ON027	ON028
Light-bellied Brent Goose	1 (1)	1(3)	2 (2)	3 (1)		3 (1)	
Shelduck	2 (1)	1 (3)					
Wigeon	2 (2)	1 (4)		4 (1)			3 (1)
Teal	2 (2)	1 (3)		3 (1)			1 (2)
Pintail		1 (2)					
Cormorant		1 (2)	2 (1)	2 (1)	1 (1)		
Ringed Plover		1 (2)	1 (1)	1 (1)			
Golden Plover			1 (1)				
Grey Plover		1 (4)		2 (1)			
Lapwing	1 (3)	1 (3)	2 (1)	2 (3)			2 (3)
Dunlin	3 (1)	1 (4)		3 (1)			
Black-tailed Godwit		1 (1)					
Bar-tailed Godwit	2 (1)	1 (4)	1 (2)				
Curlew	2 (3)	1 (4)	2 (4)	3 (3)	4 (2)	5 (2)	4 (2)
Greenshank	1 (3)	1 (4)	3 (2)	3 (1)		5 (1)	1 (1)
Redshank	2 (3)	1 (4)	2 (4)	4 (3)	6 (1)	6 (1)	3 (2)
Black-headed Gull		1 (4)	2 (4)	1 (3)			3 (2)

The inner bay (OH519) held peak numbers of nine species foraging at low tide (Table 4.7.2) although peak numbers during any of the four surveys were also found in other subsites for Light-bellied Brent Goose and Ringed Plover. Poulnasherry inner bay was also found to support peak numbers of most waterbird SCI species during the high tide period (Table 4.7.3).

Table 4.7.2: Relative importance of each subsite for SCI species foraging intertidally at low tide – selected species only (highest rank obtained in a low tide survey).

Species	OH517	OH519	OH520	ON025	ON026	ON027	ON028
Light-bellied Brent Goose	1	1				1	
Shelduck		1					
Ringed Plover		1	1				
Grey Plover		1					
Lapwing	1	2		1			
Dunlin	2	1	2				
Black-tailed Godwit		1					
Bar-tailed Godwit	2	1	2				
Curlew	3	1	2	2			
Redshank	2	1	2	2		5	

Table 4.7.3: Relative importance of each subsite for SCI species at high tide based on ranked total numbers.

Species	OH517	OH519	OH520	ON025	ON026	ON027	ON028
Light-bellied Brent Goose	1	2		3			
Shelduck		1					
Wigeon	2	1	3				
Teal	3	1	2				
Pintail	Not recorded						
Cormorant			1				
Ringed Plover				1	2		
Golden Plover	Not recorded						
Grey Plover		1	2				
Lapwing		3		1			2
Dunlin	4	1	3	2			
Black-tailed Godwit	Not recorded						
Bar-tailed Godwit	Not recorded						
Curlew	2	1	4	3		5	
Greenshank	2	1		2			
Redshank	3	1	2	4	4		
Black-headed Gull	2	3		4			1

60% of the total number of waterbirds recorded during the high tide survey were located in the inner bay (OH519). 94% of these birds (1,228 birds) were roosting (Figure 4.7.1, Figure 4.7.2). (Note not all recorded birds are mapped).

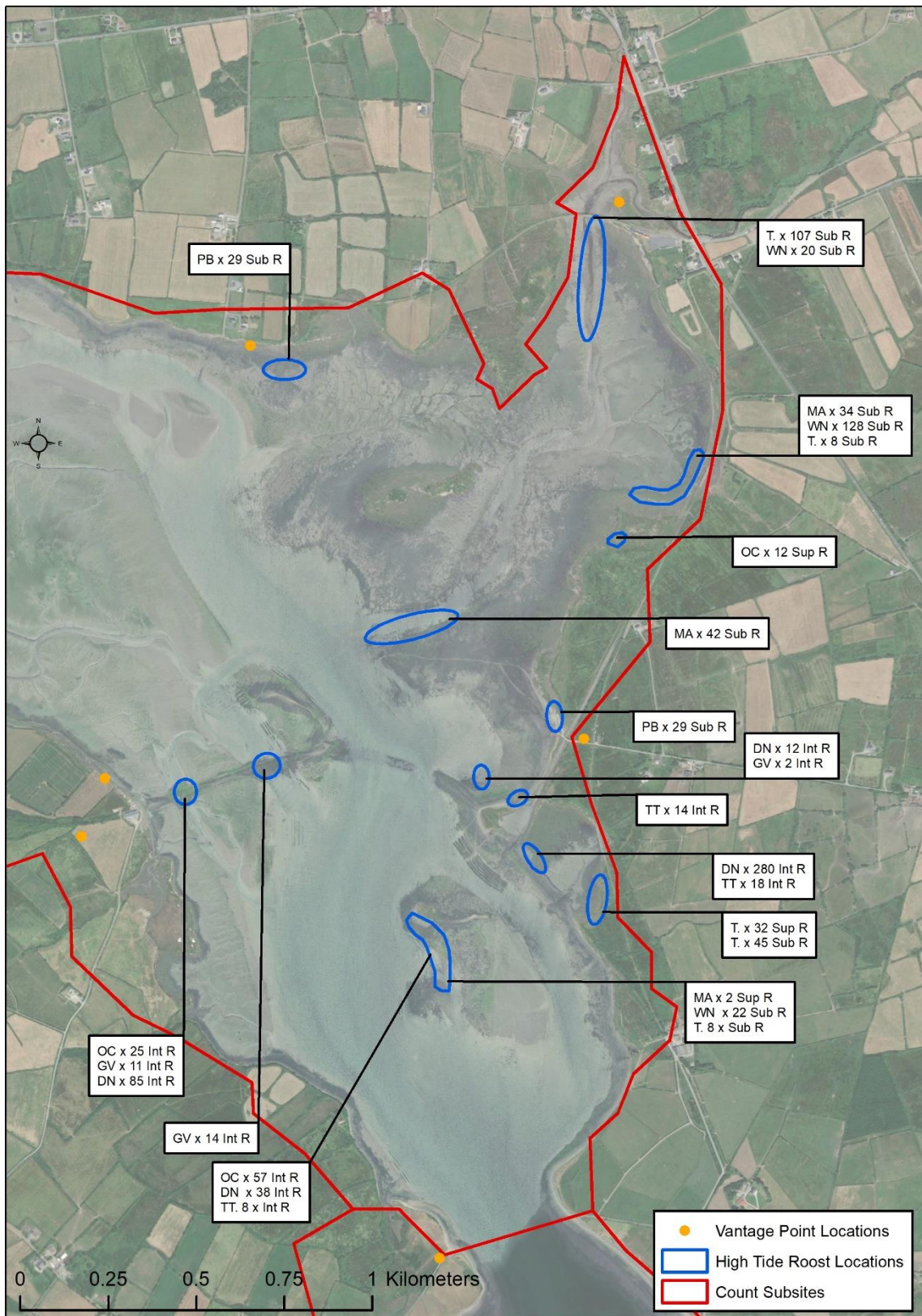


Figure 4.7.1: High tide roost locations OH519 south and east.

Bird Codes: DN Dunlin, OC Oystercatcher, GV Grey Plover, MA Mallard, PB Light bellied-Brent Goose, T. Teal, TT Turnstone, WN Wigeon.

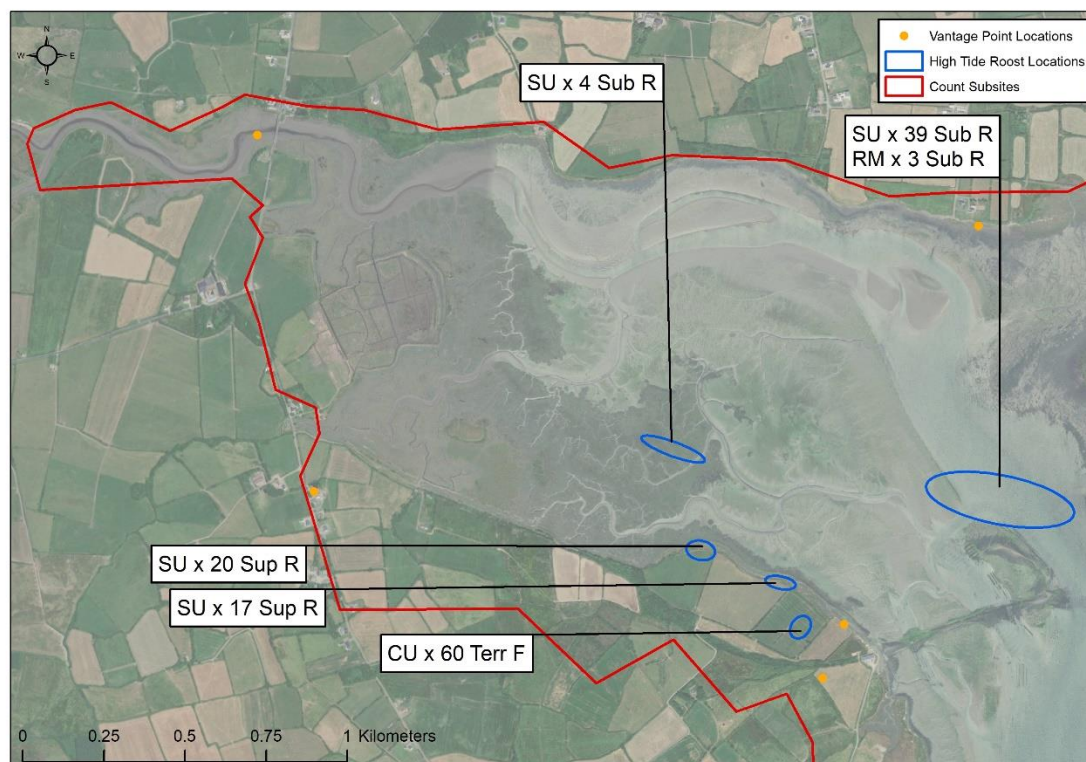


Figure 4.7.2: High tide roost locations OH519 north-west

Bird Codes: CU Curlew, RM Red-breasted Merganser, SU Shelduck.

4.8. Activities and disturbance

Based on the results of the 2020/21 surveys, Poulnasherry Bay appears to be subject to low levels of human activities and disturbance during winter (table 4.8.1).

Table 4.8.1: Activities recorded at Poulnasherry Bay 2020/21.

Subsite Code	Subsite Name	Activity	Number of survey occasions activity recorded	Causing a disturbance?	Response of waterbirds
OH519	Poulnasherry inner Bay	Human walking (intertidal)	1	No	Moderate
		Aquaculture activities	3	No	
		Bait diggers	3	Yes	
OH520	Poulnasherry outer Bay	Powered watercraft	1	No	
		Bait diggers	1	No	
ON025		Bait diggers	2	Yes	Moderate
		Non-powered watercraft	1	No	
		Powered watercraft	1	Yes	

5. DISCUSSION

Poulnasherry Bay is an integral part of the larger Shannon & Fergus estuaries system that is known to support over 20,000 waterbirds during winter (Crowe, 2005). Although lack of count cover during I-WeBS means that site total counts have not exceeded 20,000 waterbirds in recent years, recent counts during the winter of 2017/18 season for the Shannon Integrated Framework Programme (SIFP) (MKOS, 2019) confirmed that 20,000 waterbirds were present across all winter months. The peak count of 43,093 waterbirds (December 2017) (MKOS, 2019) confirms that the Shannon & Fergus estuaries is the most important site in the Republic of Ireland in terms of total waterbird numbers.

Covering an area of little over 350ha, Poulnasherry Bay is a relatively small area within the overall Shannon and Fergus system. Seven waterbird species were recorded in numbers of all-Ireland (national) importance: Shelduck, Wigeon, Teal, Pintail, Little Egret, Grey Plover and Dunlin. The surveys conducted through winter 2020/21 therefore again show that this bay is important for several waterbird species listed as waterbird SCIs for the River Shannon and River Fergus Estuaries SPA.

As found in recent winter surveys, and of note, was that the peak count of total waterbirds in the inner bay (OH519) was considerably higher than any count recorded within this same subsite during the 2010/11 NPWS Waterbird Survey Programme counts. Indeed, this peak count of over 3,000 waterbirds was higher than any combined count of the inner and outer bay during the winter of 2010/11. However, this may be related to the very cold winter weather experienced during winter 2010/11. The cold weather that occurred between December 2010 and February 2011 is likely to have affected waterbird distribution and numbers across sites (NPWS, 2012b) so perhaps the data collected during winter 2010/11 does not serve as a useful baseline.

It is clear that waterbird numbers within Poulnasherry Bay can vary widely between months, perhaps simply because some species range widely across the wider Shannon system and are therefore not frequently present within Poulnasherry Bay. Teal and Wigeon were examples here, these species recorded in relatively high numbers on one survey occasion only. The great variability in waterbird numbers between months, and between winter seasons therefore makes assessing trends in waterbird numbers difficult.

Despite higher total numbers of total waterbirds in recent surveys compared to the baseline period (95/96-99/00), a comparison of mean peak numbers (95/96 – 99/00) of waterbird SCI species with peak numbers from recent surveys (2018/19 – 2020/21) showed lower recent numbers for 15 species and higher numbers for only five species. This suggest that the majority of waterbirds SCIs now occur in lower numbers than c.20 years ago. However, the total numbers of waterbirds wintering in Ireland has declined by almost 40% since the mid 1990's (Burke *et al.* 2019), and such a large decline nationally, obviously has implications for numbers at individual sites. A comparison of recent data with data from the NPWS surveys of winter 2010/11 was more encouraging with seven species occurring in greater number recently, out of the total 21 waterbird SCIs. Also of note was that peak waterbird numbers across the entire survey area have been consistent across the three recent winters.

It is impossible to pinpoint the reasons for declines in waterbird numbers. Many factors in combination are likely to have played a part in the large declines observed in the past 25 years (Lewis *et al.* 2019).

Poulnasherry inner bay (OH519) remains the most important subsite for waterbirds across the survey area. The inner parts of the subsite that are sheltered, close to freshwater flows and have expanses of saltmarsh habitat, appeared to be favoured to a large extent, especially at high tide for roosting. Results are consistent with the recent surveys undertaken during winter 2017/18 (MKOS, 2019) where the inner bay was found to be most important (based on total numbers at low tide) for Light-bellied Brent Goose, Shelduck, Ringed Plover, Grey Plover, Knot, Dunlin, Bar-tailed Godwit and Curlew. The total number of birds within the inner bay during the high tide survey of January 2021 equates to 3.6% of the total number of waterbirds across the entire Shannon and Fergus estuary system in January (based on total counts in MKOS (2019).

While the current study at Poulnasherry Bay recorded low levels of disturbance overall, the standard low tide survey methodology is not best suited to assessing the effects of, for example, aquaculture activities and disturbance to waterbirds. Bespoke studies (e.g. Gittings & O'Donoghue, 2012) would provide better detail. Also pertinent to Poulnasherry Bay and its management going forwards, is the lack of a time series of waterbird count data. The site has received little coverage by I-WeBS in recent years (last counted in winter 2010/11). The continuation of a bespoke annual waterbird monitoring programme is therefore recommended, because without the continued collection of count data, discerning trends in waterbird numbers at this site will remain difficult.

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APPENDIX I: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA SITE SYNOPSIS

Site Name: River Shannon and River Fergus Estuaries SPA

Site Code: 004077

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry.

The site has vast expanses of intertidal flats which contain a diverse macro-invertebrate community, e.g. *Macoma-Scrobicularia-Nereis*, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches.

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Whooper Swan, Light-bellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131) and Black-tailed Godwit (2,035). A further 18 species have populations of national importance, i.e. Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Redshank (2,645), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total).

The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010).

Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe (50), Grey Heron (38), Oystercatcher (551), Turnstone (124) and Common Gull (445) - figures are five year mean peak counts for the period 1995/96 to 1999/2000.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn.

The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of three species, i.e. Light-bellied Brent Goose, Dunlin and Black-tailed Godwit. In addition, there are 18 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which

occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit.

APPENDIX 2: MONTHLY SUBSITE COUNT DATA

*Subsite counts for waterbirds recorded within Poulnasherry Bay winter 2020/21. * indicates numbers of national importance.*

Species Name	Code	Subsite	Subsite name	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	PB	0H517	Querrin				58	103
	PB	0H519	Poulnasherry inner bay		12	3	23	58
	PB	0H520	Poulnasherry outer bay			22	2	
	PB	0N025	Poulnasherry bay addition 1				13	53
	PB	0N027	0H517/518 combined			17		
Shelduck	SU	0H517	Querrin				2	
	SU	0H519	Poulnasherry inner bay		27	39	75	104*
Wigeon	WN	0H517	Querrin			16	20	11
	WN	0H519	Poulnasherry inner bay	750*	153	392	96	176
	WN	0N025	Poulnasherry bay addition 1				2	10
	WN	0N028	Kilrush Marina				3	
Teal	T.	0H517	Querrin	310		130	15	20
	T.	0H519	Poulnasherry inner bay	1103*	277	81		210
	T.	0N025	Poulnasherry bay addition 1	20		28		54
	T.	0N028	Kilrush Marina			2	45	
Mallard	MA	0H517	Querrin	8				
	MA	0H519	Poulnasherry inner bay	7	40	12	19	87
Pintail	PT	0H519	Poulnasherry inner bay		71	7		
Long-tailed Duck	LN	0H519	Poulnasherry inner bay		1			
Red-breasted Merganser	RM	0H519	Poulnasherry inner bay		5	4		3
Great Northern Diver	ND	0H519	Poulnasherry inner bay		8	3		2
	ND	0H520	Poulnasherry outer bay	1	1	1	1	1
	ND	0N025	Poulnasherry bay addition 1			1		1
	ND	0N026	Poulnasherry bay addition 2	1		2		2
	ND	0N027	0H517/518 combined				1	
Little Grebe	LG	0H519	Poulnasherry inner bay			1		5
Great Crested Grebe	GG	0H517	Querrin				1	
	GG	0H519	Poulnasherry inner bay	1	1		1	3
	GG	0H520	Poulnasherry outer bay		2	2	2	
	GG	0N025	Poulnasherry bay addition 1	1		1		
	GG	0N026	Poulnasherry bay addition 2	4		10	1	1
	GG	0N027	0H517/518 combined			1	1	
Cormorant	CA	0H519	Poulnasherry inner bay	6	7			
	CA	0H520	Poulnasherry outer bay		2			1
	CA	0N025	Poulnasherry bay addition 1	1				
	CA	0N026	Poulnasherry bay addition 2			1		
Shag	SA	0N025	Poulnasherry bay addition 1	1				
	SA	0N026	Poulnasherry bay addition 2	1				
Little Egret	ET	0H519	Poulnasherry inner bay	26*	30*	19	3	3
	ET	0H520	Poulnasherry outer bay		3	1		
	ET	0N025	Poulnasherry bay addition 1	3				
Grey Heron	H.	0H517	Querrin					1
	H.	0H519	Poulnasherry inner bay	1	1	2		
	H.	0H520	Poulnasherry outer bay		2	2		
	H.	0N025	Poulnasherry bay addition 1	2		1		
	H.	0N027	0H517/518 combined			1		
Oystercatcher	OC	0H517	Querrin			1		7
	OC	0H519	Poulnasherry inner bay	22	20	9	6	82
	OC	0H520	Poulnasherry outer bay	8	18	6	13	
	OC	0N025	Poulnasherry bay addition 1	8		33	1	7
	OC	0N027	0H517/518 combined				16	
	OC	0N028	Kilrush Marina			2	5	2
Ringed Plover	RP	0H519	Poulnasherry inner bay		52	39		
	RP	0H520	Poulnasherry outer bay	54				
	RP	0N025	Poulnasherry bay addition 1			47		55
	RP	0N026	Poulnasherry bay addition 2					1

Golden Plover	GP	OH520	Poulnasherry outer bay	52				
Grey Plover	GV	OH519	Poulnasherry inner bay	8	8	26	113*	27
	GV	OH520	Poulnasherry outer bay					13
	GV	ON025	Poulnasherry bay addition 1			1		
Lapwing	L.	OH517	Querrin	28		63	26	
	L.	OH519	Poulnasherry inner bay	107	69	5		1
	L.	OH520	Poulnasherry outer bay		33			
	L.	ON025	Poulnasherry bay addition 1	4		200	17	8
	L.	ON028	Kilrush Marina	36		1	8	4
Knot	KN	OH519	Poulnasherry inner bay			18		
	DN	OH517	Querrin			4		2
	DN	OH519	Poulnasherry inner bay	470*	382	667*	888*	410
	DN	OH520	Poulnasherry outer bay	10				55
	DN	ON025	Poulnasherry bay addition 1			20		340
Snipe	SN	OH517	Querrin			2		
	SN	OH519	Poulnasherry inner bay	3				3
	SN	ON025	Poulnasherry bay addition 1			7	2	
	SN	ON028	Kilrush Marina	1				
Black-tailed Godwit	BW	OH519	Poulnasherry inner bay			7		
Bar-tailed Godwit	BA	OH517	Querrin			1		
	BA	OH519	Poulnasherry inner bay	4	6	3	13	
	BA	OH520	Poulnasherry outer bay	9		1		
Curlew	CU	OH517	Querrin	40		6	24	24
	CU	OH519	Poulnasherry inner bay	166	174	229	94	78
	CU	OH520	Poulnasherry outer bay	11	9	5	80	2
	CU	ON025	Poulnasherry bay addition 1	11		4	1	16
	CU	ON026	Poulnasherry bay addition 2	1			3	
	CU	ON027	OH517/518 combined			2	2	1
	CU	ON028	Kilrush Marina				8	
Greenshank	GK	OH517	Querrin	4		2	3	1
	GK	OH519	Poulnasherry inner bay	4	5	3	5	4
	GK	OH520	Poulnasherry outer bay			2	1	
	GK	ON025	Poulnasherry bay addition 1	2				1
	GK	ON027	OH517/518 combined			1		
	GK	ON028	Kilrush Marina			4		
Redshank	RK	OH517	Querrin	42		25	6	7
	RK	OH519	Poulnasherry inner bay	122	143	52	55	12
	RK	OH520	Poulnasherry outer bay	8	2	10	20	8
	RK	ON025	Poulnasherry bay addition 1	9		11	1	4
	RK	ON026	Poulnasherry bay addition 2	1				4
	RK	ON027	OH517/518 combined			3		
	RK	ON028	Kilrush Marina	22		16		
Turnstone	TT	OH519	Poulnasherry inner bay	2	8	1	35	36
	TT	OH520	Poulnasherry outer bay					33
	TT	ON026	Poulnasherry bay addition 2					1
Black-headed Gull	BH	OH517	Querrin					4
	BH	OH519	Poulnasherry inner bay	207	196	8	10	3
	BH	OH520	Poulnasherry outer bay	6	1	3	9	
	BH	ON025	Poulnasherry bay addition 1	15		8	22	2
	BH	ON028	Kilrush Marina			2	5	14
Common Gull	CM	OH519	Poulnasherry inner bay	2	29	9	23	
	CM	OH520	Poulnasherry outer bay		1	7	7	
	CM	ON025	Poulnasherry bay addition 1	2		12	4	3
	CM	ON028	Kilrush Marina					1
Lesser Black-backed Gull	LB	OH519	Poulnasherry inner bay	1				
	LB	OH520	Poulnasherry outer bay	2				
	LB	ON025	Poulnasherry bay addition 1	1				
Herring Gull	HG	OH519	Poulnasherry inner bay	8	4	1	5	

	HG	0H520	Poulnasherry outer bay		2		1	
	HG	0N025	Poulnasherry bay addition 1	4			2	
	HG	0N028	Kilrush Marina	6				2
Great Black-backed Gull	GB	0H519	Poulnasherry inner bay	1	4	3	3	
	GB	0N025	Poulnasherry bay addition 1			2		