EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Marine Institute Bird Studies

Poulnasherry Bay Waterbird Survey.

2018-2019

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

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

Foras na Mara
Marine Institute

Operational Programme	European Maritime and Fisheries Fund (EMFF) Operational Programme 2014-2020
Priority	Union Priority 1 Sustainable Development of Fisheries Union Priority 6 Fostering the implementation of the Integrated Maritime Policy
Thematic Objective	TO 6 - Preserving and protecting the environment and promoting resource efficiency
Specific Objective	UP1 SO1 - Reduction of the impact of fisheries and aquaculture on the marine environment, including the avoidance and reduction, as far as possible, of unwanted catch. UP1 SO2 - Protection and restoration of aquatic biodiversity and ecosystems. UP6 SO1 - Development and implementation of the Integrated Maritime Policy
Measure	Marine Biodiversity Scheme
Project No.	MB/2019/08
EMFF Certifying Body	Finance Division, Department of Agriculture, Food and the Marine
Managing Authority	Marine Agencies & Programmes Division, Department of Agriculture, Food and Marine
Specified Public Beneficiary Body	Marine Institute
Grant Rate	100%
EU Co-Financing Rate	50%
Legal Basis	Article 29, 40 & 80 EMFF
Details	Report to the Marine Institute Inís.

This project or operation is part supported by the Irish government and the European Maritime & Fisheries Fund as part of the EMFF Operational Programme for 2014-2020

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Poulnasherry Bay Waterbird Survey

Winter 2018-19

Bird Survey Report

July 2019

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.

Suite 11,
Shannon Commercial Properties,
Information Age Park,
Ennis,
County Clare
Ireland.

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) 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	29/04/19	**Report prepared by:**	Dr. Lesley Lewis BSc PhD MCIEEM	
1	17/07/19	**Report checked by:**	Dr. Alex Copland BSc PhD	
1	30/07/19	**Report signed off by:**	Howard Williams CEnv, MCIEEM CBiol MRSB MIFM	
Title		Poulnasherry Bay Waterbird Survey – Winter 2018-19 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, 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 2018/19 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 2018/19 waterbird survey programme. The results are examined and discussed in light of similar surveys undertaken during the four 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 in 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.

Mr. Chris Cullen Dip. Eng. Dip. Ecol. ACIEEM is a Senior Ecologist with INIS and has more than 10 years' experience as a professional ecologist, specialising in birds. Chris is an Associate Member of the Chartered Institute of Ecology and Environmental Management. He holds a Higher National Diploma in Engineering and a further Diploma in Field Ecology. Chris has a broad range of experience within the environmental sector. He is a specialist in Ornithological survey and assessment and has experience at a professional and voluntary level of a wide range of bird survey techniques. He is interested in wintering wildfowl and has been a contributor to I-WeBS and Low Tide count studies across the south of Ireland. He has conducted specific research on the diet of wintering raptors such as Short-eared Owl and Hen Harrier. Chris has been a co-recipient of the BTO Boddy and Sparrow prize in respect of research on the roosting of Barn Swallows.

He also has experience in Project Management, Appropriate Assessment (Case law), Expert Witness testimony, Legal review, Due Diligence, Cumulative Impact Assessment, Habitat Mapping, Mitigation Development, EIA, Collision Risk Modelling, Biomonitoring, Education, and Public Speaking. Over the last number of years Chris has been involved in a number of significant SID Projects and has overseen Ecology requirements from Scoping Stage through planning and oral hearing. Chris has had a number of papers published in peer reviewed publications such as Irish Birds, The Irish Naturalists Journal, The Proceedings of the Royal Irish Academy, Ringing and Migration and In Practice. Chris has also been a named author on additional papers published in journals such as Ibis.

Dr. Alex Copland BSc PhD is Senior Ecologist with INIS and has over 20 years of bird survey experience. He is proficient in experimental design and data analysis and has been working on bird populations in Ireland for over 18 years. He has managed several large-scale, multi-disciplinary conservation projects, including research and conservation work for species of conservation concern, the design and delivery of practical conservation actions, education and interpretation on the environment and the development of co-ordinated, strategic plans for birds and biodiversity in Ireland.

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 sits on the Editorial Panel of the scientific journal, *Irish Birds*.

Dr. Lesley Lewis BSc PhD MCIEEM is a specialist waterbird ecologist. Her PhD focused on the ecological disturbance and effects on estuarine benthic invertebrate communities and their avian predators. Lesley is an accomplished waterbird surveyor having undertaken surveys for her PhD and within the private consultancy sector. As Waterbird Ecologist for NPWS, she was responsible for the design and implementation of the NPWS baseline low tide waterbird survey programme. Lesley was the project manager for the programme of surveys that ran over three winters (2009/10, 2010/11 and 2011/12) with surveys undertaken across 32 coastal Special Protection Areas (SPAs). Data collected from the low tide waterbird survey programme were analysed and used in the process of formulating conservation objectives for coastal SPAs. Lesley worked on all aspects of this process from the initial stages of conception and development, data analysis, through to the production of conservation objectives documents for all 32 coastal SPAs. This work culminated in the publication of standard low-tide survey methods for waterbirds (Lewis & Tierney, 2014).

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 2.2.1; 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 fully 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 this report details the results of the surveys and examines these results in the context of existing waterbird data for the site and wider Shannon and Fergus estuaries system.

[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).

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 & 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	*Cygnus*	Yes	A	118	All-Ireland Importance
Light-bellied Brent Goose	*Branta bernicla hrota*		A	494	International Importance
Shelduck	*Tadorna*		A	1,025	All-Ireland Importance
Wigeon	*Anas penelope*		A	3,761	All-Ireland Importance
Teal	*Anas crecca*		A	2,260	All-Ireland Importance
Pintail	*Anas acuta*		R	62	All-Ireland Importance
Shoveler	*Anas clypeata*		R	107	All-Ireland Importance
Scaup	*Aythya marila*		A	102	All-Ireland Importance
Cormorant	*Phalacrocorax carbo*		A	245	All-Ireland Importance
Ringed Plover	*Charadrius hiaticula*		A	223	All-Ireland Importance
Golden Plover	*Pluvialis apricaria*	Yes	A	5,664	All-Ireland Importance
Grey Plover	*Pluvialis squatarola*		A	558	All-Ireland Importance
Lapwing	*Vanellus*			15,126	All-Ireland Importance
Knot	*Calidris canutus*		R	2,015	All-Ireland Importance
Dunlin	*Calidris alpina*		A	15,131	International Importance
Black-tailed Godwit	*Limosa*		A	2,035	International Importance
Bar-tailed Godwit	*Limosa lapponica*	Yes	A	460	All-Ireland Importance
Curlew	*Numenius arquata*		R	2,396	All-Ireland Importance
Greenshank	*Tringa nebularia*		A	61	All-Ireland Importance
Redshank	*Tringa totanus*		R	2,645	All-Ireland Importance
Black-headed Gull	*Chroicocephalus ridibundus*		R	2,681	All-Ireland Importance

[a] Listed on 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 willing count volunteers.

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 (Poulnasherry outer bay) and 0H520 (Poulnasherry inner 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. 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*. 2018). 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 2018/19 winter season therefore followed the standard methodology developed by the NPWS waterbird survey programme. Similar surveys were also undertaken during the 2017/18 season in relation to the Shannon Integrated Framework Programme (SIFP) (MKOS, 2017) in addition to the baseline data collected by NPWS in 2009/10.

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 this (Winter 2018/19) study we 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). It appears that this error was carried forward by the field surveyor who recorded birds in the inner bay as 0H519 and outer bay as 0H520. Consequently the data for these subsites in the SPA Conservation Objectives Supporting Document (NPWS, 2012b) are presented incorrectly. This also means that subsites were subsequently wrongly coded in MKOS (2017). This error has been notified to NPWS and 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 the current monitoring. During their 2017/18 monitoring work MKOS (2017) included additional subsites in the outer bay as follows 0H517, 0H518, 0N025 and 0N026. The current monitoring work therefore followed suit and these subsites were included in the 2018/19 survey work (Table 3.2.1, Figure 3.2.1, Figure 3.2.2).

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 Subsites of Poulnasherry Bay

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

Figure 3.2.1: Count subsites used for the Poulnasherry Bay waterbird surveys.

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'; see Figure 3.2.1).

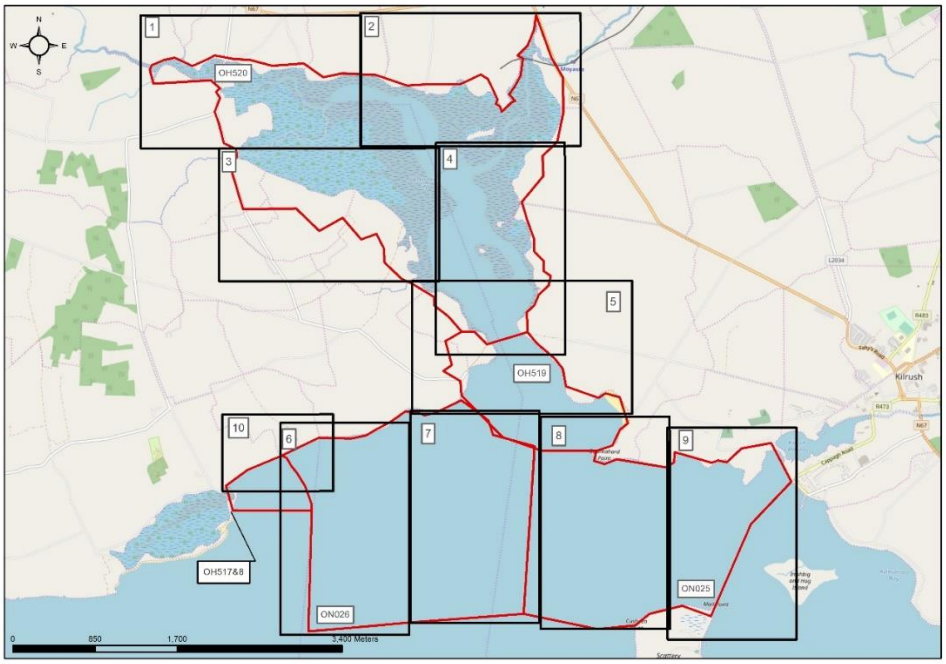

Figure 3.2.2: Map showing count subsites used for the Poulnasherry Bay waterbird surveys. The subsites are bordered by a red line; the numbered boxes relate to the sub-divided field maps that were used to mark flocks ('flock maps') during surveys.

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 an Access database. From Access, 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*. (2018).
- 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);
- Intertidal foraging densities (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, and with a maximum five subsites counted, we simply ranked subsites as 1-5 (low-high) in each analysis.

Intertidal foraging density was calculated for SCI species and for each low tide survey occasion, by dividing the number of the species within subsites 0H519 and 0H520 by the area of intertidal habitat within the subsite. Outer bay subsites were not included in these calculations.

3.4.3. Trends

Poulnasherry Bay has been counted a total of 11 times during I-WeBS as the subsite (0H498). The subsite has not received count coverage since the 2009/10 season. However it did receive nearly full coverage during the baseline period used for SPA designation (1995/96 – 1999/00). This enabled a comparison between the baseline mean peak number of waterbirds within Poulnasherry Bay and the current peak count from the 2018/19 survey programme (note that data were compared for the same survey areas i.e. I-WeBS subsite 0H498 = 0H519 + 0H520).

4. RESULTS

4.1. Survey schedule and conditions

The 2018/19 winter waterbird survey season proceeded relatively unhampered by weather conditions. All surveys were carried out with good weather conditions (Table 4.1.1).

Table 4.1.1: Dates and survey type for the 2018/19 survey programme.

Date	Survey	Wind	Cloud (%)	Rain	Visibility	Notes
13.11.18	Low Tide 1	Calm	67-100	Occasional drizzle	Moderate – Good	No survey constraints
10.12.18	Low Tide 2	Calm	67-100	None	Good	Perfect conditions
25.02.19	Low Tide 3	Breezy	67-100	None	Good	Perfect conditions
15.03.19	High Tide	Calm	67-100	None	Good	Perfect conditions
27.03.19	Low Tide 4	Calm	34-66	Showers	Good	No survey constraints

4.2. Species assemblage and diversity

A total of 34 waterbird species were recorded during the 2018/19 surveys, which included 15 wildfowl and allies, 13 wader species, five gull species, and one unidentified gull (Table 4.2.1).

The total 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, and 26 species that are on the Birds of Conservation Concern in Ireland lists (Colhoun & Cummins, 2013), including six that are Red-listed and are of highest concern, and a further 20 species that are Amber-listed. The species list also 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 December 2018 (Figure 4.2.1). Overall subsite diversity ranged from six species (0N026) to a maximum 34 species (0H520 Poulnasherry inner bay). Poulnasherry outer bay (0H519) supported a total of 19 species. This compares favourably with the species diversity recorded during the NPWS Waterbird Survey programme in 2011/11 when 0H520 (inner bay) supported 34 species, and 0H519 (outer bay) supported 15 species.

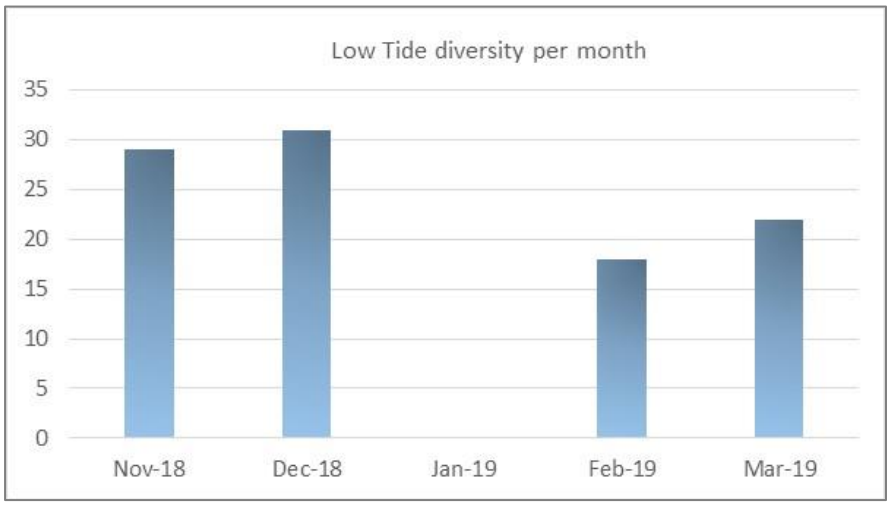

Figure 4.2.1: Overall species diversity during the four Low Tide surveys

Table 4.2.1: Species recorded during the winter surveys of Poulnasherry Bay. A ticked cell means that a species was recorded in the corresponding subsite. The table also highlights Annex I species (EU Bird's Directive) and Red (R) and Amber-listed (A) species under Birds of Conservation Concern in Ireland (BoCCI) (Colhoun & Cummins, 2013

Species name	Latin name	BoCCI	Annex I	0H519	0H520	0N025	0N026	0N027
Light-bellied Brent Goose	*Branta bernicla hrota*	A		√	√			√
Shelduck	*Tadorna*	A			√			
Wigeon	*Anas penelope*	A			√	√		
Teal	*Anas crecca*	A			√			
Mallard	*Anas platyrhynchos*				√	√		√
Pintail	*Anas acuta*	R			√			
Shoveler	*Anas clypeata*	R			√			
Goldeneye	*Bucephala clangula*	A			√			
Red-breasted Merganser	*Mergus serrator*				√			
Great Northern Diver	*Gavia immer*		Yes	√	√		√	√
Little Grebe	*Tachybaptus ruficollis*	A			√			
Great Crested Grebe	*Podiceps cristatus*	A		√	√	√	√	√
Cormorant	*Phalacrocorax carbo*	A		√	√	√	√	
Little Egret	*Egretta garzetta*		Yes	√	√			√
Grey Heron	*Ardea cinerea*			√	√	√		√
Oystercatcher	*Haematopus ostralegus*	A		√	√	√		√
Ringed Plover	*Charadrius hiaticula*	A		√	√			
Golden Plover	*Pluvialis apricaria*	A	Yes		√			
Grey Plover	*Pluvialis squatarola*	A			√			
Lapwing	*Vanellus*			√	√			
Dunlin	*Calidris alpina*	A		√	√			
Snipe	*Gallinago*	A		√	√		√	√
Black-tailed Godwit	*Limosa*	A			√			
Bar-tailed Godwit	*Limosa lapponica*	A	Yes	√	√			
Curlew	*Numenius arquata*	R		√	√	√	√	√
Greenshank	*Tringa nebularia*	A			√	√		√
Redshank	*Tringa totanus*	R		√	√	√		√
Turnstone	*Arenaria interpres*			√	√			
Black-headed Gull	*Chroicocephalus ridibundus*	R		√	√	√		√
Common Gull	*Larus canus*	A		√	√			
Lesser Black-backed Gull	*Larus fuscus*	A		√	√	√		
Herring Gull	*Larus argentatus*	R		√	√	√	√	
Great Black-backed Gull	*Larus marinus*	A			√			
Unidentified gull	*Larus sp.*				√			
Total number of species per subsite >				**19**	**34**	**12**	**6**	**12**

Collectively the two subsites 0H519 and 0H520 (inner and outer Poulnasherry Bay combined) supported a total of 34 waterbird species during winter 2018/19. The corresponding I-WeBS subsite (0H498) has not been counted as part of I-WeBS since the winter of 2009/10 when a total of 20 waterbird species was recorded.

Waterbird species diversity was highest in 0H520 (Poulnasherry inner bay) during all low tide surveys (Figure 4.2.2), followed by 0H519 (Poulnasherry outer bay). 0N026 was the least diverse subsite over all months.

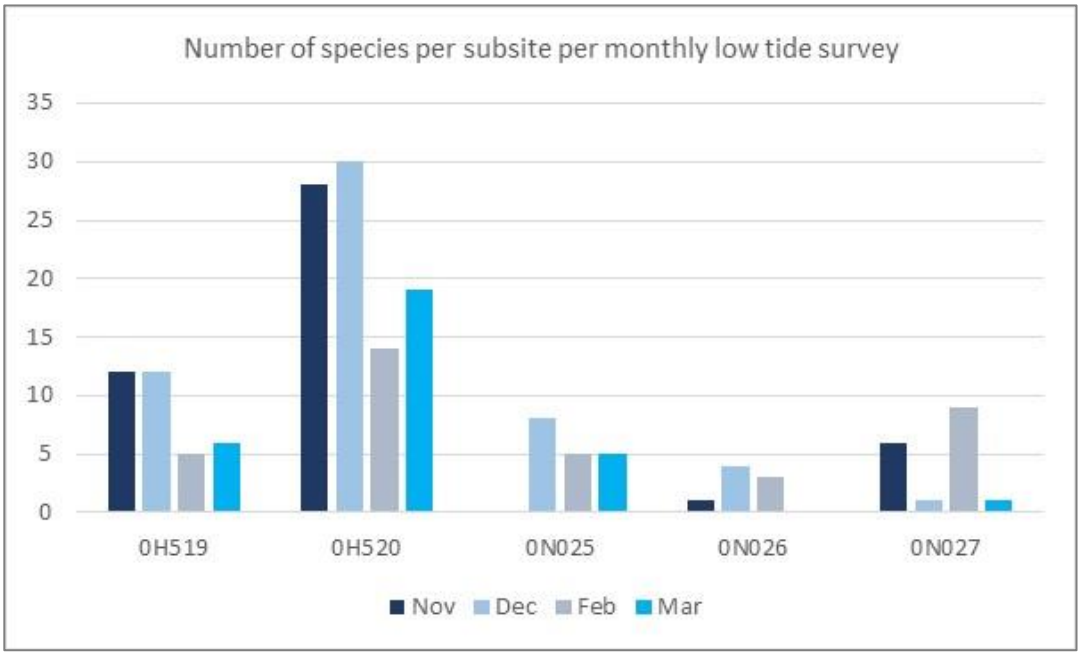

Figure 4.2.2: Monthly species diversity per subsite for low tide counts

4.3. Total numbers of waterbirds

During winter 2018/19, total numbers of waterbirds during low tide surveys (across the entire survey area) ranged from 547 individuals (March 2019) to the peak low tide count of 3,314 waterbirds during December 2018. Individual subsites followed suit with all except 0N027 recording subsite peak counts during December 2018 (Table 4.3.1). The peak counts in 0H520 during November and December 2018, exceeded those recorded during the 2010/11 NPWS counts but thereafter were lower in the final counts.

November and December count totals also exceeded the peak count (1,263) recorded during the 2009/10 I-WeBS season for the same area (subsite 0H498).

Table 4.3.1: Total numbers of waterbirds counted within the study area during the five surveys of 2018/19, plus count totals from the 2010/11 Waterbird Survey Programme for 0H519 and 0H520.

Winter	Area	Total Numbers of Waterbirds				
		LT1 (Nov)	LT2 (Dec)	LT3 (Feb)	LT4 (Mar)	HT (Mar)
2018/19	Entire Survey area	1,294	3,314	760	547	614
2018/19	0H519	84	102	19	18	19
2018/19	0H520	1,198	1,943	677	511	573
2018/19	0H519 + 0H520	1,282	2,045	696	529	592
2018/19	0N025	0	1,250	23	14	17
2018/19	0N026	1	16	5	0	3
2018/19	0N027	11	3	36	4	2
2010/11	0H519	52	32	63	64	44
2010/11	0H520	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 2018/19 at Poulnasherry Bay are shown in Table 4.4.1.

Three waterbird species were recorded in numbers of all-Ireland importance: Shelduck, Pintail and Little Egret.

Amongst the wildfowl and allies, Light-bellied Brent Goose, Wigeon and Teal were the most numerous species. Amongst the waders, Lapwing, Curlew and Dunlin were the most numerous while Redshank, with a peak count of 80 individuals was also relatively abundant overall. Numbers of gull species were relatively low overall with the exception of a large count of Black-headed Gull (1,329 in December 2018).

4.5. Trends in waterbird numbers

Poulnasherry Bay (I-WeBS subsite 0H498) received nearly full count coverage during the baseline period used for SPA designation (1995/96 – 1999/00). This enabled a comparison between the baseline mean peak number of waterbirds within Poulnasherry Bay, the peak count recorded during 2010/11 (NPWS) and the peak count from the current 2018/19 survey programme (note these data relate to the same survey areas, i.e. I-WeBS subsite 0H498 = 0H519 + 0H520).

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 7, suggest that almost all of the waterbird SCI species have decreased in number in Poulnasherry Bay since the baseline period with only Teal, Pintail and Shoveler appearing to occur in greater or similar numbers.

Table 4.4.1: Waterbird species totals per survey (across entire survey area). * denotes numbers of all-Ireland importance (after Burke *et al*. 2018).

Species name	Latin name	LT1	LT2	LT3	LT4	HT1
Light-bellied Brent Goose	*Branta bernicla hrota*		57	207	256	209
Shelduck	*Tadorna*	18	60	115*	27	76
Wigeon	*Anas penelope*	332	297	33	8	15
Teal	*Anas crecca*	169	218	134	60	150
Mallard	*Anas platyrhynchos*	22	21	4	7	5
Pintail	*Anas acuta*	14	82*			
Shoveler	*Anas clypeata*	6				
Goldeneye	*Bucephala clangula*		1			
Red-breasted Merganser	*Mergus serrator*		3		1	
Great Northern Diver	*Gavia immer*	4	12	1	4	4
Little Grebe	*Tachybaptus ruficollis*		2			
Great Crested Grebe	*Podiceps cristatus*	12	19	4	1	3
Cormorant	*Phalacrocorax carbo*	1	4	8	1	19
Little Egret	*Egretta garzetta*	13	7	8	21*	9
Grey Heron	*Ardea cinerea*	8	3	3	1	
Oystercatcher	*Haematopus ostralegus*	22	28	20	19	37
Ringed Plover	*Charadrius hiaticula*	53	2		7	2
Golden Plover	*Pluvialis apricaria*		9	80		
Grey Plover	*Pluvialis squatarola*		7			
Lapwing	*Vanellus*	342	483			
Dunlin	*Calidris alpina*	59	336		4	1
Snipe	*Gallinago*	3	8			6
Black-tailed Godwit	*Limosa*	2				
Bar-tailed Godwit	*Limosa lapponica*	6	3			
Curlew	*Numenius arquata*	104	169	95	84	29
Greenshank	*Tringa nebularia*	7	4	2	8	7
Redshank	*Tringa totanus*	45	80	30	20	18
Turnstone	*Arenaria interpres*	5	3			5
Black-headed Gull	*Chroicocephalus ridibundus*	11	1,329	10	5	
Common Gull	*Larus canus*	8	48		1	
Lesser Black-backed Gull	*Larus fuscus*	4	1	1	1	
Herring Gull	*Larus argentatus*	3	17	5	9	16
Great Black-backed Gull	*Larus marinus*	1	1		2	3
Unidentified gull	*Larus sp.*	20				
	TOTAL WATERBIRDS	**1,294**	**3,314**	**760**	**547**	**614**

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 season.

Species	Mean 95/96 - 99/00	Peak count 2010/11	Peak count 2018/19	General trend ↑ or ↓
Whooper Swan	1	0	0	n/a
Light-bellied Brent Goose	539	56	256	↓
Shelduck	180	196	115	↓
Wigeon	1,125	61	332	↓
Teal	176	510	218	↑
Pintail	57	0	82	↑
Shoveler	3	37	6	↑
Scaup	22	8	0	↓
Cormorant	58	12	8	↓
Ringed Plover	155	28	53	↓
Golden Plover	1,380	7	80	↓
Grey Plover	66	37	7	↓
Lapwing	2,522	155	483	↓
Knot	164	33	0	↓
Dunlin	2,300	457	336	↓
Black-tailed Godwit	16	10	2	↓
Bar-tailed Godwit	95	16	5	↓
Curlew	654	209	146	↓
Greenshank	32	13	8	↓
Redshank	197	153	80	↓
Black-headed Gull	1,818	42	109	↓

4.6. Subsite totals for waterbirds

The majority of waterbirds occurred in greater numbers within subsite 0H520 (Poulnasherry inner bay), including species such as Great Northern Diver and Great Crested Grebe that might be expected to occur in greater numbers in the more expansive subtidal areas of the outer bay subsites 0N025, 0N026 and ON027 (Table 4.6.1). Of the 28 waterbird species listed in Table 8, 17 species occurred in 0H520 during three or more low tide counts. In contrast, five species occurred in 0H519 during three or more low tide counts (Great Northern Diver, Grey Heron, Oystercatcher, Curlew and Redshank).

Table 4.6.1: Subsite counts for waterbird SCI species and other selected waterbirds recorded within Poulnasherry Bay winter 2018-2019. Subsite peak counts are in bold font. 'n' refers to the number of low tide counts a species was recorded in within the subsite.

Subsite	Species name	LT1	LT2	LT3	LT4	*n*	HT1
0H519	Light-bellied Brent Goose			6		1	
0H520			57	185	256	3	209
0N027				16		1	
0H520	Shelduck	18	60	115	27	4	76
0H520	Wigeon	332	297	33	7	4	15
0N025					1	1	
0H520	Teal	169	218	134	60	4	150
0H520	Mallard	22	21		5	3	3
0N025					2	1	2
0N027				4		1	
0H520	Pintail	14	82			2	
0H520	Shoveler	6				1	
0H520	Red-breasted Merganser		3		1	2	
0H519	Great Northern Diver	1	2		2	3	
0H520		1	6	1	2	4	2
0N026		1	4			2	1
0N027		1				1	1
0H519	Great Crested Grebe	1	1			2	1
0H520		8	7		1	3	1
0N025			3			1	
0N026			8			1	
0N027		3		4		2	1
0H519	Cormorant		1			1	
0H520		1	1	2	1	4	2
0N025			1	1		2	1
0N026			1	2		2	3
0H519	Little Egret	1				1	
0H520		12	7	7	21	4	9
0N027				1		1	
0H519	Grey Heron	3		1	1	3	
0H520		4	2			2	
0N025			1			1	
0N027		1		2		2	
0H519	Oystercatcher	5	12	3	1	4	4
0H520		15	11	9	11	4	33
0N025			2	4	3	3	
0N027		2	3	4	4	4	
0H519	Ringed Plover	47			7	2	2
0H520		6	2			2	

Table 4.6.1: (Continued)

Subsite	Species name	LT1	LT2	LT3	LT4	*n*	HT1
0H520	Golden Plover		9	80		2	
0H520	Grey Plover		7			1	
0H519	Lapwing		8			1	
0H520		342	475			2	
0H519	Dunlin	3			4	2	
0H520		56	336			2	1
0H520	Black-tailed Godwit	2				1	
0H519	Bar-tailed Godwit	1				1	
0H520		5	3			2	
0H519	Curlew	6	56	7		3	2
0H520		95	90	76	77	4	27
0N025			20	10	7	3	
0N026			3	2		2	
0N027		3				1	
0H520	Greenshank	7	4		8	3	6
0N025				1		1	1
0N027				1		1	
0H519	Redshank	12	3	2	3	4	
0H520		33	77	23	17	4	18
0N025				2		1	
0N027				3		1	
0H519	Black-headed Gull		11			1	
0H520		11	109	9	5	4	
0N025			1,209			1	
0N027				1		1	
0H519	Common Gull		2			1	
0H520		8	46		1	3	
0H519	Lesser Black-backed Gull	3				1	
0H520		1		1	1	3	
0N025			1			1	
0H519	Herring Gull		1				
0H520		3	3	3	8	4	12
0N025			13		1	2	4
0N026				2			

4.6.1. Relative importance of subsites

Waterbird distribution was examined by ranking the proportional use of subsites by SCI waterbirds following the methods described in Section 3.4. Simple rank numbers are used with 1 equalling the highest, and 5 equalling the lowest used subsite. The highest rank number across all surveys for each of the subsites is shown in the results tables. Blank cells mean that a species was not recorded in the subsite.

Based on total numbers across all four low tide surveys, clearly subsite 0H520 (Poulnasherry inner bay) is the most important for the majority of waterbirds (Table 4.6.2), with all 18 SCI species that were recorded during the survey occurring in their largest numbers on at least one occasion in this subsite. 0H519 (Poulnasherry outer bay) was ranked as most important on at least one occasion for Cormorant and Ringed Plover, and thereafter second or third most important for a total of seven waterbirds. Of the species that forage intertidally, again 0H520 was the top ranked subsite for all species (Table 4.6.3).

Table 4.6.2: Relative importance of each subsite based on total numbers of waterbird SCI species during low tide surveys. The number in brackets provides the number of surveys that a species was recorded in that subsite. Blank cells means that a species was not recorded in that subsite.

Species	0H519	0H520	0NO25	0NO26	0NO27
Light-bellied Brent Goose	2 (1)	1 (4)			3 (1)
Shelduck		1 (4)			
Wigeon		1 (4)	2 (1)		
Teal		1 (4)			
Pintail		1 (2)			
Shoveler		1 (1)			
Cormorant	1 (1)	1 (4)	1 (2)	1 (2)	
Ringed Plover	1 (2)	1 (2)			
Golden Plover		1 (2)			
Grey Plover		1 (1)			
Lapwing	2 (1)	1 (2)			
Dunlin	2 (1)	1 (2)			
Black-tailed Godwit		1 (1)			
Bar-tailed Godwit	2 (1)	1 (2)			
Curlew	2 (3)	1 (4)	2 (3)	2 (2)	3 (1)
Greenshank		1 (3)	1 (1)		1 (1)
Redshank	2 (4)	1 (4)	3 (1)		4 (1)
Black-headed Gull	3 (1)	1 (4)	1 (1)		2 (1)

Table 4.6.3: 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	0H519	0H520	0NO25	0NO26	0NO27
Light-bellied Brent Goose	3	1			2
Shelduck		1			
Wigeon		1			
Teal		1			
Ringed Plover	1	1			
Grey Plover		1			
Dunlin	2	1			
Bar-tailed Godwit	2	1			
Curlew	1	1	3	4	2
Redshank	2	1	3		2

Subsite 0H520 (Poulnasherry inner bay) was also found to support the greatest number of most waterbirds during the high tide period (Table 4.6.4; Table 4.6.5).

*Table 4.6.4: Relative importance of each subsite for SCI species at high tide based on ranked total numbers. *indicates species that were not recorded at high tide.*

Species	0H519	0H520	0NO25	0NO26	0NO27
Light-bellied Brent Goose		1			
Shelduck		1			
Wigeon		1			
Teal		1			
Pintail*					
Shoveler*					
Cormorant		2	1	3	
Ringed Plover	1				
Golden Plover*					
Grey Plover*					
Lapwing*					
Dunlin		1			
Black-tailed Godwit*					
Bar-tailed Godwit*					
Curlew	2	1			
Greenshank		1	2		
Redshank		1			
Black-headed Gull*					

Table 4.6.5: Relative importance of each subsite for SCI species recorded roosting at high tide based on ranked total numbers. *indicates species that were not recorded roosting at high tide.

Species	0H519	0H520	0NO25	0NO26	0NO27
Light-bellied Brent Goose		1			
Shelduck		1			
Wigeon		1			
Teal		1			
Pintail*					
Shoveler*					
Cormorant		2	1	3	
Ringed Plover		1			
Golden Plover	1				
Grey Plover*					
Lapwing*					
Dunlin		1			
Black-tailed Godwit*					
Bar-tailed Godwit*					
Curlew	2	1			
Greenshank		1	2		
Redshank*					
Black-headed Gull*					

4.7. Waterbird densities

0H520 (Poulnasherry inner bay), the largest subsite by area, supported the greatest average density of total waterbirds (Table 4.7.1), and recorded the second highest maximum density after 0N025, the latter figure attributed to a large flock of Black-headed Gulls recorded in this subsite during the December low tide survey. With no subsite supporting more than 4 birds/ha overall, density is considered low.

Table 4.7.1: Average density of total waterbirds (min-max) within count subsites 2018/19.

	LT1	LT2	LT3	LT4	Average	Min	Max
0H519	1.00	0.72	0.13	0.13	0.49	0.13	1.00
0H520	1.77	2.87	1.00	0.76	1.60	0.76	2.87
0N025	-	3.26	0.06	0.04	1.12	0.04	3.26
0N026	0.00	0.03	0.01	-	0.02	0.00	0.03
0N027	0.31	0.08	1.00	0.11	0.38	0.08	1.00

The peak intertidal foraging density was 6.9 Dunlin/ha (0H520 LT2). By way of comparison, the peak intertidal foraging density recorded by the NPWS low tide surveys in 2010/11 was 31.9 Dunlin per ha, recorded for subsite 0H529 (Islandavanna upper - Fergus estuary).

The second highest recorded density was for Light-bellied Brent Goose (3.6/ha), also recorded for 0H520 during the March low tide survey (Table 11). This is greater than the peak intertidal foraging density recorded by the NPWS low tide surveys in 2010/11 (2.5 birds/ha, recorded for subsite 0K507 (Dooneen Pt – Corcas in the greater Shannon system)). Similarly, the peak intertidal foraging density recorded during the current study was found to be higher for Shelduck then recorded within any subsite during the 2010/11 NPWS low tide surveys.

Table 4.7.2: Intertidal foraging densities (birds/ha) for selected species – subsites 0H519 and 0H520 only.

Subsite	Species	LT1	LT2	LT3	LT4	Min	Max
0H519				0.12	0.00	0.00	0.12
0H520	Light-bellied Brent Goose		0.65	3.37	3.63	0.65	3.63
0H520	Shelduck	0.37	1.04	2.10	0.49	0.37	2.10
0H519		0.08	0.20	0.02	0.02	0.02	0.20
0H520	Oystercatcher	0.31	0.20	0.10	0.16	0.10	0.31
0H519		0.96			0.14	0.14	0.96
0H520	Ringed Plover	0.12	0.04			0.04	0.12
0H520	Grey Plover		0.14			0.14	0.14
0H519		0.06			0.08	0.06	0.08
0H520	Dunlin	1.10	6.86			1.10	6.86
0H519		0.02				0.02	0.02
0H520	Bar-tailed Godwit	0.10	0.06			0.06	0.10
0H519		0.06	1.14	0.12		0.06	1.14
0H520	Curlew	1.16	1.12	1.33	1.49	1.12	1.49
0H519		0.24	0.06	0.04	0.06	0.04	0.24
0H520	Redshank	0.65	1.45	0.47	0.18	0.18	1.45

4.8. Activities and disturbance

Based on the results of the 2018/19 surveys, Poulnasherry Bay appears to be subject to a low level of disturbance during winter. While aquaculture is the main activity to occur at the site (Table 12), the birds present in the vicinity appeared to be affected to a low degree with a disturbance response recorded on one out of the four low tide surveys only (Table 12).

Table 4.10.1 Activities recorded at Poulnasherry Bay 2018/19.

Subsite Code	Subsite Name	Activity	Number of survey occasions activity recorded	Causing a disturbance? (species affected)	Response of waterbirds
0H519	Poulnasherry outer Bay	Bait diggers	1	Yes (SU)	Weak – slight movement
0H520	Poulnasherry outer Bay	Aquaculture machinery	2	Yes, one occasion (all birds present)	Moderate – move to another part of subsite
0N025		Human on shoreline	1	Yes (Redshank)	Moderate – move to another part of subsite
0N026		Fishing boat	1	Yes (Black-headed Gull)	Weak – slight movement
0N027	0H517/518 combined	Male Hen Harrier		Yes (all birds present)	Weak – slight movement and brief

5. DISCUSSION

5.1. Overview of the 2018/19 season

Poulnasherry Bay is just one part of the larger Shannon & Fergus estuaries system that is known to support over 20,000 waterbirds during winter (Crowe, 2005). Despite is relatively small size; inner and outer bay subsites (0H520 and 0H519 respectively) that collectively cover an area of little over 350ha, the site supported good numbers of birds on occasion and three waterbird species were recorded in numbers of all-Ireland importance (Shelduck, Pintail and Little Egret).

Of all the analyses undertaken, 0H520 (inner bay) was clearly the most important subsite for waterbirds across the survey area. The most regularly-occurring species in the inner bay included Shelduck as well as Teal and Wigeon, typical species of inner muddy sediment estuaries, as well as the waders Oystercatcher, Redshank and Curlew which are usually widely distributed across estuarine sites. The inner parts of 0H520, close to freshwater flows and saltmarsh habitat, appeared to be favoured to a large extent (based on flock mapping data) (Figure 5). Interestingly, the majority of waterbirds occurred in greater numbers within 0H520 including species such as Great Northern Diver and Great Crested Grebe that might be expected to occur in greater numbers in the more expansive subtidal areas of the outer bay subsites.

Figure 5.1.1: Favoured areas in Poulnasherry inner bay for waterbirds.

5.2. Waterbird numbers and trends

Total numbers of waterbirds during low tide surveys across the entire survey area ranged from 547 individuals (March 2019) to the peak low tide count of 3,314 waterbirds during December 2018. The peak counts in 0H520 (inner bay) during November and December 2018 exceeded those recorded during the 2010/11 NPWS counts, but thereafter were lower in the final counts. This could be due to the survey timing, as the final three NPWS counts were undertaken in the months of January and

February with no survey extending into the month of March. It could also reflect lower usage of the bay during late winter when foraging resources have been depleted.

However, while total waterbird numbers were comparable with the 2010/11 survey, individual species counts were not. Lack of a time series of data precludes a thorough assessment of species trends but a comparison of current 2018/19 data with data from the 2010/11 (NPWS Waterbird Survey Programme) and I-WeBS data from the baseline period (95/96-99/00) reveals that almost all of the waterbird special conservation interest (SCI) species have decreased in number in Poulnasherry Bay since the baseline period with only Teal, Pintail and Shoveler appearing to occur in greater or similar numbers. Although site-level factors cannot be discounted, such declines in numbers are in line with declines in wintering waterbird numbers on a national scale. Burke et al. (2018) in presenting updated waterbird population estimates, showed that wintering waterbirds in Ireland have declined by almost 500,000 since the mid 1990's, equivalent to a decline of 40%. Such a large decline nationally obviously has implications for numbers at individual sites. However species that are not declining at national level e.g. Light-bellied Brent Goose, and Black- and Bar-tailed Godwits, have also decreased in number at Poulnasherry Bay against a national trend for increase, which would suggest site-level factors could be responsible.

The observed declines in waterbird numbers at Poulnasherry Bay are part of a much larger decline across the island of Ireland. While climate change is a likely contributing factor in some cases, it is clear that wintering waterbirds are under pressure from a range of factors (Burke et al., 2018), with the effects of habitat loss, habitat modification and disturbance likely all contributing cumulatively to the overall declines. In some areas where human use and high waterbird value coincide, acceptable levels of human disturbance may therefore need to be determined and managed into the future (e.g. Beale 2007; Gill 2007). Disturbance may cause displacement of waterbirds, both within and between sites, influence feeding and resting behaviour, result in increased daily and seasonal energy expenditure overall, and increase the chance of predation. Overall this may ultimately affect the condition and fitness of migratory species (Kirby et al. 2008). 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 on waterbirds, where bespoke studies (e.g. Gittings & O'Donoghue, 2012) would provide better detail. Pertinent to Poulnasherry Bay is the lack of a time series of waterbird count data, because the bay has received little coverage by I-WeBS in recent years. As a final recommendation, an annual waterbird monitoring programme should be put in place with regular assessments of waterbird trends which could then inform any future management decisions at the site.

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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.

Further details available on www.emff.marine.ie

Managing Authority EMFF 2014-2020	Specified Public Beneficiary Body
Department of Agriculture Food & the Marine Clogheen, Clonakilty, Co. Cork. P85 TX47 Tel: (+)353 (0)23 885 9500 www.agriculture.gov.ie/emff	Marine Institute Rinville, Oranmore, Co. Galway, H91 R673 Phone: (+)353 (0)91 38 7200 www.marine.ie

This project or operation is part supported by the Irish government and the European Maritime & Fisheries Fund
as part of the EMFF Operational Programme for 2014-2020

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

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

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