

Marine Institute

Poulnasherry Bay Waterbird Survey

Winter 2018-19

Bird Survey Report

July 2019

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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.

The logo for Inis, featuring the word "Inis" in a dark blue serif font. A small leaf icon is positioned above the letter 'i'.


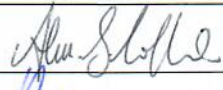
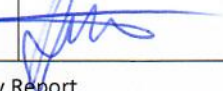
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The findings outlined within this report and the data we have provided are to our knowledge true and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental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

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

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

| Version | Date | | Name | Signature |
|---------|----------|---|---|---|
| 1 | 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 | | |

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Table of Contents

| | |
|---|-----------|
| 1. INTRODUCTION | 4 |
| 1.1. Constraints and limitations..... | 4 |
| 1.2. Statement of authority..... | 4 |
| 2. EXISTING ENVIRONMENT | 6 |
| 2.1. Site description | 6 |
| 2.2. Poulnasherry Bay waterbirds..... | 7 |
| 2.2.1. Published status and trends of Poulnasherry Bay waterbirds..... | 8 |
| 3. METHODOLOGIES | 9 |
| 3.1. Background to the low tide survey programme | 9 |
| 3.2. Survey design and count area | 9 |
| 3.3. Field survey methods | 10 |
| 3.4. Data analysis..... | 12 |
| 3.4.1. General..... | 12 |
| 3.4.2. Waterbird distribution | 12 |
| 3.4.3. Trends..... | 13 |
| 4. RESULTS..... | 14 |
| 4.1. Survey schedule and conditions..... | 14 |
| 4.2. Species assemblage and diversity | 14 |
| 4.3. Total numbers of waterbirds | 16 |
| 4.4. Species totals | 17 |
| 4.5. Trends in waterbird numbers..... | 17 |
| 4.6. Subsite totals for waterbirds..... | 19 |
| 4.6.1. Relative importance of subsites | 22 |
| 4.7. Waterbird densities..... | 24 |
| 4.8. Activities and disturbance | 26 |
| 5. DISCUSSION | 27 |
| 5.1. Overview of the 2018/19 season | 27 |
| 5.2. Waterbird numbers and trends..... | 27 |
| REFERENCES..... | 29 |
| APPENDIX I: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA SITE SYNOPSIS | 30 |

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*, *Ringling 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/EC¹ (see Appendix I for the River Shannon and River Fergus Estuaries SPA Site Synopsis). Poulnasherry Bay is also a designated Shellfish Area under the EU Shellfish Waters Directive.² The *West Shannon Poulnasherry Shellfish Area* covers an area of 7.1 km² and extends from Querrin Point to Baunahard Point, taking in the entirety of Poulnasherry Bay (Co. Clare).



Figure 2.2.1; 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 Ocean³. The largest estuarine complex in Ireland (Crowe, 2005), the Shannon estuary comprises the tidal reaches of the river between Limerick City and the Atlantic Ocean including the Fergus Estuary (Hickey & Healey, 2005).

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

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

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

^a 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: OH519 (Poulnasherry bay outer) and OH520 (Poulnasherry bay inner).

During this (Winter 2018/19) study we discovered that subsites OH519 (outer) and OH520 (inner) were wrongly coded/allocated in the subsite map in Appendix 6 of the SPA Conservation Objectives Supporting Document (NPWS, 2012b). It appears that this error was carried forward by the field surveyor who recorded birds in the inner bay as OH519 and outer bay as OH520. 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 OH519 and OH520, 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 OH517, OH518, ON025 and ON026. 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 |
|--------------|---|
| OH519 | Poulnasherry outer bay |
| OH520 | Poulnasherry inner bay |
| ON025 | |
| ON026 | |
| ON027 | Subsite created to encompass OH517 and OH518 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).

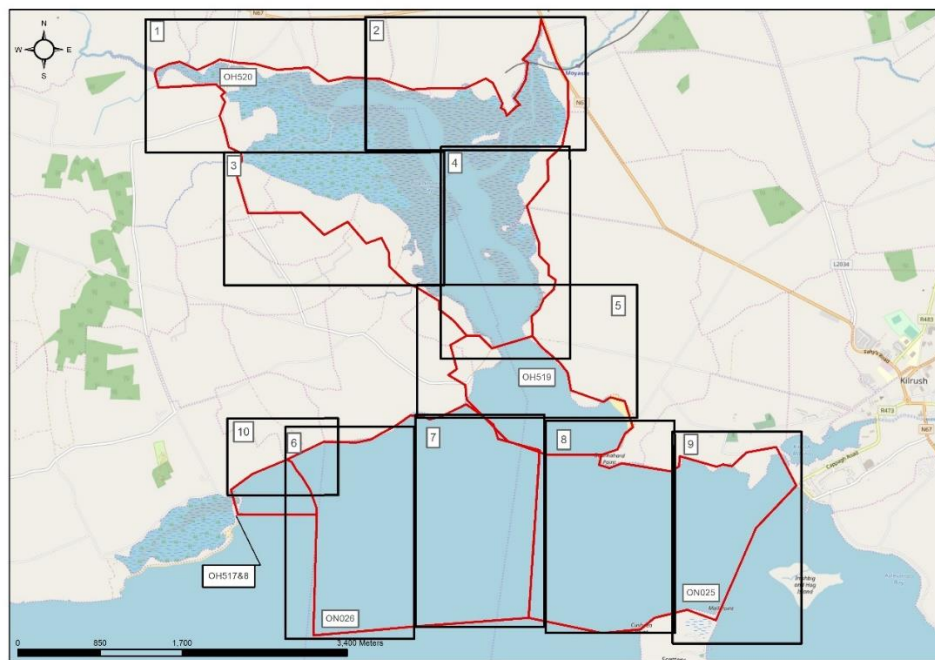


Figure 3.2.2: Map showing count subsites used for the Poulnasherry Bay waterbird surveys. The subsites are bordered by a red line; the numbered boxes relate to the sub-divided field maps that were used to mark flocks ('flock maps') during surveys.

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 OH519 and OH520 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 (ON026) to a maximum 34 species (OH520 Poulnasherry inner bay). Poulnasherry outer bay (OH519) supported a total of 19 species. This compares favourably with the species diversity recorded during the NPWS Waterbird Survey programme in 2011/11 when OH520 (inner bay) supported 34 species, and OH519 (outer bay) supported 15 species.

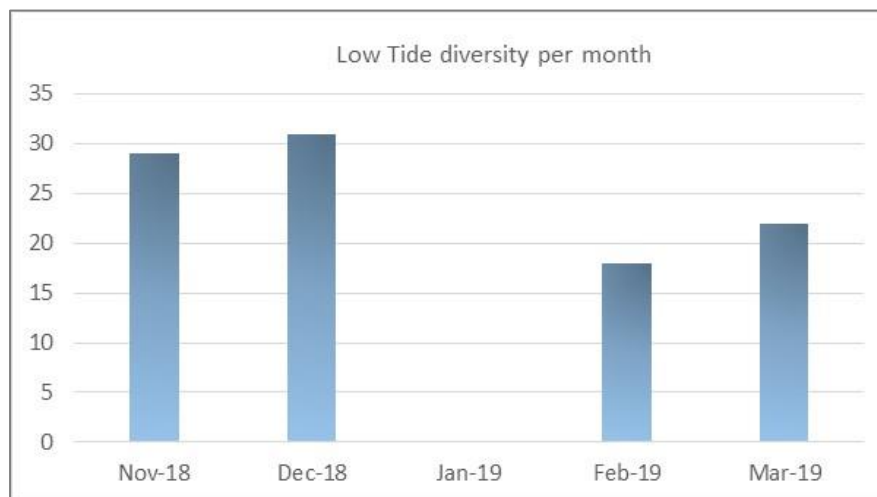


Figure 4.2.1: Overall species diversity during the four Low Tide surveys

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 | OH519 | OH520 | ON025 | ON026 | ON027 |
|---------------------------------------|-----------------------------------|-------|---------|-------|-------|-------|-------|-------|
| Light-bellied Brent Goose | <i>Branta bernicla hrota</i> | A | | ✓ | ✓ | | | ✓ |
| Shelduck | <i>Tadorna</i> | A | | | ✓ | | | |
| Wigeon | <i>Anas penelope</i> | A | | | ✓ | ✓ | | |
| Teal | <i>Anas crecca</i> | A | | | ✓ | | | |
| Mallard | <i>Anas platyrhynchos</i> | | | | ✓ | ✓ | | ✓ |
| Pintail | <i>Anas acuta</i> | R | | | ✓ | | | |
| Shoveler | <i>Anas clypeata</i> | R | | | ✓ | | | |
| Goldeneye | <i>Bucephala clangula</i> | A | | | ✓ | | | |
| Red-breasted Merganser | <i>Mergus serrator</i> | | | | ✓ | | | |
| Great Northern Diver | <i>Gavia immer</i> | | Yes | ✓ | ✓ | | ✓ | ✓ |
| Little Grebe | <i>Tachybaptus ruficollis</i> | A | | | ✓ | | | |
| Great Crested Grebe | <i>Podiceps cristatus</i> | A | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Cormorant | <i>Phalacrocorax carbo</i> | A | | ✓ | ✓ | ✓ | ✓ | |
| Little Egret | <i>Egretta garzetta</i> | | Yes | ✓ | ✓ | | | ✓ |
| Grey Heron | <i>Ardea cinerea</i> | | | ✓ | ✓ | ✓ | | ✓ |
| Oystercatcher | <i>Haematopus ostralegus</i> | A | | ✓ | ✓ | ✓ | | ✓ |
| Ringed Plover | <i>Charadrius hiaticula</i> | A | | ✓ | ✓ | | | |
| Golden Plover | <i>Pluvialis apricaria</i> | A | Yes | | ✓ | | | |
| Grey Plover | <i>Pluvialis squatarola</i> | A | | | ✓ | | | |
| Lapwing | <i>Vanellus</i> | | | ✓ | ✓ | | | |
| Dunlin | <i>Calidris alpina</i> | A | | ✓ | ✓ | | | |
| Snipe | <i>Gallinago</i> | A | | ✓ | ✓ | | ✓ | ✓ |
| Black-tailed Godwit | <i>Limosa</i> | A | | | ✓ | | | |
| Bar-tailed Godwit | <i>Limosa lapponica</i> | A | Yes | ✓ | ✓ | | | |
| Curlew | <i>Numenius arquata</i> | R | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Greenshank | <i>Tringa nebularia</i> | A | | | ✓ | ✓ | | ✓ |
| Redshank | <i>Tringa totanus</i> | R | | ✓ | ✓ | ✓ | | ✓ |
| Turnstone | <i>Arenaria interpres</i> | | | ✓ | ✓ | | | |
| Black-headed Gull | <i>Chroicocephalus ridibundus</i> | R | | ✓ | ✓ | ✓ | | ✓ |
| Common Gull | <i>Larus canus</i> | A | | ✓ | ✓ | | | |
| Lesser Black-backed Gull | <i>Larus fuscus</i> | A | | ✓ | ✓ | ✓ | | |
| Herring Gull | <i>Larus argentatus</i> | R | | ✓ | ✓ | ✓ | ✓ | |
| Great Black-backed Gull | <i>Larus marinus</i> | A | | | ✓ | | | |
| Unidentified gull | <i>Larus sp.</i> | | | | ✓ | | | |
| Total number of species per subsite > | | | | 19 | 34 | 12 | 6 | 12 |

Collectively the two subsites OH519 and OH520 (inner and outer Poulnasherry Bay combined) supported a total of 34 waterbird species during winter 2018/19. The corresponding I-WeBS subsite (OH498) 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 OH520 (Poulnasherry inner bay) during all low tide surveys (Figure 4.2.2), followed by OH519 (Poulnasherry outer bay). ON026 was the least diverse subsite over all months.

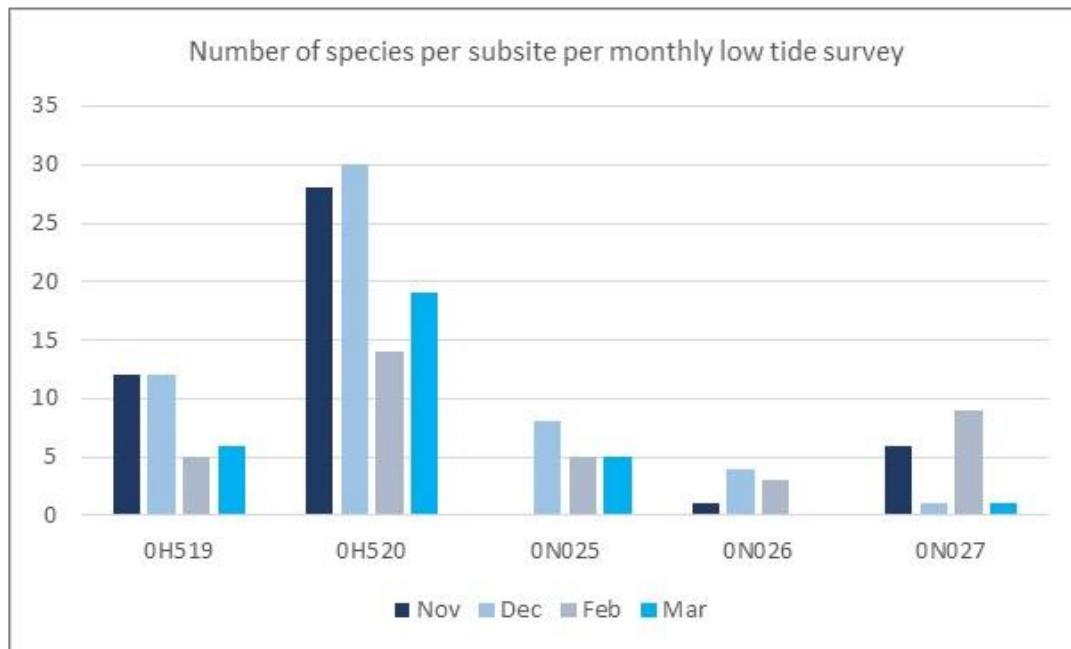


Figure 4.2.2: Monthly species diversity per subsite for low tide counts

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 ON027 recording subsite peak counts during December 2018 (Table 4.3.1). The peak counts in OH520 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 OH498).

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 OH519 and OH520.

| 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 | OH519 | 84 | 102 | 19 | 18 | 19 |
| 2018/19 | OH520 | 1,198 | 1,943 | 677 | 511 | 573 |
| 2018/19 | OH519 + OH520 | 1,282 | 2,045 | 696 | 529 | 592 |
| 2018/19 | ON025 | 0 | 1,250 | 23 | 14 | 17 |
| 2018/19 | ON026 | 1 | 16 | 5 | 0 | 3 |
| 2018/19 | ON027 | 11 | 3 | 36 | 4 | 2 |
| | | | | | | |
| 2010/11 | OH519 | 52 | 32 | 63 | 64 | 44 |
| 2010/11 | OH520 | 1,518 | 1,200 | 1,440 | 1,103 | 761 |
| 2010/11 | OH519 + OH520 | 1,570 | 1,232 | 1,503 | 1,167 | 805 |

4.4. Species totals

Waterbird species peak counts for the 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 OH498) 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 OH498 = OH519 + OH520).

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 | <i>Branta bernicla hrota</i> | | 57 | 207 | 256 | 209 |
| Shelduck | <i>Tadorna</i> | 18 | 60 | 115* | 27 | 76 |
| Wigeon | <i>Anas penelope</i> | 332 | 297 | 33 | 8 | 15 |
| Teal | <i>Anas crecca</i> | 169 | 218 | 134 | 60 | 150 |
| Mallard | <i>Anas platyrhynchos</i> | 22 | 21 | 4 | 7 | 5 |
| Pintail | <i>Anas acuta</i> | 14 | 82* | | | |
| Shoveler | <i>Anas clypeata</i> | 6 | | | | |
| Goldeneye | <i>Bucephala clangula</i> | | 1 | | | |
| Red-breasted Merganser | <i>Mergus serrator</i> | | 3 | | 1 | |
| Great Northern Diver | <i>Gavia immer</i> | 4 | 12 | 1 | 4 | 4 |
| Little Grebe | <i>Tachybaptus ruficollis</i> | | 2 | | | |
| Great Crested Grebe | <i>Podiceps cristatus</i> | 12 | 19 | 4 | 1 | 3 |
| Cormorant | <i>Phalacrocorax carbo</i> | 1 | 4 | 8 | 1 | 19 |
| Little Egret | <i>Egretta garzetta</i> | 13 | 7 | 8 | 21* | 9 |
| Grey Heron | <i>Ardea cinerea</i> | 8 | 3 | 3 | 1 | |
| Oystercatcher | <i>Haematopus ostralegus</i> | 22 | 28 | 20 | 19 | 37 |
| Ringed Plover | <i>Charadrius hiaticula</i> | 53 | 2 | | 7 | 2 |
| Golden Plover | <i>Pluvialis apricaria</i> | | 9 | 80 | | |
| Grey Plover | <i>Pluvialis squatarola</i> | | 7 | | | |
| Lapwing | <i>Vanellus</i> | 342 | 483 | | | |
| Dunlin | <i>Calidris alpina</i> | 59 | 336 | | 4 | 1 |
| Snipe | <i>Gallinago</i> | 3 | 8 | | | 6 |
| Black-tailed Godwit | <i>Limosa</i> | 2 | | | | |
| Bar-tailed Godwit | <i>Limosa lapponica</i> | 6 | 3 | | | |
| Curlew | <i>Numenius arquata</i> | 104 | 169 | 95 | 84 | 29 |
| Greenshank | <i>Tringa nebularia</i> | 7 | 4 | 2 | 8 | 7 |
| Redshank | <i>Tringa totanus</i> | 45 | 80 | 30 | 20 | 18 |
| Turnstone | <i>Arenaria interpres</i> | 5 | 3 | | | 5 |
| Black-headed Gull | <i>Chroicocephalus ridibundus</i> | 11 | 1,329 | 10 | 5 | |
| Common Gull | <i>Larus canus</i> | 8 | 48 | | 1 | |
| Lesser Black-backed Gull | <i>Larus fuscus</i> | 4 | 1 | 1 | 1 | |
| Herring Gull | <i>Larus argentatus</i> | 3 | 17 | 5 | 9 | 16 |
| Great Black-backed Gull | <i>Larus marinus</i> | 1 | 1 | | 2 | 3 |
| Unidentified gull | <i>Larus sp.</i> | 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 OH520 (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 ON025, ON026 and ON027 (Table 4.6.1). Of the 28 waterbird species listed in Table 8, 17 species occurred in OH520 during three or more low tide counts. In contrast, five species occurred in OH519 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 |
|---------|---------------------------|-----|-----|-----|-----|---|-----|
| OH519 | Light-bellied Brent Goose | | | 6 | | 1 | |
| OH520 | | | 57 | 185 | 256 | 3 | 209 |
| ON027 | | | | 16 | | 1 | |
| OH520 | Shelduck | 18 | 60 | 115 | 27 | 4 | 76 |
| OH520 | Wigeon | 332 | 297 | 33 | 7 | 4 | 15 |
| ON025 | | | | | 1 | 1 | |
| OH520 | Teal | 169 | 218 | 134 | 60 | 4 | 150 |
| OH520 | Mallard | 22 | 21 | | 5 | 3 | 3 |
| ON025 | | | | | 2 | 1 | 2 |
| ON027 | | | | 4 | | 1 | |
| OH520 | Pintail | 14 | 82 | | | 2 | |
| OH520 | Shoveler | 6 | | | | 1 | |
| OH520 | Red-breasted Merganser | | 3 | | 1 | 2 | |
| OH519 | Great Northern Diver | 1 | 2 | | 2 | 3 | |
| OH520 | | 1 | 6 | 1 | 2 | 4 | 2 |
| ON026 | | 1 | 4 | | | 2 | 1 |
| ON027 | | 1 | | | | 1 | 1 |
| OH519 | Great Crested Grebe | 1 | 1 | | | 2 | 1 |
| OH520 | | 8 | 7 | | 1 | 3 | 1 |
| ON025 | | | 3 | | | 1 | |
| ON026 | | | 8 | | | 1 | |
| ON027 | | 3 | | 4 | | 2 | 1 |
| OH519 | Cormorant | | 1 | | | 1 | |
| OH520 | | 1 | 1 | 2 | 1 | 4 | 2 |
| ON025 | | | 1 | 1 | | 2 | 1 |
| ON026 | | | 1 | 2 | | 2 | 3 |
| OH519 | Little Egret | 1 | | | | 1 | |
| OH520 | | 12 | 7 | 7 | 21 | 4 | 9 |
| ON027 | | | | 1 | | 1 | |
| OH519 | Grey Heron | 3 | | 1 | 1 | 3 | |
| OH520 | | 4 | 2 | | | 2 | |
| ON025 | | | 1 | | | 1 | |
| ON027 | | 1 | | 2 | | 2 | |
| OH519 | Oystercatcher | 5 | 12 | 3 | 1 | 4 | 4 |
| OH520 | | 15 | 11 | 9 | 11 | 4 | 33 |
| ON025 | | | 2 | 4 | 3 | 3 | |
| ON027 | | 2 | 3 | 4 | 4 | 4 | |
| OH519 | Ringed Plover | 47 | | | 7 | 2 | 2 |
| OH520 | | 6 | 2 | | | 2 | |

Table 4.6.1: (Continued)

| Subsite | Species name | LT1 | LT2 | LT3 | LT4 | n | HT1 |
|---------|--------------------------|-----|-------|-----|-----|---|-----|
| OH520 | Golden Plover | | 9 | 80 | | 2 | |
| OH520 | Grey Plover | | 7 | | | 1 | |
| OH519 | Lapwing | | 8 | | | 1 | |
| OH520 | | 342 | 475 | | | 2 | |
| OH519 | Dunlin | 3 | | | 4 | 2 | |
| OH520 | | 56 | 336 | | | 2 | 1 |
| OH520 | Black-tailed Godwit | 2 | | | | 1 | |
| OH519 | Bar-tailed Godwit | 1 | | | | 1 | |
| OH520 | | 5 | 3 | | | 2 | |
| OH519 | Curlew | 6 | 56 | 7 | | 3 | 2 |
| OH520 | | 95 | 90 | 76 | 77 | 4 | 27 |
| ON025 | | | 20 | 10 | 7 | 3 | |
| ON026 | | | 3 | 2 | | 2 | |
| ON027 | | 3 | | | | 1 | |
| OH520 | Greenshank | 7 | 4 | | 8 | 3 | 6 |
| ON025 | | | | 1 | | 1 | 1 |
| ON027 | | | | 1 | | 1 | |
| OH519 | Redshank | 12 | 3 | 2 | 3 | 4 | |
| OH520 | | 33 | 77 | 23 | 17 | 4 | 18 |
| ON025 | | | | 2 | | 1 | |
| ON027 | | | | 3 | | 1 | |
| OH519 | Black-headed Gull | | 11 | | | 1 | |
| OH520 | | 11 | 109 | 9 | 5 | 4 | |
| ON025 | | | 1,209 | | | 1 | |
| ON027 | | | | 1 | | 1 | |
| OH519 | Common Gull | | 2 | | | 1 | |
| OH520 | | 8 | 46 | | 1 | 3 | |
| OH519 | Lesser Black-backed Gull | 3 | | | | 1 | |
| OH520 | | 1 | | 1 | 1 | 3 | |
| ON025 | | | 1 | | | 1 | |
| OH519 | Herring Gull | | 1 | | | | |
| OH520 | | 3 | 3 | 3 | 8 | 4 | 12 |
| ON025 | | | 13 | | 1 | 2 | 4 |
| ON026 | | | | 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 OH520 (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. OH519 (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 OH520 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 | OH519 | OH520 | ONO25 | ONO26 | ONO27 |
|---------------------------|-------|-------|-------|-------|-------|
| 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 | OH519 | OH520 | ONO25 | ONO26 | ONO27 |
|---------------------------|-------|-------|-------|-------|-------|
| 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 OH520 (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 | OH519 | OH520 | ONO25 | ONO26 | ONO27 |
|---------------------------|-------|-------|-------|-------|-------|
| 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 | OH519 | OH520 | ON025 | ON026 | ON027 |
|---------------------------|-------|-------|-------|-------|-------|
| 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

OH520 (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 ON025, 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 |
|-------|------|------|------|------|---------|------|------|
| OH519 | 1.00 | 0.72 | 0.13 | 0.13 | 0.49 | 0.13 | 1.00 |
| OH520 | 1.77 | 2.87 | 1.00 | 0.76 | 1.60 | 0.76 | 2.87 |
| ON025 | - | 3.26 | 0.06 | 0.04 | 1.12 | 0.04 | 3.26 |
| ON026 | 0.00 | 0.03 | 0.01 | - | 0.02 | 0.00 | 0.03 |
| ON027 | 0.31 | 0.08 | 1.00 | 0.11 | 0.38 | 0.08 | 1.00 |

The peak intertidal foraging density was 6.9 Dunlin/ha (OH520 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 OH529 (Islandavanna upper - Fergus estuary).

The second highest recorded density was for Light-bellied Brent Goose (3.6/ha), also recorded for OH520 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 than 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 OH519 and OH520 only.

| Subsite | Species | LT1 | LT2 | LT3 | LT4 | Min | Max |
|---------|---------------------------|------|------|------|------|------|------|
| OH519 | Light-bellied Brent Goose | | | 0.12 | 0.00 | 0.00 | 0.12 |
| OH520 | | | 0.65 | 3.37 | 3.63 | 0.65 | 3.63 |
| OH520 | Shelduck | 0.37 | 1.04 | 2.10 | 0.49 | 0.37 | 2.10 |
| OH519 | Oystercatcher | 0.08 | 0.20 | 0.02 | 0.02 | 0.02 | 0.20 |
| OH520 | | 0.31 | 0.20 | 0.10 | 0.16 | 0.10 | 0.31 |
| OH519 | Ringed Plover | 0.96 | | | 0.14 | 0.14 | 0.96 |
| OH520 | | 0.12 | 0.04 | | | 0.04 | 0.12 |
| OH520 | Grey Plover | | 0.14 | | | 0.14 | 0.14 |
| OH519 | Dunlin | 0.06 | | | 0.08 | 0.06 | 0.08 |
| OH520 | | 1.10 | 6.86 | | | 1.10 | 6.86 |
| OH519 | Bar-tailed Godwit | 0.02 | | | | 0.02 | 0.02 |
| OH520 | | 0.10 | 0.06 | | | 0.06 | 0.10 |
| OH519 | Curlew | 0.06 | 1.14 | 0.12 | | 0.06 | 1.14 |
| OH520 | | 1.16 | 1.12 | 1.33 | 1.49 | 1.12 | 1.49 |
| OH519 | Redshank | 0.24 | 0.06 | 0.04 | 0.06 | 0.04 | 0.24 |
| OH520 | | 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 |
|--------------|------------------------|-----------------------|--|---|--|
| OH519 | Poulnasherry outer Bay | Bait diggers | 1 | Yes (SU) | Weak – slight movement |
| OH520 | Poulnasherry outer Bay | Aquaculture machinery | 2 | Yes, one occasion (all birds present) | Moderate – move to another part of subsite |
| ON025 | | Human on shoreline | 1 | Yes (Redshank) | Moderate – move to another part of subsite |
| ON026 | | Fishing boat | 1 | Yes (Black-headed Gull) | Weak – slight movement |
| ON027 | OH517/518 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 its relatively small size; inner and outer bay subsites (OH520 and OH519 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, OH520 (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 OH520, 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 OH520 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 OH520 (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.