EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Marine Institute Bird Studies

Poulnasherry Bay Waterbird Survey.

2021-2022

Lead Agency: Marine Institute

Authors: INIS Environmental Consultants Ltd.

Ireland's EU Structural and Investment Funds Programmes 2014 - 2020
Co-funded by the Irish Government and the European Union

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

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This measure is part-financed by the European Maritime and Fisheries Fund

Foras na Mara
Marine Institute

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Poulnasherry Bay Waterbird Survey

Winter 2021-22 Bird Survey Report

June 2022

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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Quality Assurance

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) good practice guidelines. Where pertinent CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017a), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2017b) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine*, (CIEEM, 2019). 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 Acts, 1976-2021,* the *European Communities (Birds and Natural Habitats) Regulations 2011-2021,* EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the EU Birds *Directive 2009/147/EC* and *Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

Version	**Date**		**Name**	**Signature**
1	21/06/2022	**Report prepared by:**	Dr Lesley Lewis BSc PhD MCIEEM	
1	27/06/2022	**Report checked by:**	Dr. Alex Copland BSc PhD MIEnvSc	
1	27/06/2022	**Report signed off by:**	Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM	
Title		Poulnasherry Bay Waterbird Survey: Winter 2021-22 Bird Survey Report		

Notice

This report was produced by INIS Environmental Consultants Ltd. (INIS) on behalf of the Marine Institute, the client, 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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Table of Contents

1. INTRODUCTION

INIS Environmental Consultants Ltd. were contracted to co-ordinate a series of waterbird surveys at Poulnasherry Bay, Co. Clare during the 2021/22 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 this 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

Dr. Lesley Lewis BSc PhD MCIEEM is a specialist waterbird ecologist and wrote this report. 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 18 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 (EcIA), 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). She manages a team of four and is responsible for the delivery of these projects for the National Parks and Wildlife Service.

Dr Alex Copland BSc PhD MIEnvSc is Technical Director with INIS and reviewed this report. He has over 25 years of professional experience working in both statutory and private companies, in third-level research institutions and with environmental NGOs. He is proficient in experimental design and data analysis and has managed several large-scale, multi-disciplinary ecological projects. These have included research and targeted management work for species of conservation concern, the design and delivery of practical conservation actions with a range of stakeholders and end-users, education and interpretation on the interface between people and the environment and the development of coordinated, strategic plans for birds and biodiversity.

He has written numerous scientific papers, developed and contributed to evidence-based position papers, visions and strategies on birds and habitats in Ireland. He has supervised the successful completion of research theses for several post-graduate students, including doctoral candidates. He lectures to both undergraduate and post-graduate students at UCD, as well as being a collaborative researcher with both UCD and UCC. He also sits on the Editorial Panel of the scientific journal, Irish Birds, which publishes original ornithological research relevant to Ireland's avifauna.

Mr Howard Williams MCIEEM CEnv CBiol MRSB MIFM is Lead Ecologist with Inis and reviewed and signed off on this report. He 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.

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/EC[1] (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 km^2 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 (*Crassostrea gigas*) 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

[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).*

survey programme was therefore undertaken at Poulnasherry Bay during the period October 2018 to March 2019, and subsequently followed by surveys during winters 2019/20, 2020/21 and the current reporting period, winter 2021/22. This report details the results of the surveys during winter 2021/22 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 Ocean[3]. 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 and 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 SPA because it regularly supports over 20,000 waterbirds during the non-breeding season making this a site of international importance.

2.2.1. Published status and trends of Poulnasherry Bay waterbirds

Updated waterbird site trends for 97 wetland sites around the Republic of Ireland were published in April 2022 (Kennedy *et al.*, 2022). These species trends are based on data from the Irish Wetland Bird Survey (I-WeBS) but only sites with sufficient bird count data over the lifetime of the project can be included in analyses. 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 count coverage during I-WeBS has dropped considerably since 2010/11 largely due to a lack of volunteer counters in the area, and to the very large extent of the site. For this reason, site trends for the Shannon & Fergus Estuaries I-WeBS site can therefore not be calculated.

Lewis *et al*. (2016) also 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 noted that I-WeBS subsite 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] *http://www.infomar.ie/surveying/Bays/Shannon.php*

Table 2.2.1 *Waterbird Special Conservation Interest (SCI) species listed for the Shannon & Fergus Estuaries Special Protection Area.*

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

[a] After Birds of Conservation Concern in Ireland (Gilbert *et al*., 2021), [b] Five-year peak mean for the period 1995/96-1999/00.

3. METHODOLOGICAL APPROACH

3.1. Background to the low tide survey programme

The Irish Wetland Bird Survey (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; Kennedy *et al.*, 2022). 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 2021/22 winter season therefore followed the standard methodology developed by the NPWS waterbird survey programme. Similar surveys were also undertaken during the 2018/19, 2019/20 and 2020/21 seasons (Inis Environmental, 2019, 2020, 2021). 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: 0H519 (Poulnasherry bay outer) and 0H520 (Poulnasherry bay inner).

During the waterbird survey programme of 2018/19, it was discovered that subsites 0H519 (outer) and 0H520 (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 0H519 (outer) and 0H520 (inner).

Since then, it has been discovered that data collection and mapping for the SPA Conservation Objectives Supporting Document use **0H519 (Poulnasherry bay inner)** and 0H520 **(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 **0H519 (Poulnasherry bay inner)** and 0H520 **(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 0H519 and 0H520, 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 0H517, 0H518, 0N025 and

0N026. The current monitoring work therefore followed suit (**Table 3.2.1**, **Figure 3.2.1**). A further subsite (0N028 Kilrush Marina) was also added.

Table 3.2.1: *Count Subsites of Poulnasherry Bay*

Subsite Code	Subsite Name
0H517	Querrin
0H519	Poulnasherry inner bay
0H520	Poulnasherry outer bay
0N025	
0N026	
0N027	Subsite created to encompass 0H517 and 0H518 combined
0N028	Kilrush Marina

Figure 3.2.1: *Count subsites used for the Poulnasherry Bay waterbird surveys. 0NO28 (Kilrush Marina) is the small water body immediately north-east of 0NO25 (marked with a star).*

3.3. Field survey methods

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.

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 numerically in each analysis.

3.4.3. Trends

Poulnasherry Bay (I-WeBS subsite 0H498) 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 0H519 and 0H520 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 2021/22 winter waterbird survey season proceeded unhampered by weather conditions. All surveys were carried out with good weather conditions (Table **4.1.1**). Count coverage of subsites is shown in Table **4.1.2**.

Table 4.1.1: *Dates and survey type for the 2021/22 survey programme.*

Date	Survey[a]	Wind	Cloud (%)	Rain	Visibility	Notes
23.10.21	LT1	Breezy	67 - 100	Showers	Good	No constraints
21.11.21	LT2	Light	0 - 33	None	Good	No constraints
23.12.21	LT3	Breezy	67 - 100	Showers	Good	No constraints
28.01.22	HT	Breezy	67 - 100	Showers	Good	No constraints
19.02.22	LT4	Light	0 - 33	None	Good	No constraints

[a] LT = Low tide; HT = High tide.

Table 4.1.2: *Count coverage of subsites during winter 2021/22.*

Subsite Code	Subsite Name	LT1	LT2	LT	LT4	HT
0H517	Querrin	1	1	1	1	1
0H519	Poulnasherry inner bay	1	1	1	1	1
0H520	Poulnasherry outer bay	1	1	1	1	1
0N025		1	1	1	1	1
0N026		1	1	1	1	1
0N027	0H517 and 0H518 combined	1	1	1	1	1
0N028	Kilrush Marina				1	

4.2. Species assemblage, diversity and occurrence

A total of 32 waterbird species was recorded during the winter 2021/22 surveys (**Table 4.2.1**). The species list included 15 wildfowl and allies, 13 wader species and four gull species. **Table 4.2.1** provides the 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 January 2022 (29 species) (**Figure 4.2.1**).

Table 4.2.1: *Species recorded during the winter surveys of Poulnasherry Bay 2021/22. A ticked cell means that a species was recorded in the monthly survey. The table also highlights (*) Annex I species on the EU Bird's Directive.*

Species name	Latin name	Code	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	*Branta bernicla hrota*	PB	√	√	√	√	√
Shelduck	*Tadorna tadorna*	SU		√	√	√	√
Wigeon	*Anas penelope*	WN	√	√	√	√	√
Teal	*Anas crecca*	T.	√	√	√	√	√
Mallard	*Anas platyrhynchos*	MA	√	√	√	√	√
Pintail	*Anas acuta*	PT			√	√	√
Shoveler	*Anas clypeata*	SV	√				√
Red-breasted Merganser	*Mergus serrator*	RM		√		√	√
Great Northern Diver*	*Gavia immer*	ND	√	√	√	√	√
Little Grebe	*Tachybaptus ruficollis*	LG				√	√
Great Crested Grebe	*Podiceps cristatus*	GG	√	√	√	√	√
Cormorant	*Phalacrocorax carbo*	CA	√	√	√	√	√
Shag	*Phalacrocorax aristotelis*	SA	√	√	√	√	√
Little Egret*	*Egretta garzetta*	ET	√	√	√	√	√
Grey Heron	*Ardea cinerea*	H.	√	√	√	√	
Oystercatcher	*Haematopus ostralegus*	OC	√	√	√	√	√
Ringed Plover	*Charadrius hiaticula*	RP	√	√	√	√	
Golden Plover*	*Pluvialis apricaria*	GP	√	√	√		√
Grey Plover	*Pluvialis squatarola*	GV	√	√	√	√	
Lapwing	*Vanellus vanellus*	L.	√	√	√		√
Knot	*Calidris canutus*	KN			√		√
Dunlin	*Calidris alpina*	DN	√	√	√	√	√
Snipe	*Gallinago gallinago*	SN	√	√	√	√	√
Bar-tailed Godwit*	*Limosa lapponica*	BA	√	√			√
Curlew	*Numenius arquata*	CU	√	√	√	√	√
Greenshank	*Tringa nebularia*	GK	√	√	√	√	√
Redshank	*Tringa totanus*	RK	√	√	√	√	√
Turnstone	*Arenaria interpres*	TT	√	√	√	√	√
Black-headed Gull	*Chroicocephalus ridibundus*	BH	√	√	√	√	√
Common Gull	*Larus canus*	CM	√	√	√	√	√
Herring Gull	*Larus argentatus*	HG	√	√	√	√	√
Great Black-backed Gull	*Larus marinus*	GB	√	√	√	√	√

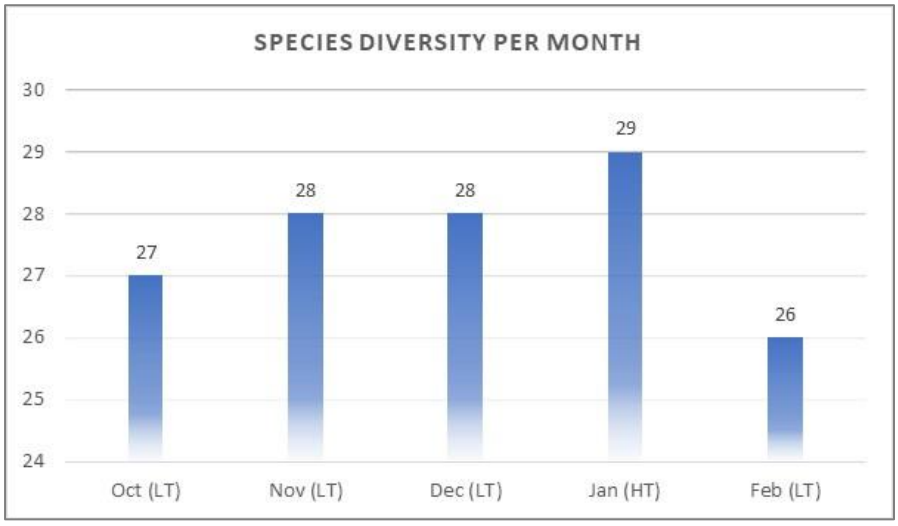

Figure 4.2.1: *Overall species diversity during the monthly surveys.*

Overall subsite diversity ranged from six species (0N028) to a maximum 32 species (0H519 Poulnasherry inner bay) (**Table 4.2.2**, **Figure 4.2.2**). Note however that the peripheral subsite 0N028 (Kilrush Marina) was counted only once during the winter. Poulnasherry outer bay (0H520) supported a total of 17 species. By contrast, species diversity recorded from the NPWS Waterbird Survey Programme in 2010/11 reported a total of 34 species (inner bay) and 15 species (outer bay).

The most widely distributed species were Oystercatcher, Curlew, Redshank, Black-headed Gull and Herring Gull; each recorded in all six subsites (Note 0N028 is not included in the calculations as it was only counted once) (**Table 4.2.2**). Nine species occurred in one subsite only: Pintail, Shoveler, Red-breasted Merganser, Little Grebe, Ringed Plover, Grey Plover, Knot, Dunlin and Bar-tailed Godwit. All of these species were only recorded in the inner bay (0H519). **Figure 4.2.3** highlights that a greater number of species was found in only one subsite. Waterbird species diversity was highest in 0H519 (Poulnasherry inner bay) during all low tide surveys and during the high tide survey (Figure 4.2.4).

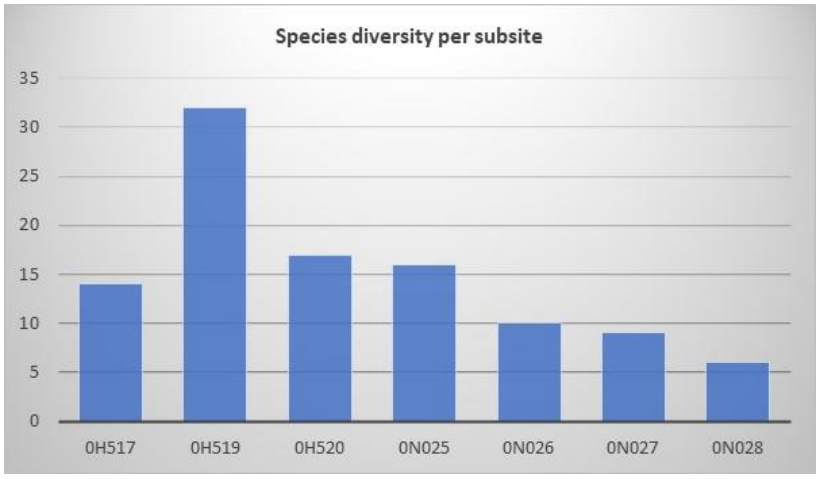

Figure 4.2.2: *Species diversity per subsite.*

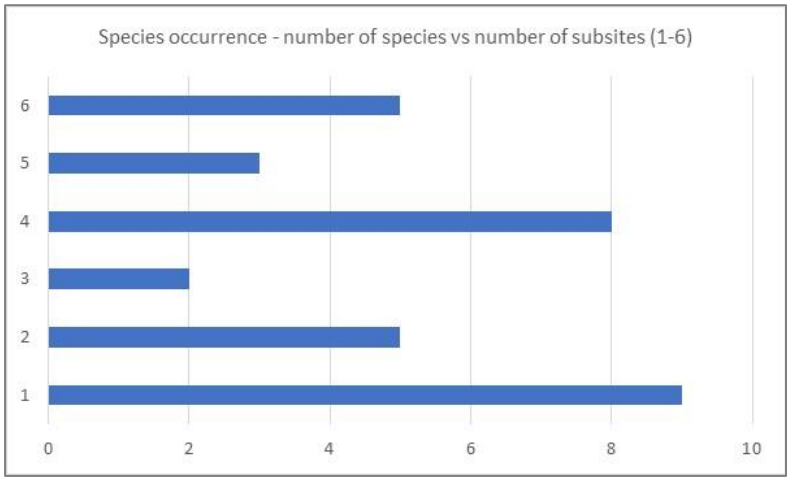

Figure 4.2.3: *Species occurrence – highlights that a greater number of species was found in only one subsite.*

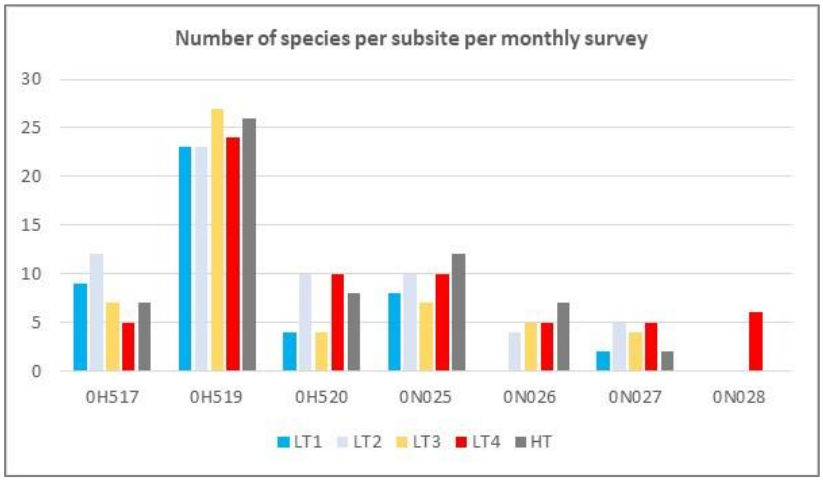

Figure 4.2.4: *Monthly species diversity per subsite for low tide counts*

Table 4.2.2: *Subsite diversity recorded during the winter surveys of Poulnasherry Bay 2021/22. 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*). Note 0N028 is not included in the calculations as it was only counted a single time.

Species name	0H517	0H519	0H520	0N025	0N026	0N027	0N028	Number of subsites (% occurrence)
Light-bellied Brent Goose	1	5	3	1		1		5 (83)
Shelduck	3	4						2 (33)
Wigeon	3	5						2 (33)
Teal	5	5					1	3 (50)
Mallard	1	5						2 (33)
Pintail		3						1 (17)
Shoveler		2						1 (17)
Red-breasted Merganser		3						1 (17)
Great Northern Diver		3	3	4	3			4 (67)
Little Grebe		1						1 (17)
Great Crested Grebe		3	3	1	3	2		5 (83)
Cormorant		2	3	5	2			4 (67)
Shag		2	1	4	1			4 (67)
Little Egret	2	5	1			1		4 (67)
Grey Heron	1	3	3		1			4 (67)
Oystercatcher	1	5	4	5	3	5	1	6 (100)
Ringed Plover		4						1 (17)
Golden Plover		3		1				2 (33)
Grey Plover		4						1 (17)
Lapwing	3	4		1		1		4 (67)
Knot		2						1 (17)
Dunlin		5						1 (17)
Snipe		4	1					2 (33)
Bar-tailed Godwit		3						1 (17)
Curlew	5	5	2	4	2	2		6 (100)
Greenshank	4	5	1	1			1	5 (83)
Redshank	5	5	2	4	3	4	1	6 (100)
Turnstone		3	1	1	2			4 (67)
Black-headed Gull	3	5	2	5		1	1	6 (100)
Common Gull		5	1	3				3 (50)
Herring Gull	3	5	3	4		1	1	6 (100)
Great Black-backed Gull		5	2	3	1			4 (67)

4.3. Total numbers of waterbirds

During winter 2021/22, total numbers of waterbirds during low tide surveys (across the entire survey rea) peaked at a total 3,088 waterbirds during November 2021 (**Table 4.3.1**). The lowest total count was in February 2022 (1,750 waterbirds). Peak waterbird numbers across the entire survey area have been relatively consistent across recent winters at 3,088 (2021/22), 3,771 (2020/21), 3,757 (2019/20) and 3,314 (2018/19).

Throughout these four recent winters, and during the NPWS baseline waterbird survey programme, 0H519 (inner bay) has supported the greatest number of waterbirds. However, as **Figure 4.3.1** shows, numbers within this subsite have increased over time. In contrast, numbers in the outer bay (0H520) appear to have decreased over time (**Figure 4.3.2**).

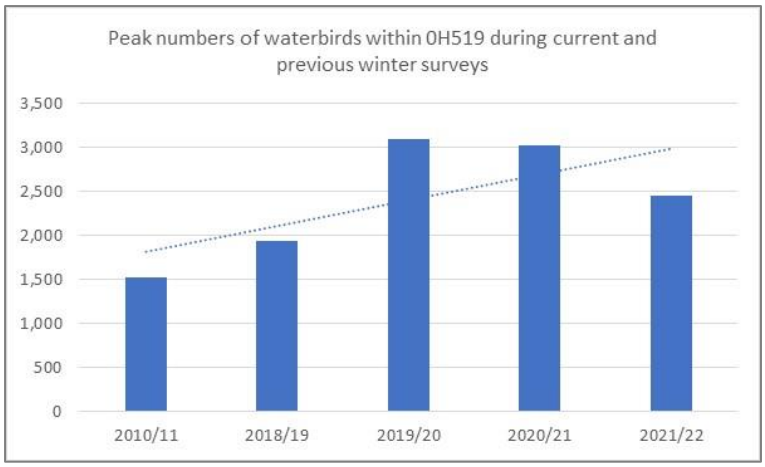

Figure 4.3.1: *Peak numbers recorded within 0H519 over time.*

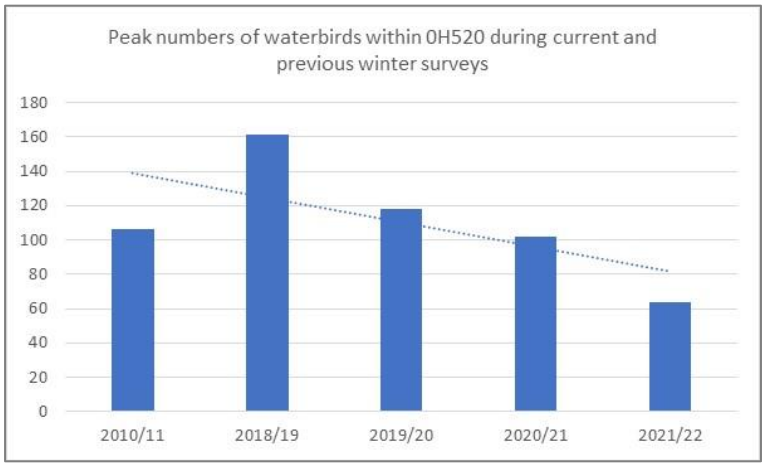

Figure 4.3.2: *Peak numbers recorded within 0H520 over time.*

Table 4.3.1: *Total numbers of waterbirds counted within the study area during 2021/22, plus count totals from the 2010/11 Waterbird Survey Programme for 0H519 and 0H520, and from the waterbird surveys during winter 2018/19, 2019/20 and 2021/21 (*not counted).*

		LT1 (Oct)	LT2 (Nov)	LT3 (Dec)	LT4 (Feb)	HT (Jan
2021/22	Entire Survey area	2,698	3,088	2,817	1,750	1,911
2021/22	0H517	395	412	306	57	103
2021/22	0H519	2,238	2,265	2449	1,458	1,608
2021/22	0H520	7	106	21	91	16
2021/22	0N025	47	230	21	80	140
2021/22	0N026	0	7	9	11	39
2021/22	0N027	8	68	11	22	5
2021/22	0N028	*	*	*	31	*
2020/21	Entire Survey area	3,771	1,809	2,396	1,921	2,187
2020/21	0H517	432	*	250	155	180
2020/21	0H519	3,021	1,733	1.643	1,467	1,307
2020/21	0H520	161	76	62	136	113
2020/21	0N025	84	*	376	65	554
2020/21	0N026	8	*	13	4	9
2020/21	0N027	0	*	25	20	1
2020/21	0N028	65	*	27	74	23
2019/20	Entire Survey area	1,756	3,757	915	1,170	1,691
2019/20	0H517	139	284		52	116
2019/20	0H519	1,477	3,099	715	825	1,315
2019/20	0H520	42	118	73	101	22
2019/20	0N025	18	80	25	158	183
2019/20	0N026	26	15	13	1	21
2019/20	0N027	9	17	89	11	10
2019/20	0N028	45	144		32	24
2018/19	Entire Survey area	1,294	3,314	760	547	614
2018/19	0H520	84	102	19	18	19
2018/19	0H519	1,198	1,943	677	511	573
2010/11	0H520	52	32	63	64	44
2010/11	0H519	1,518	1,200	1,440	1,103	761
2010/11	0H519 + 0H520	1,570	1,232	1,503	1,167	805

4.4. Species totals

Waterbird species peak counts for the 2021/22 winter season 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, Great Northern Diver, Little Egret and Dunlin. Both Wigeon and Teal were recorded in numbers of national importance on two survey occasions, and they were the most numerous of wildfowl and allies. Of the wading birds, Lapwing and Dunlin were the most numerous species, while Black-headed Gull was the most abundant gull species.

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	1% Nat	1% Int	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	350	400	10	106	99	79	65
Shelduck	100	2500		11	88	133*	86
Wigeon	560	14000	550	679*	589*	35	266
Teal	360	5000	805*	460*	333	276	316
Mallard	280	53000	24	13	13	3	11
Pintail	20	600			14	57*	17
Shoveler	20	650	4				5
Red-breasted Merganser	25	860		2		3	2
Great Northern Diver	20	50	3	2	4	13	21*
Little Grebe	20	4700					6
Great Crested Grebe	30	6300	4	4	5	3	5
Cormorant	110	1200	4	4	4	4	5
Shag	0	0	2	6	2	5	18
Little Egret	20	1100	28*	15	7	17	17
Grey Heron	25	5000	1	6	2	3	
Oystercatcher	610	8200	38	34	37	33	69
Ringed Plover	120	540	28	32	18	6	
Golden Plover	920	9300	8	111	98		65
Grey Plover	30	2000	4	2	2	6	
Lapwing	850	72300	239	257	554		163
Knot	160	5300			11		65
Dunlin	460	13300	411	410	396	591*	277
Snipe			6	1	2	3	1
Bar-tailed Godwit	170	1500	9	14			26
Curlew	350	7600	157	316	157	175	165
Greenshank	20	3300	9	8	5	5	5
Redshank	240	2400	73	222	61	118	50
Turnstone	95	1400	2	1	4	36	40
Black-headed Gull			184	296	245	70	106
Common Gull			7	4	18	37	22
Herring Gull			80	68	43	36	13
Great Black-backed Gull			5	4	6	3	4

4.5. Trends in waterbird numbers

Poulnasherry Bay (I-WeBS subsite 0H498) 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 0H519 and 0H520 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, 2019/20, 2020/21 and 2021/22 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 16 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 four of the 21 species assessed have declined in number, while five species have occurred in greater number recently, with the remaining species showing such variation that no trend is possible to discern.

Graphically comparing the baseline mean peak numbers of waterbird SCI species with peak numbers from surveys 2018/19 – 2021/22 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, 2020/21 and 2021/22 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	(F) Peak count 2021/22	Peak C-F	(A) vs (C/D/E/F)	(B) vs (C/D/E/F)
Whooper Swan	1	0	0	0	0	0	0	n/a	n/a
Light-bellied Brent Goose	539	56	256	179	214	106	256	↓	↑
Shelduck	180	196	115	48	104	133	133	↓	↓
Wigeon	1,125	61	332	763	750	679	763	↓	↑
Teal	176	510	218	274	1,103	805	1103	↑	Stable/variable
Pintail	57	0	82	51	71	57	82	Stable/variable	↑
Shoveler	3	37	6	13	0	5	13	Stable/variable	↓
Scaup	22	8	0	0	0	0	0	↓	↓
Cormorant	58	12	8	5	9	5	9	↓	↓
Ringed Plover	155	28	53	213	54	32	213	↓	Stable/variable
Golden Plover	1,380	7	80	102	52	111	111	↓	↑
Grey Plover	66	37	7	10	113	6	113	↓	Stable/variable
Lapwing	2,522	155	483	238	107	554	554	↓	Stable/variable
Knot	164	33	0	26	18	65	65	↓	Stable/variable
Dunlin	2,300	457	336	921	888	591	921	↓	Stable/variable
Black-tailed Godwit	16	10	2	4	7	0	7	↓	Stable/variable
Bar-tailed Godwit	95	16	5	33	13	26	33	↓	Stable/variable
Curlew	654	209	146	269	234	316	316	↓	Stable/variable
Greenshank	32	13	8	10	6	9	10	↓	Stable/variable
Redshank	197	153	80	96	145	222	222	Stable/variable	Stable/variable
Black-headed Gull	1,818	42	109	118	213	296	296	↓	↑

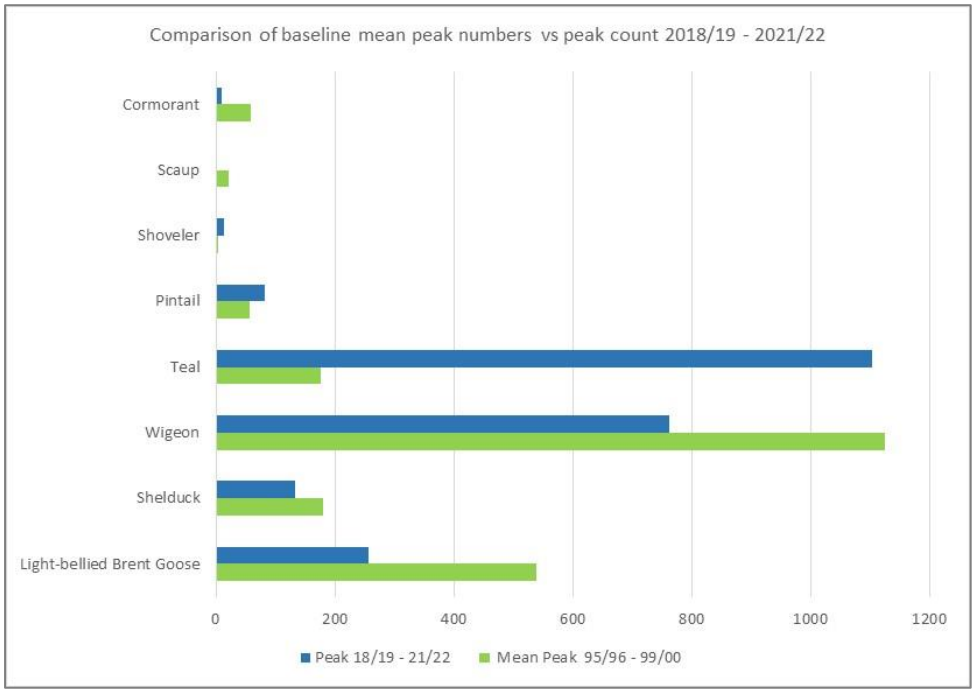

Figure 4.5.1a: *Wildfowl and allies - Comparison of baseline mean peak numbers of waterbird SCI species with peak numbers from recent surveys 2018/19 – 2021/22.*

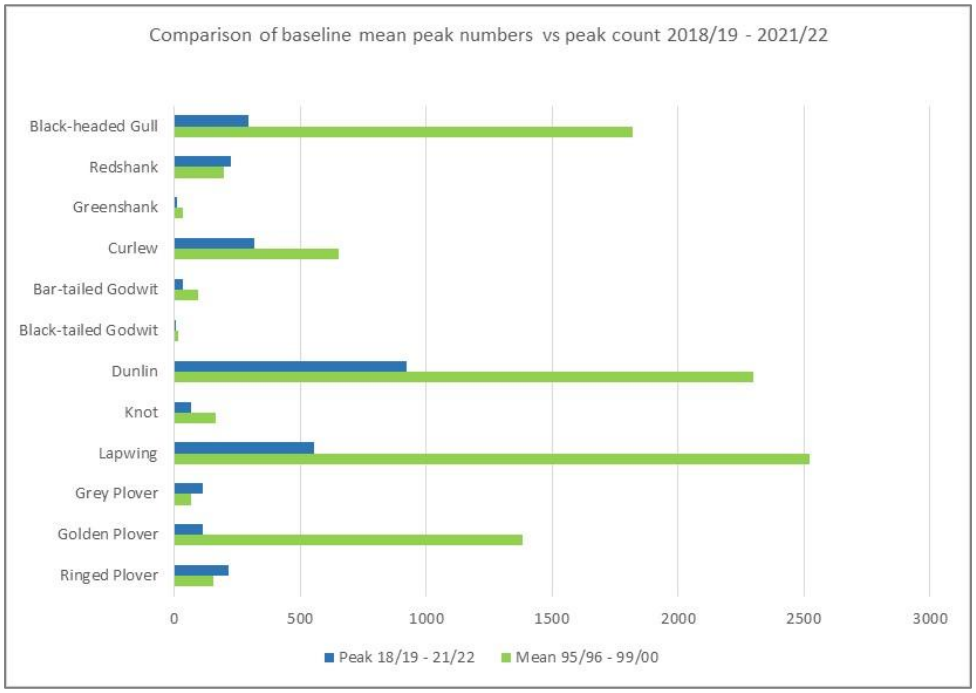

Figure 4.5.1b: *Wading birds and gull species - Comparison of baseline mean peak numbers of waterbird SCI species with peak numbers from surveys 2018/19 – 2021/22.*

4.6. Total waterbird numbers per subsite

Monthly subsite count data are provided in Appendix 2. Numbers of Shelduck, Wigeon, Teal, Pintail, Little Egret and Dunlin exceeded the threshold for national importance within the inner bay during low tide surveys (0H519).

4.7. Relative importance of subsites

Based on total numbers across all four low tide surveys, 0H519 (Poulnasherry inner bay) was the most important subsite for all of the waterbird SCI species recorded during the survey (**Table 4.7.1**), with all SCI species except occurring in their largest numbers on at least one occasion in this subsite. Note that Whooper Swan and Black-tailed Godwit were not recorded during the 2021/22 winter survey. The outer bay (0H520) held peak numbers of only one species (Light-bellied Brent Goose).

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.* Note 0N028 was only counted once.*

Species	0H517	0H519	0H520	0N025	0N026	0N027	0N028*
Light-bellied Brent Goose		1(4)	1 (3)			3 (1)	
Shelduck	2 (2)	1 (3)					
Wigeon	2 (2)	1 (4)					
Teal	2 (4)	1 (4)					3 (1)
Pintail		1 (2)					
Shoveler		1 (1)					
Cormorant		1 (2)	2 (2)	1 (4)	2 (1)		
Ringed Plover		1 (4)					
Golden Plover		1 (2)		1 (1)			
Grey Plover		1 (4)					
Lapwing	2 (3)	1 (3)	2 (1)			3 (1)	
Knot		1 (1)					
Dunlin		1 (4)		3 (1)			
Black-tailed Godwit	Not recorded						
Bar-tailed Godwit		1 (2)					
Curlew	2 (4)	1 (4)	4 (1)	3 (2)	4 (1)	3 (2)	
Greenshank	2 (3)	1 (4)	2 (1)				2 (1)
Redshank	2 (4)	1 (4)	4 (1)	3 (4)	4 (2)	3 (3)	4 (1)
Black-headed Gull	3 (3)	1 (4)	2 (4)	1 (3)		3 (1)	3 (1)

The inner bay (0H519) held peak numbers of ten species foraging at low tide (**Table 4.7.2**), with the outer bay (0H520) supporting peak numbers of two species.

Poulnasherry inner bay (0H519) was also found to support peak numbers of most waterbird SCI species during the high tide period (**Table 4.7.3**). 79% of the total number of waterbirds recorded across the survey area during the high tide survey were recorded as roosting in the inner bay (0H519), further highlighting the importance of this area. Please refer to **Figures 4.7.1 – 4.7.3** that show high tide roost locations.

Table 4.7.2: *Relative importance of each subsite (highest ranked number) based on numbers of selected waterbird SCI species foraging intertidally during low tide surveys. The highest rank number from any of the four low tide surveys is shown.*

Species	0H517	0H519	0H520	0N025	0N026	0N027	0N028
Light-bellied Brent Goose		1	1			3	
Shelduck	2	1					
Ringed Plover		1	1				
Grey Plover		1					
Lapwing		1				2	
Knot		1					
Dunlin		1					
Bar-tailed Godwit		1					
Curlew	2	1	3	3	4	3	
Redshank	2	1	5	3	4	3	6

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

Species	0H517	0H519	0H520	0N025	0N026	0N027	0N028
Light-bellied Brent Goose	2	3		1			
Shelduck	2	1					
Wigeon	2	1					
Teal	2	1					
Pintail		1					
Shoveler		1					
Cormorant			2	1	2		
Ringed Plover	Not recorded						
Golden Plover		1					
Grey Plover	Not recorded						
Lapwing		1		2			
Knot		1					
Dunlin		1					
Black-tailed Godwit	Not recorded						
Bar-tailed Godwit		1					
Curlew	2	1	4	3	5		
Greenshank	2	1		1			
Redshank	3	1	2		2	4	
Black-headed Gull		1		2			

Figure 4.7.1: *High tide roost locations 0H519 inner north-west.*

Black-headed Gull (BH), Curlew (CU), Dunlin (DN), Greenshank (GK), Herring Gull (HG), Lapwing (L.), Little Egret (ET), Redshank (RK), Shelduck (SU), Teal (T.), Wigeon (WN)

Figure 4.7.2: *High tide roost locations 0H519 inner north-east.*

Bar-tailed Godwit (BA), Black-headed Gull (BH), Dunlin (DN), Golden Plover (GP), Knot (KN), Lapwing (L.), Little Egret (ET), Mallard (MA), Oystercatcher (OC), Redshank (RK). Teal (T.), Wigeon (WN)

Figure 4.7.3: *High tide roost locations 0H519 outer section.*
Curlew (CU), Dunlin (DN), Redshank (RK). Teal (T.), Wigeon (WN)

4.8. Activities and disturbance

Disturbance events were recorded within two count subsites only (0H519 and 0H520) with activities recorded in a maximum of two out of the five surveys undertaken. All events occurred during low tide surveys (**Table 4.8.1**). These results suggest a low level of activities that cause disturbance at the site, however, as a survey count period is a 'snap-shot' of any given time, further targeted surveys would be required to understand the full extent of activities at the site.

Table 4.8.1*: Activities recorded at Poulnasherry Bay 2021/22*

Subsite Code	Subsite Name	Activity	Number of survey occasions activity was recorded	Causing a disturbance?	Response of waterbirds
0H519	Poulnasherry inner Bay	Vehicles Aquaculture activities Bait diggers	1 2 2	No Yes Yes	 Moderate Moderate
0H520	Poulnasherry outer Bay	Dogs Bait diggers	1	No No	

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, MKOS, 2019). Although lack of count cover during I-WeBS means that site total counts have not exceeded 20,000 waterbirds in recent years, 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) confirmed that the Shannon & Fergus estuaries is the most important site in the Republic of Ireland in terms of total waterbird numbers. This is likely to still be the case.

Covering an area of little over 350ha, Poulnasherry Bay is therefore a relatively small area within the overall Shannon and Fergus system. Data collected during winter 2021/22 again confirm the importance of this bay however, with seven waterbird species recorded in numbers of national (all-Ireland) importance namely Shelduck, Wigeon, Teal, Pintail, Great Northern Diver, Little Egret and Dunlin. Poulnasherry Bay is therefore an integral and important part of the overall Shannon and Fergus estuarine system.

The total number of waterbirds within the inner and outer bay has increased since the NPWS baseline low tide survey programme carried out in winter 2010/11. In that winter, a peak count of 1,570 waterbirds was recorded in the inner and outer bay combined. In more recent winters, the inner bay alone has supported numbers of over 3,000 waterbirds on some survey occasions. However, it is known that 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 the data collected during winter 2010/11 may not serve as a useful baseline. Data collected since winter 2018/19 shows that peak waterbird numbers across the entire survey area have been relatively consistent (3,088 (2021/22), 3,771 (2020/21), 3,757 (2019/20) and 3,314 (2018/19)). Numbers of waterbirds in the inner bay appear to have increased over time, or at minimum have remained stable. While there appears to be a downwards trend for total numbers of waterbirds in the outer bay, differences in the peak counts of waterbirds over time actually relate to relatively small numbers of birds so again, the trend for the outer bay is actually relatively stable.

Understanding patterns and trends is difficult overall because numbers of waterbirds within Poulnasherry Bay can vary widely between months, possibly due to some species ranging widely across the wider Shannon system and therefore not frequently present within Poulnasherry Bay. While species such as Lapwing and Knot can vary in number greatly, other species however, seem to be very consistent in numbers across the months, examples being Light-bellied Brent Goose and Oystercatcher.

Assessment of species trends by comparison of recent peak counts with baseline data used for SPA designation shows an overwhelming decline in number of many species. The majority of waterbirds SCIs now occur in lower numbers than c.20 years ago. This is not surprising given that we know that 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 (Kennedy et al., 2022).

Comparing peak counts recorded in winter 2010/11 with the most recent winter (2021/22) suggests that four of the 21 species assessed have declined in number, while five species have occurred in greater number recently, with the remaining species showing such variation that no trend is possible

to discern. However as noted above, the count data collected in winter 2010/11 may not serve as a useful baseline. Species peak counts for the period 2018-19 to current (2021/22) suggest relative stability in the numbers of the majority of species assessed, which is encouraging.

Poulnasherry inner bay (0H519) 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, appear to be favoured to a large extent, especially at high tide for roosting. Results are consistent with the coordinated 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. As noted above, the numbers of waterbirds using the area appear to be relatively stable, which is encouraging against the backdrop of known declines in wintering waterbird populations nationally. Pertinent to Poulnasherry Bay and its management going forwards, is the lack of a time series of waterbird count data within I-WeBS. The continuation of a bespoke annual waterbird monitoring programme at Poulnasherry Bay is therefore highly recommended.

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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 2021/22. * indicates numbers of national (all Ireland) importance.*

Species name	Subsite name	Code	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	Querrin	0H517					11
	Poulnasherry inner bay	0H519	10	40	81	19	5
	Poulnasherry outer bay	0H520		66	18	58	
		0N025					49
	0H517/518 combined	0N027				2	
Shelduck	Querrin	0H517		2		3	4
	Poulnasherry inner bay	0H519		9	88	130*	82
Wigeon	Querrin	0H517	60	167			17
	Poulnasherry inner bay	0H519	490	512	589*	35	249
Teal	Querrin	0H517	220	156	157	49	42
	Poulnasherry inner bay	0H519	585*	304	176	214	274
	Kilrush Marina	0N028				13	
Mallard	Querrin	0H517	6				
	Poulnasherry inner bay	0H519	18	13	13	3	11
Pintail	Poulnasherry inner bay	0H519			14	57*	17
Shoveler	Poulnasherry inner bay	0H519	4				5
Red-breasted Merganser	Poulnasherry inner bay	0H519		2		3	2
Great Northern Diver	Poulnasherry inner bay	0H519			1	8	15
	Poulnasherry outer bay	0H520		1	1		3
		0N025	3		2	3	1
		0N026		1		2	2
Little Grebe	Poulnasherry inner bay	0H519					6
Great Crested Grebe	Poulnasherry inner bay	0H519	3		1	1	
	Poulnasherry outer bay	0H520	1			1	1
		0N025					1
		0N026		4	2		3
	0H517/518 combined	0N027			2	1	
Cormorant	Poulnasherry inner bay	0H519	3	2			
	Poulnasherry outer bay	0H520		1		1	1
		0N025	1	1	3	3	3
		0N026			1		1
Shag	Poulnasherry inner bay	0H519			1		17
	Poulnasherry outer bay	0H520					1
		0N025	2	6	1	4	
		0N026				1	
Little Egret	Querrin	0H517		1	1		
	Poulnasherry inner bay	0H519	25*	14	6	16	17
	Poulnasherry outer bay	0H520				1	

	0H517/518 combined	0N027	3				
Grey Heron	Querrin	0H517		1			
	Poulnasherry inner bay	0H519		1	1	3	
	Poulnasherry outer bay	0H520	1	3	1		
		0N026		1			
Oystercatcher	Querrin	0H517		1			
	Poulnasherry inner bay	0H519	20	7	29	11	48
	Poulnasherry outer bay	0H520	2	19		5	2
		0N025	11	2	2	5	13
Oystercatcher		0N026			3	4	3
	0H517/518 combined	0N027	5	5	3	5	3
	Kilrush Marina	0N028				3	
Ringed Plover	Poulnasherry inner bay	0H519	28	32	18	6	
Golden Plover	Poulnasherry inner bay	0H519	8		98		65
	Poulnasherry bay addition 1	0N025		111			
Grey Plover	Poulnasherry inner bay	0H519	4	2	2	6	
Lapwing	Querrin	0H517	44	1	104		
	Poulnasherry inner bay	0H519	195	222	450		150
		0N025					13
	0H517/518 combined	0N027		34			
Knot	Poulnasherry inner bay	0H519			11		65
Dunlin	Poulnasherry inner bay	0H519	411	410	396	591*	277
Snipe	Poulnasherry inner bay	0H519	6	1	2	3	
	Poulnasherry outer bay	0H520					1
Bar-tailed Godwit	Poulnasherry inner bay	0H519	9	14			26
Curlew	Querrin	0H517	28	49	17	3	25
	Poulnasherry inner bay	0H519	129	235	136	157	130
	Poulnasherry outer bay	0H520		8			3
		0N025		5	4	4	5
		0N026				2	2
	0H517/518 combined	0N027		19		9	
Greenshank	Querrin	0H517	2	2	2		1
	Poulnasherry inner bay	0H519	7	4	3	4	2
	Poulnasherry outer bay	0H520		2			
		0N025					2
	Kilrush Marina	0N028				1	
Redshank	Querrin	0H517	28	27	22	1	3
	Poulnasherry inner bay	0H519	43	181	32	99	37
	Poulnasherry outer bay	0H520				2	4
		0N025	2	6	2	7	
		0N026			2	2	4
	0H517/518 combined	0N027		8	3	5	2
	Kilrush Marina	0N028				2	
Turnstone	Poulnasherry inner bay	0H519			4	24	16
	Poulnasherry outer bay	0H520				12	
		0N025	2				

		0N026		1			24
Black-headed Gull	Querrin	0H517	1	4	3		
	Poulnasherry inner bay	0H519	164	201	232	15	67
	Poulnasherry outer bay	0H520		1		3	
		0N025	19	90	7	42	39
	0H517/518 combined	0N027			3		
	Kilrush Marina	0N028				10	
Common Gull	Poulnasherry inner bay	0H519	7	1	18	31	13
	Poulnasherry outer bay	0H520				4	
		0N025		3		2	9
Herring Gull	Querrin	0H517	6	1		1	
	Poulnasherry inner bay	0H519	64	57	43	21	9
	Poulnasherry outer bay	0H520	3	4		4	
		0N025	7	4		8	4
	0H517/518 combined	0N027		2			
	Kilrush Marina	0N028				2	
Great Black-backed Gull	Poulnasherry inner bay	0H519	5	1	4	1	3
	Poulnasherry outer bay	0H520		1	1		
		0N025		2		2	1

Further details available on www.emff.marine.ie

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