

# REPORT

## **Millport Coastal Flood Protection Scheme: Environmental Statement**

Chapter 11 Offshore and Coastal Ornithology

Client: North Ayrshire Council

Reference: PB4749-RHD-ZZ-XX-RP-Z-0011

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Classification

Project related



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## Table of Contents

<b>11</b>	<b>Offshore and Coastal Ornithology</b>	<b>1</b>
11.1	Introduction	1
11.2	Policy, Legislation and Guidance	1
11.3	Consultation	5
11.4	Methodology	6
11.5	Existing Environment	13
11.6	Scope of EIA Assessment	18
11.7	Impact Assessment	21
11.8	Cumulative Impact Assessment	29
11.9	Inter-relationships	29
11.10	Interactions	29
11.11	Summary	30
11.12	References	32

## Table of Tables

Table 11-1	Summary of key legislation and policy relevant to this Proposed Scheme	1
Table 11-2	Relevant local planning policies	4
Table 11-3	Consultation responses	6
Table 11-4	Definitions of sensitivity levels for ornithology receptors	9
Table 11-5	Definitions of the different Nature Conservation Importance levels for ornithology receptors	10
Table 11-6	Definitions of spatial magnitude levels	10
Table 11-7	Impact significance matrix	11
Table 11-8	Impact significance definitions	12
Table 11-9	Number of pairs of birds breeding in the Millport Bay survey area	15
Table 11-10	Number and habitat use of non-breeding birds breeding in the Millport Bay survey area, and the importance of the bay to the regional (Natural Heritage Zone 17) population	16
Table 11-11	Worst case parameters values relevance to ornithology impact assessment	21
Table 11-12	Embedded mitigation measures for ornithology	21
Table 11-13	Inter-topic relationships	29
Table 11-14	Potential Impacts Identified for Ornithology	30

## Appendices

Appendix 11.1 Millport Bay Bird Survey Final Report

Project related



## Acronyms

<b>Acronym</b>	<b>Acronym description</b>
<b>AJPU</b>	Ayrshire Joint Planning Unit
<b>BoCC</b>	Birds of Conservation Concern
<b>CIEEM</b>	Chartered Institute of Ecology and Environmental Management
<b>CIA</b>	Cumulative Impact Assessment
<b>EAP</b>	Ecological Action Plan
<b>EclA</b>	Ecological Impact Assessment
<b>EIA</b>	Environmental Impact Assessment
<b>ES</b>	Environmental Statement
<b>ICZM</b>	Integrated Coastal Zone Management
<b>JNCC</b>	Joint Nature Conservation Committee
<b>LBAP</b>	Local Biodiversity Action Plans
<b>LDP</b>	Local Development Plan
<b>LNCS</b>	Local Nature Conservation Sites
<b>MPA</b>	Marine Protected Area
<b>MARPOL</b>	International Convention for the Prevention of Pollution from Ships
<b>NPF</b>	National Planning Framework
<b>NHZ</b>	Natural Heritage Zone
<b>PANS</b>	Planning Advice Notes
<b>SMP</b>	(JNCC) Seabird Monitoring Programme



<b>SPP</b>	Scottish Planning Policy
<b>SSSI</b>	Sites of Special Scientific Interest
<b>SAC</b>	Special Areas of Conservation
<b>SNH</b>	Scottish Natural Heritage
<b>SPA</b>	Special Protection Areas
<b>UKBAP</b>	UK Biodiversity Action Plan
<b>WeBS</b>	Wetland Bird Survey

## Glossary

### Glossary Term

### Glossary Text

#### **Environmental Impact Assessment (EIA)**

A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement.

#### **Environmental Statement (ES)**

A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.

#### **Millport Coastal Flood Protection Scheme**

The scheme consists of offshore rock armour structures which will be built in the vicinity of the rock islets within Millport Bay. Onshore works will include flood walls, improvement works to existing coast protection structures, and works to raise the level of existing grass areas. Works on the foreshore include shore-connected rock armour breakwaters and rock armour revetments.

## 11 Offshore and Coastal Ornithology

### 11.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the proposed Millport Coastal Flood Protection Scheme (the proposed scheme) on bird receptors.
2. This chapter provides a summary of the ornithology of the proposed development site and its vicinity followed by an assessment of the magnitude and significance of the effects upon the baseline conditions resulting from the construction, operation and decommissioning of the proposed scheme as well as those effects resulting from cumulative interactions with other existing or planned projects.
3. The potential effects on ornithology are assessed conservatively using realistic worst-case scenarios for the proposed scheme.
4. The assessment of potential effects has been made with specific reference to Scotland's National Planning Framework and Planning Policy. These are discussed further in **Chapter 2 Policy and Legislation** and outlined below in Section 11.2. These are the principal decision-making documents for flood protection schemes.
5. This chapter has been prepared by Royal HaskoningDHV and Atlantic Ecology in accordance with the relevant legislation and policies, adhering to the methodology for Environmental Impact Assessment (EIA) and Cumulative Impact Assessment (CIA) as discussed in Section 11.4.
6. Due to the close association between ornithology and ecology, this chapter should be read in conjunction with **Chapter 16 Terrestrial Ecology** for impacts to terrestrial habitats and otter, **Chapter 8 Benthic and Intertidal Ecology** for impacts to marine habitats and **Chapter 10 Marine Mammals and Basking Shark** for impacts to marine mammals.
7. Additional information to support the assessment of impacts on ornithology is provided separately in the following appendix:
  - Appendix 11.1 (Volume III): Millport Bay Bird Survey Technical Report.

### 11.2 Policy, Legislation and Guidance

#### 11.2.1 Legislation

8. There are a number of pieces of legislation applicable to ornithology. The following key pieces of International, UK and Scottish legislation which are relevant to this chapter. Further details are provided in **Chapter 2 Policy and Legislation** on the following legislation.
9. Table 11-1 below provides a brief summary of the key legislation and policy relevant to the scheme.

*Table 11-1 Summary of key legislation and policy relevant to this Proposed Scheme*

Legislation	Relevance
Habitats Directive - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and	This Directive provides protection for specific habitats listed in Annex I and species listed in Annex II of the

Legislation	Relevance
Flora	Directive. The Directive sets out decision making procedures for the protection of Special Areas of Conservation (SAC) and Special Protection Areas (SPA), implemented in Scotland through the Conservation (Natural Habitats, & c.) Regulations 1994 (as amended), and in England and Wales through The Conservation of Habitats and Species Regulations 2017.
Birds Directive - Council Directive 2009/147/EC on the Conservation of Wild Birds	This Directive (first passed in 1979 (79/409/EEC) and codified in 2009) provides a framework for the conservation and management of wild birds in Europe. The most relevant provisions of the Directive are the identification and classification of SPAs for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). It also establishes a general scheme of protection for all wild birds (required by Article 5). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.
Wildlife and Countryside Act 1981 (as amended) (includes amendments made via the Wildlife and Natural Environment (Scotland) Act 2011)	Codifies the EU Directive 2009/147/EC (the Birds Directive) into UK law. This Act makes it an offence (with exception to species listed in Schedule 2 and with additional penalties for species listed in Schedule 1) to intentionally: kill, injure, or take any wild bird; take, damage or destroy the nest of any wild bird while that nest is in use or being built; and take or destroy an egg of any wild bird. The Act makes provision for the notification and confirmation of Sites of Special Scientific Interest (SSSI).
Nature Conservation (Scotland) Act 2004	The Nature Conservation (Scotland) Act 2004 places duties on public bodies in relation to the conservation of biodiversity, increases protection for Sites of Special Scientific Interest (SSSI) from that set out in the Wildlife and Countryside Act 1981 (as amended), amends legislation on Nature Conservation Orders, provides for Land Management Orders for SSSIs and associated land, strengthens wildlife enforcement legislation (to include 'reckless' acts).
Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)	Codifies the EU Directive 92/43/EEC (The Habitats Directive) into UK law. The Regulations transpose the Council Directive 92 / 43 / EEC the 'Habitats Directive' in to national law (in respect of Scotland) and requires the state to designate SACs. The Regulations require competent authorities to consider or review planning permission, applied for or granted, affecting a European site, and, subject to certain exceptions, restrict or revoke permission where the integrity of the site would be adversely affected.

Legislation	Relevance
Marine and Coastal Access Act 2009	The act includes provisions for the coastal environment including improving access to the coast and undertaking Integrated Coastal Zone Management (ICZM), which brings policy makers, decision makers and stakeholders together to manage coastal and estuarine areas.
Marine (Scotland) Act 2010	Scotland has devolved power under MCA act for marine planning, licencing, and designated Marine Protected Areas (MPAs).

## 11.2.2 Policies and Plans

10. The policies and plans outlined below have also been reviewed for their relevance to ornithology when undertaking the EIA for the Proposed Scheme.

### 11.2.2.1 National Plans

11. The following National Plans are relevant and further details are provided in **Chapter 16 Terrestrial Ecology**:

- National Planning Framework:
- Natural Environment White Paper 2011
- A Green Future: Our 25 Year Plan to Improve the Environment 2018
- Scottish Planning Policy
- Planning Advice Notes (PANS)
  - Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment explains the role of individual planning authorities and that of the Consultation Bodies in EIA, as well as providing guidance on the ways in which EIA can be integrated into the overall development management process; and
  - PAN 60: Planning for Natural Heritage provides advice on how development and the planning system can contribute to the conservation, enhancement, enjoyment and understanding of Scotland's natural environment and encourages developers and planning authorities to be positive and creative in addressing natural heritage issues. It complements the National Planning Policy Guideline on Natural Heritage (NPPG 14), with examples of good planning practice in relation to natural heritage drawn from across Scotland highlighted in a number of case studies.

### 11.2.2.2 Local Plans

12. The Proposed Scheme falls within the North Ayrshire Council local authority boundaries.
13. North Ayrshire Council have adopted a new Local Development Plan for North Ayrshire on 28th November 2019 (North Ayrshire Council, 2019), the LDP covers a 20 year period.
14. Within this LDP, the Millport Conservation Area Regeneration Scheme (CARS) and the Flood Defence Scheme is listed as Strategic Development Area 3 for Millport, Cumbrae.
15. The Ayrshire Joint Structure Plan 'Growing A Sustainable Ayrshire' (North Ayrshire Council, East Ayrshire Council and South Ayrshire Council, 2007) establishes a framework that brings together

the aspirations of communities with those of business and industry, and the area's many supporting agencies and organisations, to provide a strategic land use context to the year 2025.

16. **Error! Reference source not found.** Table 11-2 provides details of the local planning policy documents and the relevant policies in respect to ornithology. These policy document have been considered when undertaking the EIA for the Proposed Scheme.

Table 11-2 Relevant local planning policies

Document	Policy / Guidance	Policy / Guidance purpose	ES Reference
Adopted Local Development Plan (North Ayrshire Council, 2019)	Policy 16: Protection of our Designated Sites	We will support development which would not have an unacceptable adverse effect on our valuable natural environment as defined by the following legislative and planning designations; <ul style="list-style-type: none"> <li>a) Nature Conservation Sites of International Importance;</li> <li>b) Nature Conservation Sites of National Importance;</li> <li>c) Nature Conservation Sites of Local Importance;</li> <li>d) Marine Protected Areas;</li> <li>e) Biodiversity Action Plan Habitats and Species; and</li> <li>f) Protected Species.</li> </ul>	Designated sites are discussed in Section 11.5.3.
	Policy 22: Water Quality Environment	Protecting and enhancing the ecological status and riparian habitat, natural heritage, landscape values and physical characteristics of water bodies (including biodiversity and geodiversity)	Embedded mitigation measures are within Section 11.7.2.
North Ayrshire Council Environmental Policy, 2012 (North Ayrshire Council, 2012)	Challenge 3: To protect and enhance the natural environment	Protecting and preventing loss of wildlife habitats, flora and fauna; Supporting the creation of new habitats and habitat networks in both the rural and urban environment through local biodiversity action planning; Conserving and enhancing the quality and character of the landscape; Promoting the value of ecosystem services, including green engineering technology; and Encouraging sustainable public access to and enjoyment of the outdoors.	Embedded mitigation measures are within Section 11.7.2.
Ayrshire Joint Structure Plan (2014)	ENV 7 Natural Heritage Designations	The three Ayrshire Councils shall: Recognise international and national natural heritage designations and the statutory protection afforded by them; Support the identification of additional Local Natural Reserves and continue to work with other stakeholders to implement the Ayrshire Local Biodiversity Action Plan Local plans shall include policies based on the Scottish Executive Model Policies for the	Designated sites are discussed in Section 11.5.3.

Document	Policy / Guidance	Policy / Guidance purpose	ES Reference
		protection for all sites of recognised international and national natural heritage importance.	
	ENV 10 Integrated Coastal Zone Management	North and South Ayrshire Councils shall bring forward proposals for a coastal zone management plan for the Ayrshire coastline.	N/A.

### 11.2.2.3 Biodiversity Action Plan

17. The UK generated the UK Biodiversity Action Plan (UKBAP) in response to the Convention on Biological Diversity from the Rio summit in 1992. Local Biodiversity Action Plans (LBAP) were adopted at the county level to generate action on the ground and help meet UK targets.
18. Ayrshire is comprised of the three unitary authorities of East, North and South Ayrshire, including a range of islands (Arran, Great Cumbrae, Little Cumbrae and Ailsa Craig, etc.). It is a cohesive biogeographical unit from an environmental perspective as it is bounded by the sea and by watersheds. The delivery of the LBAP within Ayrshire was historically a joint project with the neighbouring authorities of South and East Ayrshire and led by the Ayrshire Joint Planning Unit (AJPU).
19. With the closure of the AJPU in the summer of 2013, a revised approach was required to address North Ayrshire Council's statutory biodiversity duty and address the Scottish Government's 2020 Challenge for Scotland's Biodiversity for the conservation and enhancement of biodiversity in Scotland. As such, the following revisions were made:
  - Ayrshire LBAP 2012-2017 Revision;
  - North Ayrshire LBAP 2015-2018 Revision; and
  - North Ayrshire LBAP 2019-2031

### 11.2.3 Best Practice and Guidance

20. The impact assessment has been based upon the following guidance and standards:
  - Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) as amended Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.1); and
  - Guiding principles for cumulative impacts assessment (CIA) for windfarms (Renewable UK, 2013).

## 11.3 Consultation

21. To inform the ES, North Ayrshire Council has undertaken a thorough pre-application consultation process, which has included the following key stages:
  - Scoping Reports submitted to Marine Scotland and North Ayrshire Council (Royal HaskoningDHV 2017); and
  - Scoping Opinion received from Marine Scotland and North Ayrshire Council (2017).

22. Full details of the proposed scheme consultation process to date are presented within **Chapter 3 EIA Methodology and Consultation**.
23. A summary of the consultation carried out at key stages throughout the proposed scheme of particular relevance to ornithology is presented in Table 11-3. Although invited to respond to the proposed scheme's Scoping Report, no responses were received from Marine Conservation Society, RSPB Scotland, National Trust Scotland or World Wildlife Fund (Scotland).

Table 11-3 Consultation responses

Joint Nature Conservation Committee (JNCC)	05/05/17 Scoping Response	This development proposal is not located within the offshore area, does not have any potential offshore nature conservation issues and is not concerned with nature conservation at a UK level. JNCC therefore does not have any comments to add to this consultation.	No response required
Scottish Natural Heritage (SNH)	05/05/17 Scoping Response	The report correctly identifies the key areas of concern to this organisation and these issues have been adequately described. The proposed measures for baseline surveys and completing the assessment of the potential impacts on the natural heritage should lead to a fair assessment of the project.	Baseline survey undertaken and described in Section 11.5 and in Appendix 11.1
Marine Scotland	6/4/2017 Screening request	Advise that formal EIA is required	EIA undertaken and presented in this ES
Scottish Wildlife Trust	18/4/2017 Scoping Response	No comments related to ornithology	No response required

## 11.4 Methodology

24. This section describes the methods used to obtain baseline data, characterise the ornithology of the area and undertake the EIA. The primary study area relevant to the EIA of the proposed scheme is Millport Bay. Due to the mobile nature of bird receptors the ornithology of this study area is also considered in terms of connectivity to with the wider local area (Great Cumbrae) and region (Firth of Clyde/ Natural Heritage Zone -17).
25. Baseline information to characterise the ornithology of the study area was sought from a combination of desk study to review existing information and a one-year programme of commissioned bird surveys of Millport Bay.

### 11.4.1 Desk Study Methods

26. As part of the write-up for the bird survey (**Appendix 11.1**) a desk review was undertaken of relevant ornithology literature. The primary reference sources of information used to provide context are as follows:

- *The Birds of Scotland* (Forrester and Andrews, 2007).

- Seabird Populations of Britain and Ireland (Mitchell *et al.*, 2004).
- Bird Atlas 2007–11: the breeding and wintering birds of Britain and Ireland (Balmer *et al.*, 2013),
- JNCC review of seasonal at-sea seabird densities (Kober *et al.*, 2010).
- The JNCC Seabird Monitoring Programme online database (information of on breeding seabird colony counts).
- The British Trust for Ornithology Wetland Bird Survey (WeBS) online database (count data for coastal birds).
- SNH SiteLink website (information on designated sites).
- South West Scotland Environmental Information Centre species records database

27. Other sources of information are cited in the text where relevant.

28. A species' population size can be considered at different spatial scales, e.g. local, regional or national, and may concern the breeding or non-breeding (wintering) population. For EIA assessment SNH advise that regional receptor populations are defined according to the relevant SNH Natural Heritage Zone (NHZ) e.g. see Wilson *et al.* (2015). Millport Bay lies in NHZ 17 ('West Central Belt'). The coast and inshore waters of NHZ-17 corresponds to the ornithology recording areas of 'Clyde', 'Clyde Islands' and 'Ayrshire'. These are together referred to as the 'Firth of Clyde' region in *The Birds of Scotland* (Forrester and Andrews, 2007), one of the twenty Scottish regions used to summarise information on regional abundance of bird species in Scotland. NHZ-17 also corresponds to the Wetland and Estuary Birds (WeBS) the combined counting regions of 'Ayrshire', Dumbarton/SE Argyll, Lanarkshire/Strathkelvin and 'Renfrew' (Frost *et al.*, 2019). Summary information on breeding seabird population size is taken from Seabird Populations of Britain and Ireland (Mitchell *et al.*, 2004) for the area defined as Cunninghame (this includes Great and Little Cumbrae, Arran and Ayrshire and the Clyde. The JNCC Seabird Monitoring Programme (SMP) online database was also checked for more up-to-date information on NHZ-17 seabird colonies but this showed that many of the seabird colonies in the region have not been recently counted (it is understood they are due to be counted in 2020).

#### 11.4.2 Baseline Bird Survey Methods

29. The baseline ornithological conditions of Millport Bay were characterised by a one-year commissioned bird survey ('the bird survey') undertaken by Atlantic Ecology between April 2018 and March 2019 (**Appendix 11.1**). The bird survey consisted of monthly visits to count the birds in a defined survey area covering the whole of Millport Bay including the coasts, islands and skerries and the sea (**Appendix 11.1**).

##### 11.4.2.1 Bird Survey Aims

30. The bird survey aims were as follows:

- To count and map the distribution of bird species using the marine, inter-tidal and shoreline habitats in the Millport Bay survey area during both the high tide and low tide parts of the tidal cycle;

- To visit The Eileans (the two vegetated islands in the bay) during the breeding season (April to July) to determine the numbers breeding;
  - To record human activity that could result in disturbance to birds and other wildlife.
31. A secondary aim was to opportunistically record other wildlife of potential relevance to the development, in particular seals, otters and cetaceans. The records of these mammals were passed to the marine mammal specialist advising on the proposed scheme.

#### 11.4.2.2 Bird Survey Fieldwork

32. The bird survey methods are described in full in **Appendix 11.1**.
33. The survey consisted of twelve 1-day visits undertaken at approximately monthly intervals between April 2018 and March 2019. The survey method used recommended methods for counting coastal birds (e.g., Gilbert et al., 1998; Jackson and Whitfield, 2011). On each visit two complete counts of the birds using the coastal and marine habitats across Millport Bay were made; one count was undertaken close to high tide conditions and the other close to low tide conditions. Counts were undertaken from series of vantage points around the foreshore of the bay with the aid of binoculars and a spotting scope. All birds and marine mammals seen were recorded on bespoke recording forms, noting the time, species, behaviour and location. Location was recorded as the relevant 100m x100m grid cell based on the Ordnance Survey British National Grid.
34. During the breeding season months (April to July) the survey included visiting The Eileans by boat to count the numbers of breeding birds and locate their nest sites. During the surveys, all human activity seen along the coast and on the sea was logged to give basic information on baseline disturbance.

#### 11.4.3 Impact Assessment Methodology

35. General methods for EIA are discussed in **Chapter 3 EIA Methodology and Consultation**. The following sections describe the methodology used to assess the potential impacts of the proposed scheme on ornithology in more detail.
36. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where possible, quantifying the sensitivity, value and magnitude of all ornithology receptors which have been scoped into this assessment. Using this information, the significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
37. The development site does not overlap with any site designated for bird conservation, and is not anticipated to have strong or moderate connectivity to any such site (e.g. any seabird breeding colony designated as SSSI or SPA).
38. The sensitivity and value of discrete receptors and the magnitude of effect are assessed using expert judgement and described with a standard semantic scale. These expert judgements of receptor sensitivity, value and magnitude of effect are guided by the understanding of baseline conditions.

##### 11.4.3.1 Receptor Sensitivity

39. The sensitivity of a receptor (Table 11-4) is dependent on the following:

- Tolerance: the extent to which the receptor is adversely affected by an effect;
  - Adaptability: the ability of the receptor to avoid adverse impacts that would otherwise arise from an effect; and
  - Recoverability: a measure of a receptor's ability to return to a state at, or close to, that which existed before the effect caused a change.
40. In determining receptor tolerance it is useful to consider how vulnerable the individuals of a species are to an effect and bear in mind that vulnerability to some effects can vary from location to location. This is particularly so for disturbance effects. The vulnerability of seabirds and coastal birds to disturbance has been the subject of various studies (e.g., Furness et al., 2012; Jarrett et al., 2018; Goodship and Furness, 2019) and the results of these studies are taken into consideration in the evaluation of receptor sensitivity.
41. In considering sensitivity in the context of ornithology it is important to bear in mind that sensitivity is a characteristic of the receptor population under consideration and not the individual birds that make up that population. Receptor populations that have a poor conservation status are likely to have reduced tolerance and recoverability and thus have higher sensitivity to an effect.

Table 11-4 Definitions of sensitivity levels for ornithology receptors

Sensitivity	Definition
High	Tolerance: Receptor has very limited tolerance of effect Adaptability: Receptor unable to adapt to effect Recoverability: Receptor unable to recover resulting in permanent or long-term (greater than ten years) change
Medium	Tolerance: Receptor has limited tolerance of effect Adaptability: Receptor has limited ability to adapt to effect Recoverability: Receptor able to recover to over the medium term (5-10 years)
Low	Tolerance: Receptor has some tolerance of effect Adaptability: Receptor has some ability to adapt to effect Recoverability: Receptor able to recover over the short term (1-5 years)
Negligible	Tolerance: Receptor generally tolerant of effect Adaptability: Receptor can completely adapt to effect with no detectable changes Recoverability: Receptor able to recover near instantaneously (less than one year)

#### 11.4.3.2 Receptor Nature Conservation Importance

42. Nature conservation importance is a measure of the conservation value of a species potentially affected by the proposed varied development. The nature conservation importance of ornithology receptors is determined according to the criteria in Table 11-5.
43. Species that receive a higher level of protection under bird protection legislation are considered to have greater Nature Conservation Importance, e.g., species listed on Annex 1 of the EU Birds Directive or on Schedule 1 of the Wildlife and Countryside Act. Species on these lists tend to have relatively small populations and restricted ranges. Species are also considered to have higher nature conservation importance if they are recognised as having a poor conservation status through inclusion on the Birds of Conservation Concern 4 Red List (Eaton *et al.*, 2015). The nature conservation importance of a species is also heightened if the individuals potentially affected are likely to be of a qualifying interest of a designated site such as a Special Protection Area (SPA).

Table 11-5 Definitions of the different Nature Conservation Importance levels for ornithology receptors

Value	Definition
<b>High</b>	Species that are listed on one or more of: Annex 1 of the EU Birds Directive Schedule 1 of the Wildlife and Countryside Act Birds of Conservation Concern 'Red' list that have a small population size (<3,000 birds in region). And The individuals potentially affected are likely to be part of the qualifying interest of a SPA  No species using the site meet these criteria.
<b>Medium</b>	Species that are listed on one or more of: Annex 1 of the EU Birds Directive Schedule 1 of the Wildlife and Countryside Act Birds of Conservation Concern 'Red' list and that have low population size (<10,000 birds in region). And <ul style="list-style-type: none"> <li>The Individuals affected are not likely to be part of the qualifying interest of a potentially affected SPA</li> </ul> Four species using the site meet these criteria: curlew, ringed plover, Sandwich tern and European shag (all are BoCC red-listed)
<b>Low</b>	Species on Birds of Conservation Concern 'Red' list and that have large and widespread populations (>10,000 birds in region)  Four species using the site meet these criteria: lapwing, herring gull, starling and linnet
<b>Negligible</b>	All other species.

### 11.4.3.3 Impact Magnitude

44. Impacts are judged in terms of magnitude in space and time.

#### Spatial magnitude

45. Determination of spatial magnitude requires that a species receptor population is appropriately defined (SNH, 2013; CIEEM, 2018). For all species examined, the appropriate receptor population is defined as the regional population. For EIA assessment SNH advise that regional receptor populations are defined according to the relevant SNH Natural Heritage Zone (NHZ). Millport Bay lies in NHZ 17 ('West Central Belt'). Spatial magnitude is considered in terms of the proportion of the receptor that would be affected by the impact and classified into four categories (Table 11-6).

Table 11-6 Definitions of spatial magnitude levels

Magnitude	Definition
High	Major reduction in the abundance and status of receptor population, caused through displacement, or reduced survival/productivity.
Moderate	Moderate reduction in the abundance and status of receptor population, caused through displacement, or reduced survival/productivity.
Low	Small but discernible reduction in the abundance and status of receptor population, caused through displacement, or reduced survival/productivity.
Negligible	Very slight reduction in the abundance and status of receptor population, caused through

	displacement, or reduced survival/productivity. Reduction barely discernible, approximating to the “no change” situation.
No impact	A potential impact that is not expected to affect the receptor population in any way

### Temporal magnitude

46. Temporal magnitude was categorised according to whether an impact is judged to be short term, medium term or long term, and whether it is considered to be temporary (reversible) or permanent (irreversible). For ornithology receptors the following definitions have been used to guide the categorisation of temporal magnitude:

- Short term: effects which occur for <1 year.
- Medium term: effects which occur over 1 to 5 years
- Long term: effects which occur for >5 years.

#### 11.4.3.4 Impact Significance

47. Following the identification of receptor importance and magnitude of the effect, it is possible to determine the significance of the impact.

48. The matrix presented in Table 11-7 is used as a starting point for determining the significance of impacts, combining spatial magnitude (Table 11-6) and receptor sensitivity (Table 11-4). Nature conservation importance (Table 11-5), information on a receptor’s population conservation status, and the extent of any uncertainty are also taken into consideration where appropriate in reaching a judgement on impact significance. Any impact determined to be moderate or above is considered significant under EIA regulations.

49. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in below and knowledge of the ecological features affected.

50. The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and commitments for the proposed scheme. Residual impacts include any additional mitigation measures required. An assessment of residual impacts is then made, after assuming implementation of additional mitigation measures where required, i.e. the significance of the effects that are predicted to remain after the implementation of all committed mitigation measures.

Table 11-7 Impact significance matrix

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Minor	Negligible	Negligible	Negligible	Negligible	Minor	Minor

51. The impact significance categories are defined as shown in Table 11-8.

Table 11-8 Impact significance definitions

Impact Significance	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which is likely to be an important consideration at a regional or district level because it contributes to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation.
Moderate	Intermediate change in receptor condition, which is likely to be an important consideration at a local level.
Minor	Small change in receptor condition, which may be raised as a local issue but is unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
No Change	No impact, therefore no change in receptor condition.

52. Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts (e.g., negligible impacts) as they may contribute to significant impacts cumulatively or through interactions with other effects.
53. Embedded mitigation has been referred to and included in the initial assessment of impact. If the impact does not require mitigation (or none is possible) the residual impact remains the same. However, if a requirement for mitigation is identified, an assessment of the post-mitigation residual impact is provided.

#### 11.4.3.5 Cumulative Impact Assessment

54. For an introduction to the methodology used for the Cumulative Impact Assessment (CIA), please refer to **Chapter 3 EIA Methodology and Consultation**. This chapter includes those cumulative impacts that are specific to ornithology.
55. The EIA Regulations require that the project is assessed for cumulative impacts with other projects or plans. The guidance available on assessing cumulative impacts relates to windfarms (e.g., SNH, 2012; King et al. 2009; Renewables UK, 2013; Durning and Broderick, 2019); the principles developed for windfarm CIA are considered relevant and have been followed. In considering cumulative effects it is necessary to identify any effects that are minor in isolation but which may be more significant additively.
56. It is assumed that any consented development would be subject to mitigation and management measures which would reduce impacts to non-significant unless there were exceptional circumstances, it is accepted that such projects or schemes may contribute to a wider cumulative impact.
57. In cases where this proposed scheme has negligible or no impact on a receptor it is considered that there is no pathway for a cumulative impact.

## 11.5 Existing Environment

### 11.5.1 Baseline Bird Survey Results

58. The baseline ornithological conditions of Millport Bay were characterised by a one-year commissioned bird survey ('the bird survey') undertaken by Atlantic Ecology between April 2018 and March 2019 (Appendix 1
59. A brief summary of the baseline bird survey is provided here, focussing on the birds of bird habitats of greatest relevance to the EIA. Full results are presented in **Appendix 11.1**.
60. The survey area was shown to support a rich birdlife throughout the year, a reflection of the wide diversity of habitats present and the opportunities this provides to birds for breeding, feeding and resting. The variety, abundance and seasonal occurrence of all the bird species seen were in line with expectations based on published literature and experience. During the year the bird survey area was used by 25 species of seabird, waterfowl and wader, together with a number of passerine species. About a third of these species occurred only occasionally and/or in very low numbers; the survey area is considered to be of negligible importance for these species. The main species were present in reasonable numbers, at least on some visits were as follows: cormorant, European shag, herring gull, great black-backed gull and common gull, oystercatcher, curlew, dunlin, turnstone and purple sandpiper, mallard, eider, wigeon, mute swan and grey heron.
61. The baseline ornithology conditions of Millport Bay in terms of the variety of bird habits, breeding birds, non-breeding birds and disturbance are described in turns below.

#### 11.5.1.1 Bird Habitats

62. The island of Great Cumbrae is located in the outer part of the Firth of Clyde about 1.5km from the mainland. Millport Bay forms the south coast of Great Cumbrae and is the setting for the island's only town, Millport. Millport Bay comprises a mixture of coastal, urban and marine habitats. The enclosed nature of the Firth of Clyde limits the wave development and thus provides a relatively sheltered setting.
63. The marine and shoreline habitats of Millport Bay are described in detail in **Chapter 8 Benthic and Intertidal Ecology**.
64. From an ornithological perspective, Millport Bay (i.e. the area covered by the baseline bird survey presented in **Appendix 11.1**) provides a diverse range of habitats of value to birds as follows:
- highly modified man-made habitats: e.g. urban and residential buildings, gardens, roads, sea wall, promenade and harbour (including jetties, slipways and piers);
  - seafront amenity grassland and associated scrub vegetation, with benches and picnic tables;
  - soft-sediment intertidal habitats, e.g. sandy beach and muddy sands;
  - rocky coast, in parts with inter-tidal and sub-tidal seaweed;
  - vegetated (grassland and shrub) offshore rocky islands, i.e. The Eileans (consisting of north Eilean and south Eilean);
  - non-vegetated, intertidal skerries. i.e. The Spoig, The Clach and The Leug;
  - the sea, i.e., the shallow inshore waters of Millport Bay.

65. The much smaller island of Little Cumbrae lies only approximately 4 km to the south-west of Millport. Little Cumbrae is relevant to the ornithology assessment because it is the closest breeding site for several of the colonial breeding seabird species that use Millport Bay for foraging and resting, in particular European shag.

#### 11.5.1.2 Breeding Birds Summary

66. The breeding bird interest of Millport Bay is focussed on birds breeding on The Eileans, though a few species also breed along the coast (Table 11-9). The breeding species of greatest importance and relevance to the EIA are oystercatcher, herring gull, great black-backed gull common gull and common eider. However in all cases the numbers of these species breeding in the survey area form only a very small proportion (well below 1%) of the regional breeding population (**Appendix 11.1**). The survey area was therefore categorised as having local importance only for these breeding bird species. However, the Eileans are undoubtedly an important ornithological feature of Great Cumbrae, holding the main concentration of breeding gulls (except 'roof-top' herring gulls), oystercatcher and common eider. As with all ground-nesting birds, the birds nesting on the Eileans are potentially vulnerable to disturbance in the breeding season.
67. During the breeding season (and at other times of year too) low to moderate numbers of European shags regularly foraged in the bay and roosted on the islands and skerries. Many of these birds were in adult plumage and therefore it is likely that some of these birds were actively breeding individuals. Millport Bay lies well within the expected foraging range of shags breeding on Little Cumbrae, the closest breeding colony (the reported mean maximum foraging range is 10 km, Thaxter *et al.*, 2012)). The numbers of European shag using the bird survey area in the breeding season at times slightly exceed 1% of the assumed NHZ regional breeding population of 585 pairs (based results in Mitchel *et al.* 2004, the most recent comprehensive count for the region as a whole) and thus the survey area is evaluated as having low importance for regional breeding shag population.
68. A number of other seabird species (gannet, razorbill, common guillemot, black guillemot and Sandwich tern) were also observed foraging in Millport Bay during the breeding season. Based on species' reported foraging ranges (Thaxter *et al.*, 2012), some of these birds may have been breeding birds from colonies elsewhere in the region (e.g. Ailsa Craig and Little Cumbrae). In all cases, the number of individuals seen was very low and therefore the survey area is considered to have negligible importance as a feeding site for all seabird species other than shag.
69. Historically, The Eileans have supported breeding terns (**Appendix 11.1**). The lack of breeding terns on the Eileans nowadays may be connected to introduced mammal species including brown rat and American mink (Bernie Zonfrillo, personal communication), both of which are commonly occur on the coastal habitats of south-west Scotland (Harris and Yalden), 2008 and have been linked to breeding seabird declines in the region (e.g., Craik, 1998). Colonisation by scrub vegetation and the presence of breeding gulls may also contribute to the current absence of breeding terns (Mitchell *et al.*, 2004).

Table 11-9 Number of pairs of birds breeding in the Millport Bay survey area

Species	North Eilean	South Eilean	Millport Bay coast and town	Total
Oystercatcher	5	6	3	14
Herring gull	3	1	12+ (roof tops)	16+
Great black-backed gull	1	1	0	2
Common gull	6	4	0	10
Common eider	approx. 2	approx. 3	approx. 4	approx. 9
Mallard	0	1	0	1
Carrion crow	1	0	0	1
Rook	0	0	approx. 30	approx. 30
Blackbird	1 (shared)		1+	2+
Rock pipit	4	4	0	8
Wren	0	1	0	1
Linnet	1 (shared)		0	1
Willow warbler	1 (shared)		1+	1

### 11.5.1.3 Non-breeding Birds Summary

70. The bird survey showed that the non-breeding bird interest of Millport Bay is limited to the various overwintering and migrant species of waterfowl, gulls and waders using the coast, islands, skerries and inshore waters of the bay (**Appendix 11.1**). The abundance and habitat use of non-breeding bird species seen in the survey area is summarised in Table 11-10, this table excludes species that were seen only occasionally and/or in very small numbers (full details of all species seen are presented in **Appendix 11.1**).
71. Table 11-10 also indicates the importance of Millport Bay for non-breeding birds. Information on the size of regional non-breeding populations was derived from the results of national non-estuarine wetland bird counts (Rehfishch *et al.*, 2003), WeBS counts (Frost *et al.*, 2019) and *The Birds of Scotland* (Forrester and Andrews, 2007) (see Section 11.4.1). The bay was categorised as having moderate regional (NHZ-17) importance for species if the maximum number recorded is between 5% and 20% of the assumed regional population size and low regional importance species if the maximum number is between 1% and 5% of the assumed regional population size. The bay was categorised as having local importance only for a species if the maximum survey count is below 1% of the regional population size.
72. No species were present in sufficient numbers for the Millport Bay to be evaluated as having moderate importance for the regional (NHZ-17) wintering population. Six species (curlew, turnstone, purple sandpiper, European shag, cormorant and great black-backed gull) were present in numbers meriting the survey area to be evaluated as having low importance for the regional wintering population.
73. The Eileans and the three small rocky skerries (i.e., The Leug, The Spoig and The Clach) have year-round importance as roost sites for waders, gulls, European shag, cormorant and grey heron.

The regular occurrence of over two hundred overwintering curlew roosting on the North Eilean and nearby skerries is considered to be the most important ornithological feature identified in the survey area.

Table 11-10 Number and habitat use of non-breeding birds breeding in the Millport Bay survey area, and the importance of the bay to the regional (Natural Heritage Zone 17) population

Species	Abundance when present Min - Max	Habitat use by non-breeding birds in bird survey area	Importance of Millport Bay (% of non-breeding NHZ-17 population)
Cormorant	1 - 34, typically <6	Foraging inshore waters, roosts on skerries and islands	Low regional importance (up to approx. 1% of NHZ-17 population)
Shag	7 - 39	Foraging inshore waters, roosts on skerries and islands	Low regional importance (up to approx. 1% of NHZ-17 population)
Grey heron	1 - 15	Foraging rocky coast, roosts on skerries and islands	Local importance
Mute swan	1 - 2	Foraging along coast, esp. Foul Port	Local importance
Wigeon	11 - 28	Foraging and roosting, rocky coast and adjacent sea	Local importance
Mallard	1 - 12	Foraging and roosting along coast and adjacent sea	Local importance
Eider	2 - 11	Foraging and roosting, rocky coast and adjacent sea.	Local importance
Oystercatcher	22 - 111	Forages and roosts on islands, skerries rocky coast and beaches.	Local importance
Turnstone	1-54	Forages and roosts on rocky littoral zone, skerries and islands. High tide roost site on North Eilean with other waders	Low regional importance (up to 1.9% of NHZ-17 population)
Purple sandpiper	1-6	Forages and roosts on rocky littoral zone, islands.	Low regional importance (up to 1.3% NHZ-17 population)
Dunlin	1-21	High tide roost site on North Eilean with other waders	Local importance
Curlew	2 - 231	Important high tide roost site on North Eilean and skerries. Rarely forages inside survey area.	Low regional importance (up to 2.8% of NHZ-17 population)
Common gull	4 - 70	Forages and roosts on coast, especially sandy beaches and tide edge.	Local importance
Herring gull	8 - 141	Forages all habitats, especially along Millport seafront. Roosts on skerries and islands.	Local importance
Great black-backed gull	1 - 12	Forages and roosts on skerries and islands.	Low regional importance (up to approx. 5% of NHZ-17 population)

#### 11.5.1.4 Existing Wildlife Disturbance

74. The bird survey results (**Appendix 11.1**) show that Millport Bay is subject to relatively high levels of human activity and that there is potential for this to affect wildlife through disturbance. The central part of Millport Bay has a large number of boat moorings and during the summer months there are typically over 30 small vessels (of approximately 5 - 15 m length) moored in the bay. With the exception of The Eileans and the skerries, all the terrestrial parts of the survey area are affected throughout the year by high to very high levels of human activity associated with Millport, e.g. vehicles, beach users, pedestrians and dog-walkers. The inshore waters, skerries and islands are also affected by potential disturbance from vessel activity, especially during the summer months when recreational boating activities are greatest.

#### 11.5.2 Anticipated Trends in Baseline Conditions

75. It is important to recognise that the baseline environment is not static; rather it is subject to natural change. These include short-term effects of storms and surges, the longer-term effects of sea-level rise associated with global climate change and habitat change through vegetation succession (e.g. scrub changing to woodland).
76. Equally important from an ornithological perspective are changes to the amount and nature of land-based and water-based human activities in Millport Bay for reasons other than the proposed scheme. It is considered likely that human activity in Millport Bay, particularly water-borne recreational activity, is likely to increase over the next decade, and consequently increase the potential for disturbance to wildlife.

#### 11.5.3 Designated Sites

77. No part of the proposed scheme's development footprint or any part of Millport Bay overlaps with a site designated for bird conservation. The closest SPAs for waterbirds and seabirds are the Inner Clyde Estuary SPA (lying between 25 and 35 km to the north-west and designated for non-breeding redshank) and Ailsa Craig SPA (lying approximately 57 km to the south and designated for breeding seabirds).
78. The bird surveys showed that with the exception of European shag, Millport Bay has negligible importance as a feeding site for seabirds. It is therefore concluded that, with the exception of European shag, Millport Bay has a negligible importance for seabirds breeding at designated colonies.
79. Kames Bay (the beach in the north-east part of Millport Bay) is designated as a SSSI for its intertidal beach biology interest feature (this site has a long history of study by the nearby marine laboratory). However ornithology is not considered to be part of this interest. Kames Bay SSSI is considered in **Chapter 8 Benthic and Intertidal Ecology**.
80. The island of Little Cumbrae, approximately 4 km south of Millport, is listed as a Local Nature Conservation Site (LNCS), a non-statutory listing that recognises the site's value for nature conservation. Breeding seabirds are a key interest of the Little Cumbrae LNCS and it is likely that the majority of the European shag using Millport Bay are associated with this site.

## 11.6 Scope of EIA Assessment

81. The Scoping Report identified that the proposed scheme could potentially have the following impacts on bird receptors, during construction, operation and decommissioning:
- Habitat loss and change.
  - Disturbance and displacement (indirect habitat loss) to birds due to construction activities (e.g., airborne noise, presence of construction workers, vehicle and vessel movements).
82. The potential for light pollution from the proposed scheme activities to contribute to bird disturbance effects is screened out on the grounds that under baseline conditions Millport Bay is subject to multiple sources of bright lighting year round, for example the street lighting along the sea front.

### 11.6.1 Screening of Receptors

83. EIA is concerned with identifying potentially significant impacts on receptors and potential requirements for mitigation measures. Before undertaking detailed impact assessment it is standard practice to screen-out receptors for which on the basis of expert judgement it is not possible that the proposed scheme could cause more than a negligible magnitude effect, as these could not be considered as either significant or requiring mitigation.
84. Receptor populations of the species listed below are screened in for detailed impact assessment; all other species are screened out.
- European shag (breeding and non-breeding)
  - Cormorant (non-breeding)
  - Curlew (non-breeding)
  - Turnstone (non-breeding)
  - Purple sandpiper (non-breeding)
  - Great black backed gull (non-breeding)
85. The screened-in species above are all species for which Millport Bay has more than negligible importance for the regional population and which are judged to have sensitivity to potential effects arising from the proposed scheme.
86. Attention is also drawn to the local importance of The Eileans for breeding and wintering oystercatcher, breeding common eider and common gull (and other wildlife including seals and otter), as these species are relevant to considering best practice mitigation and future management of The Eileans.

### 11.6.2 Screening of Potential Effects

87. Before undertaking detailed assessment it is also useful to screen potential effects and only take forward those that could lead to impacts on screened-in receptors that could be significant and merit mitigation. The only potential effects that could result in impacts on receptors that could be of a magnitude large enough to meet these criteria are disturbance and habitat loss/ change effects. All

other potential impacts are screened out for detailed assessment; further discussion on the rationale for specific effects is provided below.

88. The potential for the proposed scheme to cause indirect effects on marine prey for seabirds (e.g. small fish) is screened out as the inner part of Millport Bay (i.e. the part that would be sheltered by the new breakwater) has negligible value as a foraging site for all seabird species.
89. The potential for the proposed scheme activities to cause accidental release of contaminants, which in turn could adversely affect bird receptors, is also screened out due to the strong embedded mitigation measures designed to reduce the risk of accidental contamination events of occurring to negligible through compliance with the MARPOL convention.
90. The potential for the proposed scheme to increase the risk of spread of invasive introduced species is also screened out. Ground-nesting seabirds, wildfowl and waders that breed on islands are vulnerable to predation by introduced species such as American mink and brown rat (Mitchell et al., 2004). However, as the proposed scheme does not link The Eileans to the Great Cumbrae coast, it is not likely that the proposed scheme would increase the risk of colonisation of The Eileans by introduced mammal species above baseline risks. Furthermore, due to the relatively short sea distance from Great Cumbrae (<200m) it is likely that brown rat, at least, is already established on The Eileans and that American mink (a semi-aquatic species) could readily access them at any time. Although screened out for assessment, the matter of introduced mammal species is relevant to the future management of The Eileans with respect to realising their potential for bird conservation, e.g., the re-establishment of breeding terns and increasing numbers and productivity of breeding waders and gulls (Craik, 1998).
91. The proposed scheme is not anticipated to lead to an increase in general vessel activity in Millport Bay during operation (for example, there will be no additional moorings as a result of the proposed scheme). Therefore, the effects of medium and long-term changes in general vessel activity on bird receptors is screened out of assessment. Nevertheless, it is relevant to note that any increase in general vessel activity in the bay or in the number of people landing on The Eileans and skerries is likely to have negative effects on birds.

### 11.6.3 Overview of Potential Impacts

92. For the reasons discussed above, the effects taken forward for detailed assessment of impacts on ornithology receptors are disturbance and habitat loss/change effects. To a greater or lesser extent, these two effects could occur during the construction, operation and decommissioning stages. This section examines in greater detail the nature of these effects and where within Millport Bay the proposed scheme they could adversely affect the screened-in bird receptors.
93. Birds are potentially susceptible to visual and noise disturbance from human activities when they are breeding, foraging and resting. Indeed many bird species, including those screened in for assessment, seek out locations for these activities that are not subject to frequent disturbance. In this respect, The Eileans and three intertidal skerries have particular value for roosting and feeding birds; The Eileans also have particular value for breeding birds.
94. Birds can respond to disturbance in a number of ways. Disturbance may cause birds to move away from an area to another site, in which case the consequence is essentially the same as habitat loss (see below). Disturbance may also cause birds to temporarily interrupt their normal activity leading to, for example, reduced feeding rates or productivity. In these ways and others, disturbance effects have potential to reduce individuals' survival chances and breeding success and thus lead to

population decline. Some bird species may habituate to disturbance, indeed it is considered likely that many of the birds using Millport Bay already show a degree of habituation to human activity (see below), and this is taken into account in the assessments that follow.

95. The loss of habitat, or changes to the nature of habitat, potentially affects its value to birds. Birds may respond to habitat loss/change by attempting to relocate to an alternative location; however alternative sites may not have capacity to accommodate additional birds. Birds that are unable or do not attempt to relocate may experience lower quality feeding, roosting and breeding conditions.
96. The bird survey results show that habitat utilisation within the Millport Bay by the screened-in bird species is concentrated on The Eileans (north and south) and the three inter-tidal skerries (The Leug, The Spoig and The Clach). For this reason, the assessment of habitat loss/change focusses on the proposed 330m long offshore rock breakwater that will connect The Leug, The Spoig and the south Eilean. Turnstone, purple sandpiper and curlew also forage and occasionally roost (not curlew) along the Millport foreshore and therefore the effects the proposed foreshore works between Foul Port and Kames Bay (i.e., the installation of rock armour, sea walls and strengthening of coastal defences) is examined. European shags forage in the inshore waters throughout the bay and the potential for the proposed scheme to affect this interest is also examined.
97. The footprint of the proposed offshore rock breakwater partly overlaps the footprints of The Leug and The Spoig skerries and a small part of the shore of south Eilean. Thus at these locations there will inevitably be a degree of direct habitat loss. However, the offshore rock breakwater will also create new habitat that is potentially attractive to birds, essentially taking the form of a supratidal rock peninsula of approximately 330m length extending south-west from south Eilean. The proposed offshore rock breakwater linking The Leug, The Spoig and the south Eilean will inevitably cause the long-term loss of small areas of open water and seabed habitat corresponding to the footprint of the breakwater. The installation of rock armour and strengthening of the coastal defences along the Millport foreshore will lead to small amounts of localised habitat loss/change, and disturbance.
98. It is anticipated that the proposed scheme will cause no habitat loss or change to the The Clach (the intertidal skerry lying towards the west side of Millport Bay) or to north Eilean.
99. In assessing the potential impact of vessel disturbance an assumption has to be made regarding the distance at which birds are likely to show a disturbance response. The bird survey showed that the birds using Millport Bay experience relatively high levels of baseline vessel activity (**Appendix 11.1**) and appear to have habituated to this to some extent. For example, waders, shags and gulls using the skerries for roosting and feeding tolerate slow (<10 knots) moving vessels approaching to within approximately 100m or less before showing any disturbance response. Vessels were often seen passing between The Spoig and the south Eilean with no visible response from the birds roosting on The Spoig. Given the observed levels of tolerance by the screened-in receptor species to vessel, information on disturbance vulnerability from other studies (e.g. Furness *et al.*, 2012; Jarrett *et al.*, 2018; Goodship and Furness, 2019) and assuming vessel speeds of <10 knots, for assessment purposes it is considered reasonable to assume that project vessels would not disturb birds that are more than 100m from a vessel. For the purposes of assessment it is cautiously assumed that all birds within 100m of project vessels, machinery and personnel working at the offshore breakwater construction site would be disturbed and leave the vicinity.

## 11.7 Impact Assessment

### 11.7.1 Worst Case Scenario

100. For the purposes of the assessment of impacts on ornithology receptors the worst case realistic scenario for the spatial extent of disturbance, habitat loss/change and habitat gain effects are considered to be those presented in Table 11-11. The worst case would be that construction work proceeds simultaneously at all parts of the construction footprint. It is assumed that the construction phase will last 21 months and as such construction effects are categorised as short-medium term. The operation phase is assumed to last for at least 50 years and thus operation phase effects are categorised as long-term.

Table 11-11 Worst case parameters values relevance to ornithology impact assessment

Impact	Parameter	Notes
Habitat loss - marine waters	Long-term loss of approx. 1.1 ha.	Corresponds to footprint of offshore breakwater
Habitat loss to intertidal rocky skerries	Long-term loss of approx. 0.27 ha.	Corresponds to footprint of new offshore breakwater that overlaps with skerries
Habitat loss/change to rocky foreshore habitat	Long-term loss/change of approx. 0.22 ha.	Corresponds to footprint of new Millport foreshore rock armour and revetments
Habitat creation - supratidal rock offshore breakwater	Long-term gain of approx. 1.5 ha of offshore breakwater habitat	The offshore breakwater is anticipated to be attractive to roosting and (following colonisation by inter-tidal seaweed and zoo-fauna) feeding birds.
Disturbance from vicinity of offshore breakwater and foreshore construction works	Construction work footprint and surrounds up to 200m away	Observations during baseline surveys indicate that birds using Millport Bay have a relatively high baseline tolerance to vessel activity
Disturbance of marine areas from all construction vessel activity	Approx. 40 ha of inshore waters (around 25% of Millport Bay) potentially affected, but not all at once.	Corresponds to around 25% of Millport Bay, but not all at once. Seabirds using Millport Bay for feeding have a relatively high baseline tolerance to vessel activity

### 11.7.2 Embedded Mitigation

#### 11.7.2.1 Scheme Design

101. Embedding mitigation into the proposed scheme design is a type of primary mitigation and is an inherent aspect of the EIA process. A full account of embedded mitigation measures is contained in **Chapter 5 Project Description**. Where embedded mitigation measures have been developed into the design of the proposed scheme with specific regard to bird receptors, these are described in Table 11-12.

Table 11-12 Embedded mitigation measures for ornithology

Effect	Mitigation measures embedded into the scheme design
Disturbance 1	Within Millport Bay, project vessels will restrict their maximum speed to <10 knots, thus giving birds and other wildlife time to take evasive behaviour and generally reducing the potential for disturbance to occur.

Effect	Mitigation measures embedded into the scheme design
Disturbance 2	Within Millport Bay, project vessels will restrict their activity to within a 200m buffer around construction sites, thus spatially limiting the potential for vessel based disturbance to affect birds and other wildlife.
Disturbance 3	There will be a buoy-marked voluntary all-vessel exclusion zone of 150m radius around The Clach skerry (located in the western end of Millport Bay). This vessel exclusion zone would operate throughout the construction phase, to protect roost site for birds, especially European shag, during the period when the other two preferred roost sites (The Leug and The Spoig) are rendered temporarily unavailable by the construction of the offshore breakwater.
Disturbance 4	Potential for disturbance to birds breeding on south Eilean island will be avoided by scheduling construction of the eastern third of the offshore breakwater to take place outside the breeding season.
Disturbance 5	When travelling between construction site and ports, project vessels will adhere to agreed routes that avoid areas, as far as is possible where marine birds (and other wildlife) gather, including the vicinity of breeding colonies.
Disturbance 6	Signage on Millport beach/promenade that describes the high value of The Eileans for wildlife (breeding and wintering birds, seals and otter), the issue of disturbance and discourages landings, esp. in nesting season.
Accidental release of contaminants	Strict adherence to MARPOL legislation and best practice guidelines aimed at avoiding any accidental release of contaminants, and having protocols, equipment and appropriately trained personnel on hand to quick contain and clean up an incident that occur.
Introduction of non-native invasive species	Biosecurity measures compliant with Scotland's Environmental and Rural Services biosecurity protocol. In particular aimed at preventing introduction of non-native invasive plant and animal species to The Eileans.
Habitat loss and change	Construction of the offshore breakwater will take care not to damage to the inter-tidal habitats of the parts of The Leug and The Spoig skerries that lie outwith the footprint of the breakwater.
Habitat creation	The inter-tidal rock armour sides of the offshore breakwater will have an average slope of below 20 degrees, and thus not too steep to be attractive to foraging birds. The crest of the offshore breakwater will be approximately level and thus form a potentially attractive platform for roosting birds and other wildlife (e.g., seals).

### 11.7.2.2 Ecological Action Plan

102. All mitigation measures proposed in relation to the impacts identified for each receptor below will be incorporated and detailed in an overarching Ecological Action Plan (EAP). Where mitigation or management plans are mentioned in the mitigation sections below, these will be incorporated into the EAP also.
103. The EAP will form part of the Construction Environmental Management Plan (CEMP) and will cover the ecological requirements of the pre-, during and post-construction stages of the Proposed Scheme. The EAP will be a live document and will be updated throughout each of these phases. The EAP will take into account any planning obligations and conditions attached to the Proposed Scheme should consent be granted. The EAP will be submitted to and agreed with the North Ayrshire Council, SNH and other stakeholders, where appropriate, based upon the final design of the Proposed Scheme. The EAP will include the principal requirements of mitigation, including:

- Pre-construction ecological surveys (if required);
  - Habitats or species directly affected by the Proposed Scheme;
  - Method statements (where necessary);
  - Identification of sensitive features to be fenced off / minimum works within;
  - Tool box talks;
  - Licensing requirements (where necessary);
  - Habitat re-instatement plan;
  - Overall strategy for delivery of the mitigation proposed in this EclA; including
  - Programme for delivery of mitigation; and
  - Responsibilities attributed to the relevant parties to deliver the plan.
104. An Ecological Clerk of Works (ECoW) will audit the implementation of the EAP. This would be both a desk-based and site-based role. It should be noted that the mitigation measures presented below are based on the individual receptor, therefore in some cases there may be a conflict between the requirements of one receptor over another (or indeed with other priorities, e.g. tourism and recreation). The ECoW will have suitable expertise to develop and find pragmatic solutions to any potential conflicts in consultation with the relevant consultees.

### 11.7.3 Potential Impacts during Construction

105. This section examines the potential impacts which may occur to ornithology receptors during activities associated with the construction of the proposed scheme.
106. Two potential impacts on ornithology receptors resulting from the construction have been identified. These are:
- Disturbance; and
  - Habitat loss/change

#### 11.7.3.1 Construction Impact 1: Disturbance

107. For the reasons discussed earlier, the assessment of disturbance in the construction phase is limited to consideration of the disturbance to birds using the three skerries and The Eileans, the Millport foreshore and to foraging European shags. Disturbance to screened-in bird species using these areas could result from both shore-based and vessel-based construction activities.
108. The three skerries (The Leug, The Spoig and The Clach) in Millport Bay are all valuable roosting and feeding sites for birds, in particular for roosting European shag (roosting only), cormorant (roosting only) waders and great black-backed gull (**Appendix 11.1**). Under baseline conditions it is considered that the three skerries are effectively alternatives to one another, thus if one is rendered temporarily unavailable by disturbance, the others provide birds with alternatives, and also provide safer (albeit more exposed) alternatives to roost sites along the Millport foreshore. The Eileans also

provide potential alternative roost sites though under baseline conditions these islands were seldom used by roosting cormorants and shags. The potential impact of disturbance will be reduced by the proposed various embedded mitigation measures described in Table 11-12. With respect to roosting birds, it is proposed that there would be a 150m-radius all-vessel exclusion zone around The Clach throughout the construction phase. This measure is designed to ensure that The Clach is available throughout the construction phase as a potential alternative roost site to The Leug, The Spoig, and foreshore sites, albeit one that is smaller in size. With respect to breeding birds, the embedded mitigation measures include the avoidance of disturbance to birds breeding on the south Eilean, through scheduling the construction of the eastern third of the offshore breakwater to outside the breeding season (Table 11-12).

109. For the purposes of the assessment it is cautiously assumed that, with the exception of breeding birds on South Eilean, vessel-based disturbance will displace birds from the vicinity of the footprint of the offshore breakwater (cautiously assumed to correspond to a 200m-wide buffer) throughout the construction phase. This would mean that all birds are assumed to be displaced from The Leug and The Spoig. It is further assumed that the proposed embedded mitigation measures mean that The Clach is protected from potential disturbance throughout the construction period, and that south Eilean is not affected by disturbance during the breeding season.
110. In light of the local availability of several alternative roost sites within the bay that would not be subject to construction disturbance (e.g. North Eilean and The Clach), it is considered likely that, despite the potential non-availability through the construction phase due to disturbance of the The Leug, The Spoig for roosting, there would continue to be locally available suitable roosting sites for all screened-in species. Nevertheless, construction disturbance could potentially result in some disruption to the normal roosting behaviour of some screened-in species, in particular curlew, a species which is judged to be relatively vulnerable to disturbance when roosting. For example, even though alternative curlew roost sites would be available within the bay it is possible they may not be adopted and this could result in individuals seeking roost sites outside the bay. A study of non-breeding colour-ringed curlew on the Severn Estuary showed that birds congregated from widely spread feeding areas into communal roosts over the high tide period, and that they made use of five main alternative roost sites (Sanders and Rees, 2018). These sites were approximately 2 to 3km apart and had a maximum separation distance between them of approximately 8 km. The results of the Sanders and Rees study indicate the spatial scale of the size of areas used by individual wintering curlew. This in turn provides an insight into how Millport Bay curlew are likely to respond if construction activities disturb them from their regular roost sites and they choose not to adopt the alternative roost sites available within the bay. Under this scenario it is considered likely that birds would seek an alternative roost site up to 8km away. An 8km buffer around Millport Bay includes the nearly 60 km of coastline including the whole of Great Cumbrae and Little Cumbrae islands, the southern coast of the Island of Bute and the coast between Largs and Seamill, within which there are likely to many suitable roost sites. There is known to be an existing alternative curlew roost site at Skate Point on the north-west coast of Great Cumbrae approximately 4km from Millport (D Jackson personal observation). It is thus judged that even if construction disturbance led to the temporary displacement of roosting curlew from Millport Bay, the birds affected would have no difficulty finding suitable alternatives. Therefore construction disturbance of roosting curlew, as with the other less vulnerable species, is categorised as an effect of negligible magnitude.
111. The impact of construction disturbance on roosting birds is categorised as a short-medium term effect of negligible magnitude for all screened-in species.
112. In light of generally low importance of the The Leug, The Spoig and the parts of the foreshore affected by the proposed scheme as feeding sites for screened-in bird receptors and the wide

availability of alternative feeding sites both locally and within the region, the non-availability through the construction phase due to disturbance is categorised as a short-medium term effect of negligible magnitude for all receptors examined.

113. In light of scheduling construction activity in the vicinity of south Eilean to outside the breeding season, the potential impact of disturbance on breeding birds is categorised as a short-medium term effect of negligible magnitude for all receptors examined.
114. For the purposes of assessment, and assuming that vessels traffic is limited to defined routes within the bay, it is cautiously assumed that vessel activity associated with all aspects of the construction work (including the foreshore and offshore breakwater works) would displace foraging European shags from marine habitat up to 200m from active vessels. It is estimated that this would potentially amount to displacement from approximately a quarter of the bay (an area of approximately 0.4 km<sup>2</sup>), though the area affected at one time would be smaller. This represents a trivial proportion of the available European shag foraging habitat within the NHZ-17 region. Therefore, the potential impact of construction disturbance on foraging European shag is categorised as a short-medium term effect of negligible magnitude.
115. All the ornithology receptors examined are judged to have low sensitivity to disturbance. It is concluded that impacts of disturbance on all bird receptors during construction phase are of **negligible** significance and as such are judged to be **not significant** under the EIA regulations.

#### Mitigation

116. The above assessment assumes compliance with the best-practice embedded mitigation measures designed to benefit bird receptors (Table 11-12). In particular, the potential for disturbance will be reduced by a vessel exclusion zone around The Clach, vessel speed limits and pre-defined transit routes and not undertaking construction work in the vicinity of south Eilean during the breeding season.
117. ECoW should include ensuring these measures to limit disturbance are complied with. ECoW should also ensure there is compliance with the laws protecting breeding birds, their nests and young across all parts of Millport Bay affected by construction disturbance including the foreshore habitats.
118. No additional mitigation measures are required to prevent disturbance impacts during construction being judged significant under EIA regulations.

#### Residual Impact

119. It is judged that the residual impact of disturbance during the construction phase is **not significant**.

#### 11.7.3.2 Construction Impact 2: Habitat loss/change

120. The habitat loss/change effects that could impact on the screened-in bird receptors during the operation phase will be those caused through the construction of the breakwater. For the purposes of the assessment it is cautiously assumed that the potential for the offshore breakwater to provide foraging and roosting habitat is not realised until the operation phase and thus is not considered in the examination of construction impacts.
121. The breakwater will overlap a small part (amounting to approximately 0.27 ha) of the The Leug and The Spoig skerries, and thus result in a corresponding long-term loss of existing intertidal habitat. Although this habitat is used by several of the screened-in bird species for feeding and roosting, an area of <0.1 ha is negligible in terms of the area of intertidal rocky habitat available in Millport Bay

and more widely across NHZ-17. It should be noted that construction activities will not affect the habitat over the majority of the inter-tidal area of the The Leug and The Spoig; the habitat in these parts is anticipated to continue to be suitable for feeding and roosting birds. However, as already examined (see Construction Impact 1 above), construction disturbance is expected to influence the utilisation by birds of the habitats at the Leug and The Spoig.

122. The loss of approximately 1.1 ha of shallow water marine habitat corresponding to the footprint of the offshore breakwater will reduce foraging habitat for European shag. However, this loss represents only approximately 1% of the marine area of Millport Bay and is a trivial proportion of the extensive European shag foraging habitat within the NHZ-17 region (most inshore marine waters in the region up to approximately 30m depth are likely to be suitable foraging habitat).
123. For all bird receptors examined, it is judged that the habitat loss/change affects during the construction phase will be of negligible magnitude, adverse, and medium term in duration (i.e. the impact would persist through the construction phase). All the ornithology receptors examined are judged to have low sensitivity to habitat loss and change. It is concluded that impact of habitat /loss change effects on all bird receptors during construction phase are of **negligible** significance and as such are judged to be not significant under the EIA regulations.

#### Mitigation

124. No mitigation measures are required to prevent habitat loss/change impacts during construction being judged significant under EIA regulations.
125. The above assessment assumes compliance with the best-practice embedded mitigation measures designed to benefit bird receptors (Table 11-12). In particular, construction activities should ensure that that the intertidal habitat (i.e., rock surfaces with associated seaweed and benthos communities) on The Leug and The Spoig that lie outwith the footprint of the offshore breakwater are safeguarded from damage caused by machinery, trampling and temporary storage of construction materials.

#### Residual impact

126. It is judged that the residual impact of habitat loss/change during the construction phase is **not significant**.

### 11.7.4 Potential Impacts during Operation

127. This section examines the potential impacts which may occur to ornithology receptors during activities associated with the operation of the proposed scheme.
128. Two potential impacts on ornithology receptors resulting from the operation phase have been identified. These are:
- Habitat loss/change; and
  - Disturbance (during maintenance).

#### 11.7.4.1 Operation Impact 1: Habitat loss, change and gain

129. The habitat loss/change effects that could impact on the screened-in bird receptors during the operation phase will be those resulting from the presence of the breakwater and rock armour along the foreshore, and thus are strongly related to the habitat loss/change effects already examined for the construction phase. For the purposes of the assessment it is assumed that the potential for the

offshore breakwater and foreshore rock armour to provide foraging and roosting habitat is not realised until the operation phase.

130. The new breakwater will overlap a small part of the The Leug and The Spoig skerries, and thus result in a corresponding long-term loss of existing intertidal habitat, amounting to approximately 0.27 ha. However, it is anticipated that in the medium term (no more than a few years) the intertidal sloping rock-armour sides of the offshore breakwater will be colonised by littoral seaweed and benthos communities similar to that which currently are found on The Leug and The Spoig (see Chapter 8 Benthic and Intertidal Ecology). It therefore reasonable to assume that in the medium and long term the intertidal surfaces of the offshore breakwater (and the inter-tidal foreshore rock armour) will provide birds with foraging opportunities of an approximately similar nature and somewhat greater extent, to that available under baseline conditions.
131. Based on breakwaters of a broadly similar design elsewhere in Scotland, the crest and the sides (when not covered by the tide) of the offshore breakwater are expected to provide potential roosting habitat for birds such as cormorant, European shag and waders and gull species. The feeding and roosting opportunities afforded to birds by the newly created offshore breakwater habitat are expected to off-set the negative effects of small-scale habitat loss affecting parts of The Leug and The Spoig. It is also relevant to point out that the offshore breakwater is also likely to provide a potential haul out site for seals (see **Chapter 10 Marine Mammals and Basking Shark**).
132. The operation of the proposed scheme is not anticipated to directly affect the suitability of The Eileans as a breeding site for birds.
133. The long-term loss of approximately 1.1 ha of shallow water marine habitat corresponding to the footprint of the offshore breakwater will reduce foraging habitat for European shag. However, this loss represents only approximately 1% of the marine area of Millport Bay and is a trivial proportion European shag foraging habitat within the NHZ-17 region (most inshore marine waters in the region up to approximately 30m depth are likely to be suitable foraging habitat). Furthermore, the sheltering effect of the offshore breakwater could enhance the quality of the inner part of Millport Bay as a foraging site for European shag (and other seabird species) during periods of strong south-westerly and southerly winds.
134. For all bird receptors examined it is judged that the habitat loss/change affects during the proposed scheme's operation phase will be of negligible magnitude, could be adverse, neutral or beneficial and persist for the long term. All the ornithology receptors are judged to have low sensitivity to habitat loss and change. It concluded that impact of habitat /loss change effects on all bird receptors during operational phase are of **negligible** significance and as such are judged to be **not significant** under the EIA regulations.

### Mitigation

135. No mitigation measures are required to prevent habitat loss/change impacts during construction being judged significant under EIA regulations.
136. The above assessment assumes compliance with the embedded mitigation measures, including the actions within the EAP, designed to benefit bird receptors (Table 11-12). In particular, the potential benefits of the offshore breakwater to birds (and seals) will be affected by the surface topography (smooth is preferable to jagged) and the gradient of the sides; shallow gradients (<25 degrees) are more desirable. Therefore, as far as is reasonable and practical, the design of the offshore breakwater will maximise the potential value for feeding and roosting birds (and other wildlife) by incorporating these design features.

### Residual impact

137. It is judged that the residual impact of habitat loss/change in the operation phase is **not significant**.

#### 11.7.4.2 Operation Impact 2: Disturbance

138. It is anticipated that the operational phase of the project will result in only very low levels of activity from project vessels, limited to occasional inspection and maintenance visits of the new breakwater. It is also anticipated that the proposed scheme will not be the cause of an increase in general vessel activity in Millport Bay. However it is recognised that general vessel activity may increase incidentally, reflecting societal trends in marine-based recreational activities, and thereby increase the potential for disturbance of birds (and other wildlife).
139. For all bird receptors examined, it is judged that the disturbance affects during the proposed scheme's operation phase will be of negligible magnitude, be adverse and persist for the long term (though individual events would be short-term in nature). All the ornithology receptors are judged to have low sensitivity disturbance. It concluded that impact of disturbance on all bird receptors during operational phase are of **negligible** significance and as such are judged to be **not significant** under the EIA regulations.

### Mitigation

140. No mitigation measures are required to prevent habitat loss/change impacts during construction being judged significant under EIA regulations.
141. The above assessment assumes compliance with the best-practice embedded mitigation measures designed to benefit bird receptors (Table 11-12). In particular it is proposed that that the offshore breakwater and The Eileans will have appropriate signage that explains the value of these sites to wildlife and requests vessel users to stay clear and not to land.
142. The potential future value of The Eileans to breeding birds, and the intertidal skerries and offshore breakwater for roosting and feeding birds will be affected by the frequency and intensity of human disturbance at these locations. People landing on The Eileans and offshore breakwater are likely to be particularly detrimental. It is recommended that best practice mitigation measures (including reducing footprint and human activity on the islands in the bay where possible) to manage human disturbance at these locations is included in the EAP for Millport Bay.

### Residual Impact

143. It is judged that the residual impact of disturbance during the operation phase is **not significant**.

#### 11.7.5 Potential Impacts during Decommissioning

144. No decision has been made regarding the final decommissioning policy for the onshore infrastructure of the proposed scheme as it is recognised that industry best practice, rules and legislation change over time. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As discussed in **Chapter 5 Project Description**, a decommissioning plan will be submitted for approval by the regulatory authorities prior to construction. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase. The disturbance to birds that could result from decommissioning is likely to be similar in nature and duration to that during construction.

## 11.8 Cumulative Impact Assessment

145. The impact assessment predicts that all impacts on bird receptors are of negligible magnitude and significance. Therefore it is not plausible that the proposed scheme could materially contribute to a cumulative impact when taken into consideration with the effects of other projects.
146. For this reason it is considered that there is no pathway for a cumulative impact. The potential for cumulative impacts on bird receptors is not examined further.

## 11.9 Inter-relationships

147. Table 11-13 lists out the inter relationships between other chapters within the ES.

Table 11-13 Inter-topic relationships

Topic	Related Chapter	Where addressed in this chapter	Rationale
Baseline information on marine mammals and otter	Chapter 10, Marine Mammals and Basking Shark	Section 11.5, Existing Environment Appendix 11.1	The commissioned bird survey collected also collected information on seals, cetaceans and otter.
Disturbance of resting places	Chapter 10, Marine Mammals and Basking Shark	Section 11.7, Impact Assessment	Some seabirds and waders have similar requirements to seals for safe shoreline resting places
Habitat loss/gain	Chapter 10, Marine Mammals and Basking Shark	Section 11.7, Impact Assessment	Some seabirds and waders have similar requirements to seals for safe shoreline resting places
Habitat loss/gain	Chapter 8, Benthic and Intertidal Ecology	Section 11.7, Impact Assessment	The potential value of inter-tidal rocky habitat for foraging birds depends on their colonisation by seaweed and benthos
Vegetation management of The Eileans	Chapter 16, Terrestrial Ecology	Section 11.7, Impact Assessment	The suitability/potential value of terrestrial habitats and island to breeding birds critically depends on the type and structure of the vegetation.
Introduced invasive species (flora and fauna)	Chapter 16, Terrestrial Ecology	Section 11.7, Impact Assessment	The suitability/potential value of terrestrial habitats and island to breeding birds depends on the type and structure of the vegetation, and absence of ground predators such as American mink.

## 11.10 Interactions

148. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction.

149. At some locations the effects of habitat loss/change and disturbance from different elements of the project would potentially affect the same birds. However, because of the cautious bird response assumptions used in the assessment, the assumed consequence of both effects would be no larger than either one of the effects acting alone. No synergistic interactions were identified.

### 11.11 Summary

150. The potential impacts of the proposed scheme on ornithology receptors have been identified. Potential impacts on all bird species for which Millport Bay is shown to have more than negligible regional importance are examined in detailed. These species are European shag, cormorant, great black-backed gull, curlew, purple sandpiper and turnstone; Millport Bay, especially the three skerries and The Eileans, is a valuable roosting and foraging site for these species. Attention is also drawn to the local importance of The Eileans as a breeding site for several bird species, including oystercatcher, common eider and common gull.
151. The assessment identifies that habitat loss/change and disturbance effects could affect bird receptors during all phases of the proposed scheme. However, due to the various embedded mitigation measures the predicted impact of these effects on ornithology receptors are assessed as having negligible magnitude and significance. The assessment also identifies that the design of the proposed offshore breakwater (including embedded mitigation design features) is likely to provide new foraging and roosting opportunities for birds that and this is predicted to result in small potential benefits to some species that could off-set some of the small negative effects caused by habitat loss.
152. A summary of the potential impacts and proposed mitigation is presented in Table 11-14.

Table 11-14 Potential Impacts Identified for Ornithology

Potential Impact	Receptor	Nature Conservation Value	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
Construction							
Impact 1: Disturbance	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible
Impact 2: Habitat loss/change	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible
Operation							
Impact 1: Habitat loss/change /gain	All screened-in receptors	Low or Medium (depending on species)	Low	Negligible	Negligible	Embedded mitigation only	Negligible
Impact 2: Disturbance	All screened-	Low or Medium	Low	Negligible	Negligible	Embedded mitigation	Negligible

Potential Impact	Receptor	Nature Conservation Value	Sensitivity	Magnitude	Significance	Examples of Potential Mitigation Measures	Residual Impact
	in receptors	(depending on species)				only	
Decommissioning							
As a flood prevention scheme, the Proposed Scheme is anticipated to be maintained rather than removed, and therefore decommissioning activities are currently unknown. This will be assessed at the time of any decommissioning activities required.							

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## REPORT

# Millport Coastal Flood Protection Scheme: Environmental Statement

Appendix 11.1 Millport Bay Bird Survey 2018-19

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Date / initials: 08/10/19

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Classification

Project related



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## Millport Bay Bird Survey 2018-19

### Technical Report



**Version control**

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V0.1	28/9/19	Preparation of first draft	DJ		
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## Contents

Contents.....	3
List of tables .....	4
List of figures.....	5
List of photographs .....	5
Introduction .....	6
Survey Aims.....	6
Survey Area and Habitats.....	6
Survey Dates and Weather .....	7
Methodology.....	9
Field methodology .....	9
Data management and analysis.....	10
Context information.....	11
Results.....	12
Overview .....	12
Breeding birds summary .....	12
Non-breeding (wintering) water birds and waders summary .....	13
Bird species accounts.....	19
Mammal species accounts.....	28
Human disturbance.....	30
Discussion.....	34
Human activity and disturbance .....	35
Historical information on breeding terns .....	35
References .....	37
Appendix 1. Survey recording codes and explanations .....	38
Appendix 2. Monthly visit summaries .....	42
Appendix 3. Roseate Tern .....	48
Figures.....	49
Photographs.....	50

## List of tables

Table 1. Acronyms.....	6
Table 2. Dates, times and weather conditions for Millport Bay bird survey counts undertaken between April 2018 and March 2019 .....	8
Table 3. Summary information on the bird species seen in the Millport Bay survey area and their relevance to the proposed scheme EIA. ....	15
Table 4. Common gull monthly counts and the number of breeding pairs in the Millport Bay survey area .....	19
Table 5. Herring gull monthly counts and the number of breeding pairs in the Millport Bay survey area .....	20
Table 6. Great black-backed gull monthly counts and the number of breeding pairs in the Millport Bay survey area.....	20
Table 7. Black-headed gull monthly counts and the number of breeding pairs in the Millport Bay survey area. This species does not breed in the survey area.....	21
Table 8. Oystercatcher monthly counts and the number of breeding pairs in the Millport Bay survey area .....	22
Table 9. Curlew monthly counts for the Millport Bay survey area. This species does not breed in the survey area.....	23
Table 10. Turnstone monthly counts for the Millport Bay survey area. This species does not breed in the survey area .....	24
Table 11. Common eider monthly counts and the number of breeding pairs in the Millport Bay survey area. M = male, F = female .....	25
Table 12. Wigeon monthly counts for the Millport Bay survey area. This species does not breed in the survey area.....	26
Table 13. European shag monthly counts for the Millport Bay survey area. This species does not breed in the survey area .....	27
Table 14. Cormorant monthly counts for the Millport Bay survey area. This species does not breed in the survey area .....	27
Table 15. Grey heron monthly counts for the Millport Bay survey area. This species does not breed in the survey area .....	28
Table 16. Common seal monthly counts for the Millport Bay survey area .....	29
Table 17. Grey seal monthly counts for the Millport Bay survey area .....	29
Table 18. The number of vessels active in the Millport Bay survey area during count sessions from April 2018 to March 2019. Vessel activity for counts session undertaken in the early part of the day (before 10:30) is compared with sessions undertaken later in the day (after 10:30), this split reflecting the obvious increase in activity after around 10:30. ‘Early’ counts are defined as those that took place within the period 07:30 to 10:30, and ‘Late’ counts as between 10:30 and 18:30.....	32
Table 19. The number of people involved in activities along shoreline recorded during count sessions of Millport Bay survey area from April 2018 to March 2019. Activity for counts session undertaken in the early part of the day (before 10:30) is compared with sessions undertaken later in the day (after 10:30), this split reflecting the obvious increase in activity after around 10:30 for all activities except dog walking. ‘Early’ counts are defined as those that took place within the period 07:30 to 10:30, and ‘Late’ counts as between 10:30 and 18:30. ....	33
Table 20. Evaluation of the importance of the survey area to water fowl and wader species.....	35

## List of figures

- Figure 1. Millport Bay survey area and vantage points
- Figure 2. Location of gull species nests/territories in Millport Bay
- Figure 3. The location of oystercatcher and eider nests /territories in Millport Bay
- Figure 4. The location of passerine breeding territories on The Eileans
- Figure 5. Records of foraging and roosting herring gulls, all months
- Figure 6. Records of foraging and roosting great black-backed gull, all months
- Figure 7. Records of foraging and roosting oystercatcher, all months
- Figure 8. Records of foraging and roosting curlew, all months
- Figure 9. Records of turnstone and purple sandpiper, all months
- Figure 10. Records of common eider and Eurasian wigeon, all months
- Figure 11. Records of foraging and roosting European shag, all months
- Figure 12. Records of foraging and roosting great cormorant, all months
- Figure 13. Records of common seal and grey seal, all months

## List of photographs

- Photo 1. Millport Bay looking SE from the west shore near Foul Port
- Photo 2. Millport Bay looking SW from The Eileans (north island)
- Photo 3. The Eileans (north island) taken from The Spoig looking NE
- Photo 4. Pond, bare rock, rank grass and shrub habitats on The Eileans (north island)
- Photo 5. Foul Port, showing extensive areas of intertidal seaweed beds and rocky shore habitats
- Photo 6. Common and grey seals hauled out on The Eileans (north island)
- Photo 7. Gull species and oystercatchers on The Spoig
- Photo 8. Common seals hauled out on The Leug
- Photo 9. Otter foraging on The Eileans (north Eilean)
- Photo 10. Kayakers paddling between The Eileans
- Photo 11. Recreational human disturbance on Millport beach. Note the seaweed wrack strewn over the beach, potential foraging habitat for gulls and shorebirds.

## Introduction

This report presents the results of a one-year bird survey of Millport Bay on the island of Great Cumbrae undertaken by Atlantic Ecology between April 2018 and March 2019. The survey was commissioned by Royal HaskoningDHV provide baseline information on the numbers, status and distribution of birds to inform the ornithological impact assessment of the proposed Millport flood protection scheme (the ‘proposed scheme’) proposed by North Ayrshire Council.

The acronyms used in this report are explained in Table 1.

**Table 1. Acronyms**

Acronym	Meaning
BTO	British Trust for Ornithology
EIA	Environmental Impact Assessment
GPS	Global Positioning System
NHZ	Natural Heritage Zone
OS	Ordnance Survey
RIB	Rigid Inflatable Boat
SNH	Scottish Natural Heritage
VP	Vantage Point
WeBS	Wetland Birds Survey

## Survey Aims

The survey aims were as follows:

- To undertake monthly survey visits over a one-year period;
- To count and map the bird species using the marine, inter-tidal and shoreline habitats in the Millport Bay survey area during both the high tide and low tide parts of the tidal cycle;
- To visit The Eileans, the two vegetated islands in the bay, during the breeding season (April to July) to determine the numbers breeding;
- To record human activity that could result in disturbance to birds and other wildlife.

Although the surveys were designed to characterise the ornithology of the survey area, a secondary aim was to opportunistically record other wildlife of potential relevance to the development, in particular seals, otters and cetaceans.

## Survey Area and Habitats

The bird survey area included Millport Bay, bounded to the north and east by the main road that runs through the small town of Millport, the main settlement on Great Cumbrae (Figure 1).

The survey area has a range of coastal habitats the most important of which from an ornithological perspective are listed below:

- Highly modified man-made habitats: e.g. urban and residential buildings, gardens, roads, sea wall, promenade and harbour (including jetties, slipways and piers);
- Seafront amenity grassland and associated scrub vegetation, with benches and picnic tables;
- Soft-sediment intertidal habitats, e.g. sandy beach and muddy sands;

- Rocky coast;
- Vegetated offshore rocky island, i.e. North Eilean and South Eilean (collectively known as The Eileans);
- Non-vegetated, intertidal skerries. i.e. The Spoig, The Clach and The Leug;
- The sea, i.e., the shallow inshore waters of Millport Bay.

The central part of the study area north of The Eileans has a large number of boat moorings and during the summer months there are typically over 30 vessels of 5 m to 15 m length moored in the bay.

Photos 1 to 11 illustrate the habitats in the survey area. The captions below the individual photos draw attention to particular features of interest.

With the exception of The Eileans and the skerries, all the terrestrial parts of the survey area are affected throughout the year by high to very high levels of human activity associated with Millport, e.g. vehicles, pedestrians and dog-walkers. The inshore waters, skerries and islands are also affected by potential disturbance from vessel activity, especially during the summer months when recreational boating activities are greatest.

## Survey Dates and Weather

The survey visits were undertaken at approximately monthly intervals starting in April 2017 as detailed in Table 1. Apart from the October visit which was spread over two days, visits were completed in a single day. The non-breeding season visits (August to March) were timed to allow for counting during the low tide (within approximately one hour of low tide) and high tide periods (within approximately one hour of low tide), such that the whole of the survey area was counted twice on each visit, in contrasting tide conditions. Weather forecast information and tide tables were consulted ahead of visits and survey work only went ahead when fine weather and light winds (below force 4) were forecast, though the forecast did not always turn out to be accurate. The timing and weather conditions for each visit are summarised in Table 2.

**Table 2. Dates, times and weather conditions for Millport Bay bird survey counts undertaken between April 2018 and March 2019**

Date of count	Type of count	Time of count	Wind	Rain	Visibility	Sea state
30/04/2018	Eileans breeding birds	09:20-10:00 & 11:00-11:30	F1 S	None	10+ km	1-2
	Mid/low tide count	10:00-11:00	F1 S	None	10+ km	2
	High tide count	13:30-15:05	F1 S	None	10+ km	1
17/05/2018	High tide count	12:30-13:40	F1 S	None	10+ km	1
	Eileans breeding birds	14:10-17:05	F1 S	None	10+ km	1
	Mid/low tide count	17:40-18:55	F1 S	None	10+ km	1
11/06/2018	Mid/low tide count	08:40-09:40	F1 NW	None	10+ km	1
	Eileans breeding birds	10:05-12:00	F1 NW	None	10+ km	1
	High tide count	12:00-12:50	F1 NW	None	10+ km	1
02/07/2018	Low tide count	09:30-10:45	F2-3 NE	None	10+ km	2
	Eileans breeding birds	11:00-13:00	F2 NE	None	10+ km	2
	Mid/high tide count	13:45-14:20	F2 NE	None	10+ km	1
20/08/2018	High tide count	07:30-09:26	F0	None	10+ km	1
	Low tide count	13:00-14:06	F0	None	10+ km	1
20/09/2018	High tide count	08:45-10:45	F3 SW	None	10+ km	3-4
	Low tide count	14:40-16:36	F3 SW	None	10+ km	2-3
18/10/2018	Low tide count	14:06-15:17	F2 SW	None	10+ km	2
19/10/2018	High tide count	08:40-09:40	F4-5 SW	Showers	5 km	4-5
12/11/2018	Low tide count	08:00-09:25	F4 SE	Showers	10+ km	3
	High tide count	13:50-15:00	F4 SE	None	10+ km	3
17/12/2018	Mid/high tide count	08:45-09:50	F2 W	None	10+ km	2
	Low tide count	12:05-13:25	F2 W	None	10+ km	2
24/01/2019	Low tide count	08:25-09:37	F0	None	10+ km	1
	High tide count	13:30-14:20	F0	None	10+ km	1
20/02/2019	Low tide count	07:35-08:50	F4 SW	Light	5 km	4
	High tide count	12:10-13:15	F4-5 SW	None	5 km	4
28/03/2019	Low tide count	10:30-11:25	F3 SW	None	10+ km	2
	High tide count	16:30-17:45	F3 SW	None	10+ km	2

## Methodology

### *Field methodology*

During the breeding season months (April to July) fieldwork included undertaking visits by boat to The Eileans to count and map birds breeding on these islands (Table 1). In addition, on all survey dates, two counts were undertaken of all birds (irrespective of their breeding status) using the survey area (Table 1). The two counts were timed to correspond with the low tide and high tide conditions, defined as the period one hour either side of time of low tide and high tide respectively. On some dates day-length or by ferry time constraints meant that one of the counts was conducted slightly outside the defined ideal tide-state period (these occasions are labelled as either 'Mid/Low' or 'Mid/High' in Table 1).

The breeding season surveys of The Eileans involved accessing the islands by boat (either by RIB chartered from Cumbrae Outdoor Centre or by canoe launched from Millport beach). Birds were surveyed by slowly walking across all parts of the islands and marking the location of all birds and nests seen on a 1:2,000 scale field map (created by enlargement of 1:25,000 scale OS map) using standard British Trust for Ornithology species codes and behaviour notations. The exact location of all nests found was also recorded using a hand-held Garmin GPS unit, and all nest contents and evidence of causes of failure was noted. Hauled seals and signs of otter (spraints and runnels) were also recorded. Due care was taken to minimise disturbance to breeding birds and other wildlife. All human activity seen in the vicinity of the islands during these visits was also recorded. It took approximately three-quarters of an hour to complete each survey visit of each island.

Actively breeding birds seen away from The Eileans were recorded during the vantage point (VP) counts described below.

With the exception of the first of the counts undertaken on the 30 April, the full survey area counts were conducted from eight strategic VPs positioned approximately 400 m apart around the foreshore of Millport Bay (Figure 1). Together these eight VPs afforded good views of the whole survey area; no shoreline habitats or inner parts of the bay were more than approximately 500 m from the nearest VP. According to the light and weather conditions prevailing at the time of a count, counting was also conducted from a few additional locations along the foreshore as necessary to ensure all areas were counted thoroughly. The first count of the day on the 30<sup>th</sup> April was undertaken from a RIB boat (this had been hired to access The Eileans for the counts of breeding birds), undertaking a single circuit of the bay at slow speed so that all parts were approached to within approximately 250 m. This was not repeated on later visits because it became clear that all parts of the survey area were readily visible and more easily counted from the shoreline VPs.

VP counts were made with the aid of a tripod-mounted 25-60x spotting scope; this meant that birds up to at least one kilometre away could be detected and identified. All birds and mammals seen in the survey area were recorded and the number and behaviour recorded on a bespoke recording form using standard species and behaviour codes (Appendix 1). To facilitate the recording of where birds were seen, the study area was divided into squares based on a grid of 100 x 100 m cells based on the British National Grid (Figure 1). Each 100m grid cell was referred to by an individual identifier code (or 'address') based on the cell's position north to south (indicated by a numbers 0-11) and west to east

(indicated by letters A-Q) in the grid (Figure 1). The appropriate 100m square for a record identified with a large-scale map of the survey area, overlain with a labelled grid and identified with the aid of a map of the survey area (Figure 1). Some areas were visible from more than one VP; therefore great care was taken to ensure that the same individuals were not recorded more than once during any count session. No practical difficulty was experienced preventing double counting within a count session because the numbers of birds (and seals) present were generally low, they tended not to redistribute to any great extent in the short period of time between counting from one VP and the next and they were often in distinctive flocks.

Human activities seen during each count session that might lead to disturbance of birds and/or seals were recorded, for example boat activity, dog walkers, anglers and other recreational beach users. The type of a potential disturbance source, the time, the number of people involved and the location (100 m grid cell) was recorded on the field recording forms. The approximate travel route within the survey area of active vessels was also recorded on a field map.

During the non-breeding season months (August to March) birds and seals using The Eileans could be readily identified and counted from the shore VPs using a spotting scope, thus a boat was not necessary to achieve the survey aims at this time of year. It took approximately one to one and a half hours to complete a single count of the whole survey area.

The survey work was undertaken by Digger Jackson and Karen Yearsley of Atlantic Ecology.

### ***Data management and analysis***

#### Breeding birds

The method used to analyse breeding bird data is based on the Common Bird Census method (Gilbert *et al.*, 1996). This is designed to determine the number and approximate central location of breeding bird territories in a defined survey area from the filed registrations recorded on a series of visit maps showing where birds and nests were seen. In this case there were data available for four visits: April, May, June and July. The field records of birds that on the basis of the bird's behaviour were breeding locally (e.g., courtship, singing, alarming and tending eggs or chicks, were taken as evidence of breeding) were marked on large scale species-specific record summary maps, with the data from each visit marked in a different colour. The registrations and breeding success information (nest contents etc) marked on the species summary maps were then interpreted, circling together registrations from different visits that, on the basis of proximity and breeding success information, were considered most likely to represent a single pair/territory. The nominal territory centre was interpolated as lying at the centre of the cluster of registrations assumed to represent a pair/territory. Where the nest was found (this was usually the case for gulls species, oystercatcher and carrion crow), the position of the nest was taken to be the location of territory centre. The location of each territory together with attributes about that territory (species, evidence of breeding attempt outcome) was then entered into GIS software (QGIS).

#### Non-breeding birds

The VP count data were entered into a bespoke Excel spreadsheet database, set up to mimic the layout of the field recording form. Data quality checking included using data field validation routines, the

automated conversion of codes to their corresponding species name or behaviour description and manual visual checks of field forms against data on screen.

The 100 m grid cell identifier code (the cells address in the grid) for each observation was translated into a grid reference value for the 100 m grid cell. To prevent records of the same species seen in the same grid cell having being assigned exactly the same grid reference, and thus plotting on top of each other when mapped, records were assigned to one of 12 possible grid references values for each 100 m grid cell, each of which represents a slightly different location, but always comfortably inside the boundary of the 100 m grid cell (see species map figures). Excel pivot table routines were used to produce summary statistics on the total numbers of a species present in the survey area for each count (Appendix 2, Tables 4 to 14). Excel data were imported to GIS software and used to produced maps of the distribution and abundance across the survey area of the species of greatest relevance to the proposed scheme's EIA (Figures 2 to 13). Where relevant, these maps distinguish between birds that were resting/roosting and birds that were actively foraging.

### **Context information**

One of the reasons for collecting the survey data is to provide information that, together with other information, can be used to establish the value of the survey area for birds and marine mammals. Site evaluation involves taking into account the purpose for which species use a site (breeding, feeding, resting, etc), the conservation status of species and the number of individuals of a species that use the site relative to their wider population size. Site evaluation may also take into account the diversity of the community and whether or not it supports an important assemblage.

A species' population size can be considered at different spatial scales, e.g. local, regional or national, and may concern the breeding or non-breeding (wintering) population. For EIA assessment SNH advise that regional receptor populations are defined according to the relevant SNH Natural Heritage Zone (NHZ). Millport Bay lies in NHZ 17 ('West Central Belt'). The coast and inshore waters of NHZ-17 corresponds to the ornithology recording areas of 'Clyde', 'Clyde Islands' and 'Ayrshire'. These are together referred to as the 'Firth of Clyde' region in the *Birds of Scotland* (Forrester and Andrews, 2007), one of the twenty Scottish regions used to summarise information on regional abundance of bird species in Scotland. NHZ-17 also corresponds to the Wetland and Estuary Birds (WeBS) the combined counting regions of 'Ayrshire', Dumbarton/SE Argyll, Lanarkshire/Strathkelvin and 'Renfrew' (Frost *et al.*, 2019). Summary information on breeding seabird population size is taken from *Seabird Populations of Britain and Ireland* (Mitchell *et al.*, 2004) for the area defined as Cunninghame (this includes Great and Little Cumbrae, Arran and Ayrshire and the Clyde).

The primary source of information on conservation status is Birds of Conservation Concern 4 (Eaton *et al.* 2015) (BoCC4). This publication summarises the conservation status of all Britain's bird species and assigns each to one of three categories: green (least concern), amber (moderate concern) and red (high concern).

For the bird species that merit individual accounts, context information on regional population size and conservation status is presented. This is used to give an indication given of the value of the survey area to the species. Following convention, if the numbers of a species using the survey for a particular time of year (i.e., breeding or wintering/passage) exceed 1% of the regional population the survey

area is evaluated as having regional importance for that species. The regional importance is categorised as 'low' if the counts represent between 1 - 5% of the regional total, 'moderate' if they represent between 5 -20% and high is they exceed 20%. If the numbers of a species do not exceed 1% of the regional total the survey area is evaluated as having local importance only.

It is outside the scope of this report to present context information on the mammal species seen.

## Results

### *Overview*

During the year the study area was used by 25 waterfowl and wader species (seabirds, wildfowl, waders and herons etc):

- 2 cormorant species (cormorant and European shag);
- 5 species of gull species, (herring gull, lesser-black-backed gull, great black-backed gull, common gull and black-headed gull);
- 1 species of tern (Sandwich tern);
- 7 species of wader (oystercatcher, curlew, redshank, bar-tailed godwit, dunlin, turnstone and purple sandpiper);
- 8 wildfowl species (mallard, common eider, wigeon, teal, red-breasted merganser, goosander, greylag goose and mute swan);
- Heron and northern gannet.

The survey area was also used by four species of aquatic mammal:

- Common seal, grey seal, harbour porpoise and otter.

The total numbers of water birds (seabirds, waders, waterfowl etc), seals and otter seen in each count of the survey area each month are summarised in Appendix 2, Tables A2.1 to A2.12. The status of each species recorded is summarised in Table 3.

### *Breeding birds summary*

The birds breeding on The Eileans in 2018 are summarised below:

#### North Eilean

- oystercatcher, 5 pairs;
- herring gull, 3 pairs;
- great black-backed gull, 1 pair;
- common gull, 6 pairs;
- carrion crow, 1 pair;
- blackbird, 1 pair (shared with South Eilean);
- rock pipit, 4 pairs;
- willow warbler, 1 pair (shared with South Eilean);

- Eider duck, probably at least 1 pair nesting. One brood of eider ducklings present on July visit.

Breeding success by the oystercatchers and gull species was very low. It appears that most pairs failed due to egg predation by the pair of breeding crows.

#### South Eilean

- oystercatcher, 6 pairs;
- herring gull, 1 pairs;
- great black-backed gull, 1 pair;
- common gull, 4 pairs;
- greylag goose (domesticated), 1 pair;
- blackbird, 1 pair (shared with North Eilean);
- rock pipit, 4 pairs;
- willow warbler, 1 pair (shared with North Eilean);
- wren, 1 pair;
- linnet, 1 pair (shared with North Eilean);
- common eider, at least 1 pair nested and 2 broods of ducklings present on July visit;
- mallard, 1 pair possibly breeding.

The distribution of gulls nesting on The Eileans is illustrated in Figure 2. Similarly Figure 3 shows the distribution of breeding oystercatchers and eider, and Figure 4 the distribution of passerine territories.

Breeding success by the oystercatchers and gull species appeared to be low. The great black-backed gull pair, two pairs of common gull and at least two pairs two of oystercatcher probably bred successfully. Again there was evidence of crow predation, presumably by the crow pair nesting on the North Island.

#### ***Non-breeding (wintering) water birds and waders summary***

Approximately half of the bird species were recorded in only low numbers, and often these relatively scarce species were not present on some visits (Table 3). The survey area clearly has low importance for these relatively scarce and irregularly present species.

Thirteen waterfowl and wader bird species were regularly present in low to moderate numbers (Table 3). These species and the numbers present (range of the monthly peak counts) are as follows:

- common gull, 4 – 70;
- herring gull, 9 – 141;
- great black-backed gull, 2 – 10;
- black-headed gull, 2 – 26;
- oystercatcher, 31 – 111;
- curlew, 0 – 231; high tide roost on South Eilean from October to January;
- turnstone, 0 – 54;
- purple sandpiper, 0 – 8;
- common eider 0 – 5;

- wigeon, 0 – 28;
- European shag, 9 – 39;
- great cormorant, 0 – 34;
- grey heron, 1 – 15.

South and North Eileans and the three small rocky skerries (i.e., The Leug, The Spoig and The Clach) have particular importance as roost sites for waders, gulls, European shag, cormorant and grey heron.

The regular occurrence of over two hundred overwintering curlew roosting on the North Eilean is undoubtedly the most important ornithological feature identified in the survey period.

The importance of the survey area for the regional (West Coast Central Belt (SNH NHZ 17) and local (Great Cumbrae) populations of the regularly occurring bird species will be examined in the final report. The final report will also contain maps showing the distribution of the regularly recorded bird species across the survey area.

**Table 3. Summary information on the bird species seen in the Millport Bay survey area and their relevance to the proposed scheme EIA.**

Species	Number breeding in Survey Area	Season occurrence	Abundance when present Min - Max	Habitat use in study area	Relevance to proposed scheme EIA
Gannet	None, breeds on Ailsa Craig	Spring and summer	1-8	Foraging at sea	Negligible
Great cormorant	None	Year round, peak numbers Oct.	1-34, typically <6	Foraging inshore waters, roosts on skerries and islands	Low
European shag	None, breeds on Little Cumbrae	Year round, peak numbers Aug - Oct.	7-39	Foraging inshore waters, roosts on skerries and islands	Moderate
Grey heron	None	Year round, especially autumn/winter	1-15	Foraging rocky coast, roosts on skerries and islands	Low
Mute swan	None	Year round	1-2	Foraging along coast	Negligible
Greylag goose	None	May – non-breeding flock	110, only recorded once	Roost on sea	Negligible
Shelduck	None	Spring	3, only recorded once	On sea	Negligible
Wigeon	None	Autumn/winter, overwintering	11-28	Foraging and roosting, rocky coast and adjacent sea	Low
Teal	None	Autumn	4, only recorded once	Foraging and roosting, rocky coast and adjacent sea	Negligible
Mallard	1-2 pairs probably breed on The Eileans	Year round	1-12	Foraging and roosting, rocky coast and adjacent sea	Low
Common eider	ca. 5 pairs bred on The Eileans and Millport shore	Year round, peak numbers during breeding season (April – July)	2-11	Foraging and roosting, rocky coast and adjacent sea. Nests on Eileans and rocky coast	Low
Red-breasted merganser	None	Summer & autumn	1, only recorded twice	Foraging on sea, inshore parts of bay	Negligible
Goosander	None	Autumn & winter	1 -3	Foraging on sea, inshore parts of bay	Negligible
Oystercatcher	ca. 5 pairs on The Eileans an 4 pairs Millport shore	Year round, peak numbers in autumn and winter	22 - 111	Forages and roosts on islands, skerries rocky coast and beaches. Nests on Eileans and around coast.	Moderate
Ringed plover	None	Summer	1-2	Forages sandy beaches	Negligible
Lapwing	None	Summer (post-breeding)	2, only recorded once	Seen roosting on North Eilean	Negligible
Purple sandpiper	No	Autumn/winter, overwintering	1-6	Forages and roosts on rocky littoral zone, islands.	Low

Species	Number breeding in Survey Area	Season occurrence	Abundance when present Min - Max	Habitat use in study area	Relevance to proposed scheme EIA
Dunlin	None	Autumn passage	21, only recorded once	High tide roost site on North Eilean with other waders	Low
Bar-tailed godwit	None	Autumn/winter, overwintering	1-3	Forages along tide edge of sandy beaches. Roost North Eilean	Negligible
Curlew	None	Autumn/winter, overwintering	0-231	Important high tide roost site on North Eilean. Rarely forages inside survey area.	High
Redshank	None	Autumn/winter, overwintering	1	Forages along tide edge of sandy beaches. Roost North Eilean	Negligible
Common sandpiper	None	April, spring passage migrant	1, only recorded once	Forages and roosts on rocky littoral zone.	Negligible
Turnstone	None	Year round except July, peak numbers in autumn. Passage migrant and winter visitor	1-54	Rocky shoreline habitat, roosts and feeds on The Eileans, skerries and the rocks along Millport shoreline	Moderate
Black-headed gull	None	Year round, peak numbers	2-26	Forages and roosts on coast, especially sandy beaches and tide edge.	Negligible
Common gull	10 pairs on Eileans	Year round	4 - 70	Forages and roosts on coast, especially sandy beaches and tide edge. Nests on Eileans	Low
Lesser black-backed gull	None	Spring and summer	1	Forages and roosts on coast, especially The Eileans, skerries and the rocks along Millport shoreline	Negligible
Herring gull	4 pairs on Eileans, and 12+ on Millport rooftops	Common year round, but scarcer Oct.-Dec.	8-141	Forages all habitats, especially along Millport seafront. Roosts on skerries and islands. Breeds on The Eileans and on building roof tops in Millport	Low
Great black-backed gull	2 pairs on Eileans	Year round	1-12	Forages and roosts on rocky coast and skerries and islands. Breeds on The Eileans	Low
Sandwich tern	None	April -May, and Sept. Passage migrant	1-19	Forages inshore waters. Roosts on skerries	Low
Black Guillemot	None, breeds locally	May	1, only recorded once	Foraging at sea	Negligible

Species	Number breeding in Survey Area	Season occurrence	Abundance when present Min - Max	Habitat use in study area	Relevance to proposed scheme EIA
Common Guillemot	None, breeds on Little Cumbrae	April & May	1-2	Foraging at sea	Negligible
Razorbill	None, breeds on Little Cumbrae	April	4	Foraging at sea	Negligible
Sparrowhawk	None, probably breeds locally	Year round	1 record only	Hunting across all terrestrial habitats, especially gardens and woodland	Negligible
Buzzard	None, breeds locally	Year round	pair	Woodland and farmland. Breeds locally.	Negligible
Woodpigeon	Breeds locally	Year round	Common	Woodland and gardens	Negligible
Rock pipit	ca. 5 pairs on Eileans	Year round	1-10	Islands and rocky coast. Breeds on Eileans	Low
Breeds locally	Breeds locally	Year round	Common	All terrestrial habitats	Negligible
Meadow Pipit	None	Autumn	Uncommon, single birds seen twice.	Foraging along coast, especially on amenity grassland	Negligible
Wren	1 pair on Eileans, others in Millport	Year round	Common, 1 pair on the Eileans.	Islands, gardens and coastal scrub, Breeding gardens.	Negligible
Blackbird	1 pair on Eileans, others in Millport	Year round	Common, 1 pair on the Eileans.	Islands, gardens and coastal scrub. Breeding.	Negligible
Song Thrush	Breeds locally	Year round	Common	Gardens and woodland, breeds	Negligible
Whitethroat	1 pair, Millport	Breeding season (April – August)	1-2 pairs	Coastal scrub, breeds	Negligible
Chiffchaff	1 pair just outside survey area	Breeding season (April – August)	1 pair	Woodland, breeds	Negligible
Willow warbler	Yes, 1 pair on Eileans, others in Millport	Breeding season (April – August)	Common, 1 pair on the Eileans.	Islands, gardens and coastal scrub, , breeds	Negligible
Blue tit	Breeds locally	Year round		Gardens and woodland, breeds	Negligible
Jackdaw	Breeds in Millport	Year round	Common, nesting in town buildings. Peak shore count 70.	Gardens, woodland, town. At times forages on foreshore and tide line. Breeds in buildings.	Negligible
Rook	Ca 30 pairs breeds just outside survey area	Year round	Rookery with at least 30 nests Peak shore count 68.	Gardens, woodland, town. At times forages on foreshore and tide line. Breeding rookery is at west end of Millport (100m grid square 'A5'),	Negligible

Species	Number breeding in Survey Area	Season occurrence	Abundance when present Min - Max	Habitat use in study area	Relevance to proposed scheme EIA
Carrion crow	Yes, 1 pair on Eileans, others in Millport	Year round	1+ pair	1 pair bred on The Eileans where apparently caused failure of several wader, gulls and eider breeding attempts through egg predation	Negligible
Raven	1 pair breeds locally	Year round	1 pair	Woodland and cliffs. Breeds locally.	Negligible
Starling	Breeds in Millport	Year round	Common	Gardens, woodland, town. At times forages on foreshore and tide line	Negligible
Chaffinch	Breeds in Millport	Year round	Common	Gardens and woodland, breeds	Negligible
Linnet	1 pair on Eileans	Year round	1 pair	Islands and coastal scrub, breeds	Negligible
Reed bunting	None, breeds locally	Year round	1 record only	Coastal scrub, may breed locally.	Negligible

### ***Bird species accounts***

Species accounts below are presented for the 13 waterfowl and wader species of greatest relevance to the proposed scheme's EIA.

#### Common gull

Low to moderate numbers of common gulls were present through the year (Table 4). Ten pairs bred on The Eileans (Figure 2), though it appeared that all but one breeding attempts were unsuccessful. Numbers in the survey area peaked in August (52) and September (70). Numbers were lowest in mid-winter. The distribution of non-breeding records across the survey area is not illustrated but was similar to that of herring gull.

Common gull is a common breeding and very common wintering bird across Scotland. The regional breeding population is estimated to be 638 pairs (Seabird 2000 count for Clyde, Clyde Islands and, Ayrshire) and the regional wintering population 6,911 birds (Birds of Scotland estimate for Clyde, Clyde Islands). The numbers seen in the survey area are of negligible regional importance and are thus considered to have **local importance only**.

**Table 4. Common gull monthly counts and the number of breeding pairs in the Millport Bay survey area**

Date	Low tide count	High tide count	Number of breeding pairs
30/04/2018	0*	5*	N Eilean, 6 pairs S Eilean, 4 pairs
17/05/2018	6*	0*	
11/06/2018	2*	2*	
02/07/2018	9	5	N/A – non-breeding season
20/08/2018	13	52	
20/09/2018	70	37	
18/10/2018	21	0	
12/11/2018	14	0	
17/12/2018	5	4	
24/01/2019	2	4	
20/02/2019	0	0	
28/03/2019	11	1	

\* excludes actively breeding birds

#### Herring gull

Moderate numbers of herring gulls were present through the year (Table 4). Four pairs bred on the Eileans (Figure 2), and at least 12 pairs bred on roof tops in Millport. Numbers in the survey area peaked in September, when up to 141 were present. Numbers were lowest in November and December, when less than ten birds were counted. Herring gulls were seen foraging and roosting across the survey area; most records of roosting herring gulls were on the islands and skerries (Figure 5).

Herring gull is a very common breeding and wintering bird across Scotland. The regional breeding population is estimated to be around 2,561 pairs (Seabird 2000 count for Cunninghame) and the

regional wintering population approximately 15,300 birds (Birds of Scotland estimate for Clyde). The numbers seen in the survey area are of **local importance only**.

Depending on the time of year, up to approximately a third of the herring gulls using the survey area were in immature plumage.

**Table 5. Herring gull monthly counts and the number of breeding pairs in the Millport Bay survey area**

Date	Low tide count	High tide count	Number of breeding pairs
30/04/2018	8*	19*	N Eilean, 3 pairs S Eilean, 1 pair Millport roofs, at least 12 pairs
17/05/2018	37*	9*	
11/06/2018	68*	72*	
02/07/2018	20*	22*	N/A – non-breeding season
20/08/2018	28	32	
20/09/2018	99	141	
p18/10/2018	13	15	
12/11/2018	9	7	
17/12/2018	9	4	
24/01/2019	47	14	
20/02/2019	44	55	
28/03/2019	33	53	

\* excludes actively breeding birds on their territory but may include breeding birds feeding/resting away from their territory

#### Great black-backed gull

Low numbers of great black-backed gull were present through the year (Table 4). Two pairs bred on the Eileans (Figure 2), one of which was successful. Numbers in the survey area remained approximately constant through the year with between 5 and 12 birds recorded on all visits. The maximum flock size was just two birds. Almost all records during the year were from The Eileans or the skerries (Figure 6).

Great black-backed gull is a common breeding and wintering bird across Scotland though is much less numerous in the south of the country compared to the north. The regional breeding population is estimated to be around 555 pairs (Seabird 2000 count for Clyde & Ayrshire) and the regional wintering population approximately 127 birds (Birds of Scotland estimate for Clyde & Ayrshire). The numbers seen in the survey area in the breeding season are of local importance only. The numbers using the survey area in winter exceed 1% of the assumed regional wintering population, which would mean that the survey area has **low regional importance in winter**. However, it is possible that the regional wintering population is undercounted due to the difficulties of counting birds when they are at sea.

**Table 6. Great black-backed gull monthly counts and the number of breeding pairs in the Millport Bay survey area**

Date	Low tide count	High tide count	Number of breeding pairs
30/04/2018	1*	2*	N Eilean, 1 pair

17/05/2018	0*	1*	S Eilean, 1 pair
11/06/2018	2*	1*	
02/07/2018	3*	2*	
20/08/2018	7	6	N/A – non-breeding season
20/09/2018	6	10	
18/10/2018	4	4	
12/11/2018	5	1	
17/12/2018	3	5	
24/01/2019	12	2	
20/02/2019	4	3	
28/03/2019	4	7	

\* excludes actively breeding birds on their territory but may include breeding birds feeding/resting away from their territory

### Black-headed gull

Low to moderate numbers of black-headed gulls were regularly present from the May to December, with a maximum count of 26 birds in September (Table 7). They were only occasionally seen from January to April and did not breed in the survey area. Most records were along the Millport shore and beaches.

Black-headed gull is a common breeding and very common wintering bird across Scotland. The regional breeding population is estimated to be 50 pairs (Seabird 2000 count for Cunninghame) and the regional wintering population approximately 38,400 birds (Birds of Scotland estimate for Clyde & Ayrshire). The numbers seen in the survey area are of **local importance only**.

**Table 7. Black-headed gull monthly counts and the number of breeding pairs in the Millport Bay survey area. This species does not breed in the survey area.**

Date	Low tide count	High tide count
30/04/2018	0	0
17/05/2018	3	2
11/06/2018	2	1
02/07/2018	2	2
20/08/2018	7	8
20/09/2018	7	26
18/10/2018	1	2
12/11/2018	3	9
17/12/2018	9	2
24/01/2019	2	0
20/02/2019	0	0
28/03/2019	2	0

### Oystercatcher

Moderate numbers of oystercatchers were present through the year (Table 8Table 4). The highest number recorded was 111 birds in October.

Fourteen pairs of oystercatchers bred in the survey area (Figure 3). Eleven pairs bred on the Eileans; judging by their behaviour about half these pairs bred successfully. Two pairs bred along the rocky shore in the western part of Millport Bay, between Foul Port and the boat building yard (Figure 3). Another pair bred on the rocky coast on the east side of Millport Bay near Port Loy, this pair had a nest with 3 eggs on 17 May visit (in grid cell 'Q6') (Figure 3). None of the three pairs breeding on Great Cumbrae mainland appear to have bred successfully.

The majority of the birds present in April to June that were not actively breeding, were noted to be in immature plumage. These summering immatures mainly foraged and roosted on the various skerries and the vicinity of Foul Port (i.e., 100m grid cells 'C5' and 'D6') (Figure 7).

Outside the breeding season the survey area provided feeding for around 40-50 birds, mainly on the intertidal skerries (Figure 7). The Eileans and the skerries were also used as a high tide roost by around 80-110 birds, some of these birds coming in from feeding grounds outside the survey area (Figure 7).

Oystercatcher is a very common breeding and wintering bird across Scotland. The regional breeding population has not been estimated but is expected to be at least 2,000 pairs based on the information in *Birds of Scotland* (Forrester and Andrews, 2007); the Scottish breeding population probably exceeds 100,000 pairs. The regional wintering population is estimated at approximately 14,000 birds; this figure is derived from a third off of non-estuarine survey count for Strathclyde (17,841 birds) (Rehfish *et al.*, (2003) plus the average monthly peak WeBS count for the five-year period 1992-2002 for Clyde and Ayrshire (Forrester and Andrews, 2007). The peak number seen in the survey area (111 birds) is well below 1% of the regional wintering population and thus the survey area is evaluated as having negligible importance for the regional wintering oystercatcher population.

**Table 8. Oystercatcher monthly counts and the number of breeding pairs in the Millport Bay survey area**

Date	Low tide count	High tide count	Number breeding
30/04/2018	18*	21*	N Eilean, 5 pairs S Eilean, 6 pairs Millport Bay rocky coast, 3 pairs
17/05/2018	17*	20*	
11/06/2018	29*	20*	
02/07/2018	17	22	N/A – non-breeding season
20/08/2018	18	32	
20/09/2018	40	39	
18/10/2018	39	111	
12/11/2018	25	76	
17/12/2018	35	87	
24/01/2019	11	64	
20/02/2019	57	81	
28/03/2019	37	13	

\* excludes actively breeding birds

Curlew

Curlews were recorded in the survey area from September to March in small to moderate numbers; there were no records in the breeding season months (Approximately 4,950 curlew winter in NHZ-17; this figure is derived from a third off of non-estuarine survey count for Strathclyde (6,021 birds) (Rehfishch *et al.*, (2003) plus and the average monthly peak WeBS count (2,947 birds) for period 1992-2002 for Clyde and Ayrshire (Forrester and Andrews, 2007). The peak number seen roosting in the survey area through the winter represents approximately 4.7% of the regional wintering population. It is concluded that the survey area (in particular The Eileans) has **low importance for the regional wintering population** as a roost site, that it has negligible importance for feeding curlew and no importance for breeding curlew.

Table 9). The peak number seen was 232 birds. From October to January around 230 curlews regularly roosted on North Eilean and The Spoig skerry (Figure 8). Negligible curlew feeding activity was observed in the survey area, just the occasional record of single birds foraging on the Millport foreshore and skerries (Figure 8). Observations of curlew flying from the roost site indicated that birds were heading to destinations both to the west and east of Millport Bay. The main destination appears to have been pasture fields (and possibly intertidal areas also) on the east side of Great Cumbrae, at least as far north as Stinking Goat (ca. 4 km from Millport). Flocks of up to 60 curlews (together with oystercatchers) were regularly seen from the road in this area when driving to the ferry terminal.

Curlew is a common breeding and wintering bird across Scotland. Approximately 4,950 curlew winter in NHZ-17; this figure is derived from a third off of non-estuarine survey count for Strathclyde (6,021 birds) (Rehfishch *et al.*, (2003) plus and the average monthly peak WeBS count (2,947 birds) for period 1992-2002 for Clyde and Ayrshire (Forrester and Andrews, 2007). The peak number seen roosting in the survey area through the winter represents approximately 4.7% of the regional wintering population. It is concluded that the survey area (in particular The Eileans) has **low importance for the regional wintering population** as a roost site, that it has negligible importance for feeding curlew and no importance for breeding curlew.

Table 9. Curlew monthly counts for the Millport Bay survey area. This species does not breed in the survey area.

Date	Low tide count	High tide count
30/04/2018	0	0
17/05/2018	0	0
11/06/2018	0	0
02/07/2018	0	0
20/08/2018	0	0
20/09/2018	0	2
18/10/2018	2	221
12/11/2018	89	232
17/12/2018	231	97
24/01/2019	218	146
20/02/2019	0	22
28/03/2019	19	0

### Turnstone

Turnstones were recorded in the survey area in small to moderate numbers through the year (Table 10). They were very scarce from May to July, the period when adults on their Arctic breeding grounds. The peak number seen was 54 birds in September. Turnstones feed on intertidal rocky shore habitat. The most frequented sites in the survey area were the inter-tidal skerries, the shores of The Eileans and rocks in the vicinity of the harbour (Figure 9). Turnstone regularly roosted at high tide on the skerries and The Eileans (Figure 9).

Turnstone is a common wintering and passage migrant species across the coast of Scotland. Turnstones breed in Arctic regions such as Greenland and north-east Canada. Approximately 1,220 turnstone winter in NHZ-17; this figure is derived from a third off of non-estuarine survey count for Strathclyde (2,518 birds) (Rehfisch *et al.*, 2003) plus the average monthly peak WeBS count for Clyde and Ayrshire for the five-year period 2012/13 to 2017/18 (379 birds). The peak number (54) seen in the survey area represents approximately 4.4% of the regional wintering population. It is concluded that the survey area (in particular The Eileans) has **low importance for the regional wintering turnstone population**. The survey area has no importance for breeding turnstone.

**Table 10. Turnstone monthly counts for the Millport Bay survey area. This species does not breed in the survey area**

Date	Low tide count	High tide count
30/04/2018	4	5
17/05/2018	1	0
11/06/2018	0	1
02/07/2018	0	0
20/08/2018	0	4
20/09/2018	11	54
18/10/2018	9	50
12/11/2018	0	0
17/12/2018	0	0
24/01/2019	0	2
20/02/2019	15	2
28/03/2019	3	0

### Purple sandpiper

Purple sandpipers were seen on two occasions; six birds were present on the 30 April and one on 19 October (Figure 9). However, this species can be easily overlooked due its small size, dark coloured, camouflaging them on the seaweed covered rocks they frequent for foraging and roosting. It is therefore possible that some birds on The Eileans and the inter-tidal skerries could have gone unrecorded during in the VP counts and it considered likely that the survey potentially underestimated the numbers of purple sandpiper using the survey area.

Purple sandpiper is an uncommon wintering species in NHZ-17. The non-estuarine coast survey count for Strathclyde was 618 birds (Rehfisch *et al.*, 2003) of which around a third are likely to have been in NHZ-17. However this survey only achieved 33% coverage of the coast and so the true number is likely

to be significantly greater. In addition approximately 25 birds are counted on WeBS surveys within NHZ-17 (5 year average monthly peak count, 2012-18). It is concluded that peak numbers seen in the survey area represent in the region of 2-3% of the NHZ-17 population and thus the survey area has **low importance for the regional wintering purple sandpiper population**. The NHZ-17 region holds only a small proportion (*ca* 4%) of the purple sandpipers wintering in Scotland (approximately 15,000 birds).

Common eider

Approximately nine pairs bred in the survey area (Figure 3). Outside the breeding season (September to March) eider were rarely seen in the survey area (Table 11) (Figure 10).

Females nested on The Eileans and probably also on the mainland shore of Millport Bay. The only nest found was a predated nest on South Eilean on the 17 May. It is likely that most females nested in concealed locations in the relatively thick ground vegetation on The Eileans. Chick survival appears to have been poor. Only one of the nine small ducklings (of three broods) seen on the 17 May visit appears to still have been alive on the 11 June visit, and none of the ten ducklings (of five broods) seen on 11 June were seen on the 2 July visit. However, it is possible that females had taken their broods to feeding grounds outside Millport Bay.

Common eider is a common breeding and wintering bird around the coast of Scotland. The regional breeding and wintering population are 3,500 breeding females and 16,500 birds respectively (Birds of Scotland estimates for Firth of Clyde). The numbers seen in the survey area are of **local importance only**.

**Table 11. Common eider monthly counts and the number of breeding pairs in the Millport Bay survey area. M = male, F = female**

Date	Low tide count	High tide count	Number of breeding pairs
30/04/2018	6M, 1F *	9M, 1F *	N Eilean, S Eilean, and Millport bay shores, approx. 9 pairs in total
17/05/2018	7M, 1F *	7M, 3F *	
11/06/2018	7F+ 3 broods *	4F + 1 brood *	
02/07/2018	10F + 4 broods *	8F + 4 broods	
20/08/2018	3	2	N/A – non-breeding season
20/09/2018	0	0	
18/10/2018	0	0	
12/11/2018	0	0	
17/12/2018	0	0	
24/01/2019	0	3	
20/02/2019	0	0	
28/03/2019	2	0	

\* includes actively breeding birds

Wigeon

A wintering flock of up to 28 wigeon was present from November to March (Table 12). These birds fed and roosted along the coast in the western half of Millport Bay, especially in the vicinity of Foul Port (Figure 10).

Wigeon is a common wintering bird in coastal habitats around Scotland. The regional wintering population for NHZ-17 (based on WeBs average peak monthly counts) is estimated 3,510 birds (based on information in Forrester and Andrews, 2007). The number wintering in the survey area represent slightly below 1% of the regional wintering population. This means that the survey area has **local importance only**.

**Table 12. Wigeon monthly counts for the Millport Bay survey area. This species does not breed in the survey area**

Date	Low tide count	High tide count
30/04/2018	0	0
17/05/2018	0	0
11/06/2018	0	0
02/07/2018	0	0
20/08/2018	0	0
20/09/2018	0	0
18/10/2018	0	0
12/11/2018	25	25
17/12/2018	17	28
24/01/2019	22	17
20/02/2019	27	20
28/03/2019	11	6

#### European shag

European shag (hereafter shag) was present in the survey area through the year (Table 13). Numbers were greatest in the post-breeding months (August to October) when up to 39 birds were present. At other times of year there were typically between nine and 20 birds present. The majority of shags seen were using the survey area for roosting, the intertidal skerries being the most favoured roost sites (Figure 11). Low numbers were also seen foraging in Millport Bay. The birds seem comprised a mixture of about two-thirds adults and one-third immatures.

Although shag did not breed in the survey area, it is likely that the adult birds foraging and roosting in the survey area in the breeding season months were 'off-duty' and foraging breeding birds from the small colony on Little Cumbrae. This colony is approximately 4 km to the south-west of Millport Bay and had 20 nests in the Seabird 2000 census. It is likely that the shags using the survey area in the non-breeding months also have strong connectivity to the Little Cumbrae breeding colony. The next closest breeding colony is on Holy Island 27 km to the south-east of Millport, and thus is greater than the maximum breeding season foraging distance from the survey area. The Holy Island colony had 16 nests in the Seabird 2000 census.

The Seabird 2000 census recorded a total of 585 shag nests in NHZ-17 region. The numbers using the survey area in the breeding season at times slightly exceed 1% of the regional breeding population and thus the survey area is evaluated as having **low importance for regional breeding shag population**.

There are no estimates of the size of the NHZ-17 regional wintering shag population. However, shags typically overwinter in the same region as their breeding colony. Thus, after allowing for immature birds, it is likely that the regional winter population is in the order of 2,500 birds. The numbers using the survey area during the non-breeding months at times slightly exceed 1% of this assumed regional winter population size, and thus the survey area is evaluated as having **low importance for the regional wintering shag population**.

**Table 13. European shag monthly counts for the Millport Bay survey area. This species does not breed in the survey area**

Date	Low tide count	High tide count
30/04/2018	7	9
17/05/2018	25	13
11/06/2018	11	6
02/07/2018	6	12
20/08/2018	11	35
20/09/2018	39	38
18/10/2018	28	22
12/11/2018	2	20
17/12/2018	9	3
24/01/2019	16	17
20/02/2019	12	2
28/03/2019	2	7

Cormorant

Low numbers (5-34) of post-breeding cormorant were seen on the survey visits from August to October. By far the highest number (34) was recorded at low tide on the 18<sup>th</sup> October (Table 14). Cormorants were rarely seen during the winter and breeding season months. Most of the cormorants seen were roosting on the inter-tidal skerries, there were also a few records of birds feeding in the bay (Figure 12). One bird was seen to catch a butterfish and another was seen to catch a small flatfish.

The closest cormorant colony is on Horse Island, approximately 13 km to the south-west of Millport. The Seabird 2000 census recorded 51 nests at this colony in 1999, and 70 nests were counted in 2009. It is likely that the birds using the survey area have strong connectivity to the Holy Island breeding colony.

The Seabird 2000 census recorded a total of 358 pairs in NHZ-17. The numbers seen in the survey area during the breeding season (April to July) do not exceed 1% of the regional breeding population and thus the survey area is evaluated as having **local importance only for breeding cormorant**.

There are no estimates of the size of the NHZ-17 regional wintering cormorant population. However cormorants typically overwinter in the same region as where they breed. Thus, after allowing for immature birds, it is likely that the regional winter population is in the order of 1,500 birds. The numbers using the survey area during the non-breeding months slightly exceeded 1% of the assumed regional winter population size on one occasion (in October), and thus the survey area is evaluated as having **low regional importance for wintering cormorant**.

**Table 14. Cormorant monthly counts for the Millport Bay survey area. This species does not breed in the survey area**

Date	Low tide count	High tide count
30/04/2018	0	0
17/05/2018	1	1
11/06/2018	4	0
02/07/2018	1	1
20/08/2018	3	5
20/09/2018	5	3
18/10/2018	34	0
12/11/2018	0	0
17/12/2018	1	1
24/01/2019	2	1
20/02/2019	1	0
28/03/2019	0	0

#### Grey heron

A single non-breeding grey heron was present on most breeding season visits (Table 15). Grey heron were commonly seen in low numbers (2-15) outside the breeding season months (August to February), usually feeding or roosting on rocky coast habitat, especially the inter-tidal skerries. The highest count by far was 15 birds were present at high tide on 17 December. Most of these birds were roosting on North Eilean.

Grey heron is a common breeding and wintering bird across western Scotland. The size of the Scottish breeding population is 3,572 pairs, and the Scottish wintering population is around 15,000 birds. There are no numbers estimates for NHZ-17 but the Firth of Clyde is a stronghold for this species in winter (Forrester and Andrews, 2007). It is likely that the NHZ wintering population is around 2,000 birds. It is concluded that the survey area has no importance for breeding grey heron and is of **local importance only** for wintering grey heron.

**Table 15. Grey heron monthly counts for the Millport Bay survey area. This species does not breed in the survey area**

Date	Low tide count	High tide count
30/04/2018	1	0
17/05/2018	1	0
11/06/2018	0	0
02/07/2018	0	1
20/08/2018	2	2
20/09/2018	1	1
18/10/2018	3	6
12/11/2018	1	3
17/12/2018	4	15
24/01/2019	2	4
20/02/2019	1	2
28/03/2019	0	0

### ***Mammal species accounts***

Species accounts are presented below for the four mammal species encountered during the survey work.

#### Common seal

Common seals were present throughout the year apart from the month of August, though the number varied greatly between months (Table 16). The maximum count was 40 individuals seen in late March. Nearly all the common seals were hauled out on the various skerries or the shores of the Eileans (Figure 13, Photos 6 and 8). The common seal haul out sites were sometimes shared with grey seals.

A recently born pup and its mother were seen on The Spoig skerry on the 2 July visit, indicating that this species is breeding in the bay.

Common seals in Millport Bay show a high degree of habituation to human activity (Photo 6). For example, individuals on The Eileans haul out sites allowed surveyors to approach within approximately 25 m before showing any noticeable alarm.

**Table 16. Common seal monthly counts for the Millport Bay survey area**

Date	Low tide count	High tide count
30/04/2018	17	18
17/05/2018	12	8
11/06/2018	10	0
02/07/2018	13 + 1 pup	14
20/08/2018	0	0
20/09/2018	11	1
18/10/2018	21	0
12/11/2018	1	1
17/12/2018	32	18
24/01/2019	9	6
20/02/2019	9	9
28/03/2019	40	38

#### Grey seal

Grey seals were seen at haul out sites and swimming nearby from March to June (Table 17) (Figure 13). The maximum number seen was six individuals on the 28 March 2019 visit.

**Table 17. Grey seal monthly counts for the Millport Bay survey area**

Date	Low tide count	High tide count
30/04/2018	4	0
17/05/2018	3	0
11/06/2018	1	0
02/07/2018	1	1
20/08/2018	0	0
20/09/2018	0	0

18/10/2018	0	0
12/11/2018	0	0
17/12/2018	0	0
24/01/2019	0	0
20/02/2019	0	0
28/03/2019	6	5

### Harbour porpoise

The only cetacean seen inside the survey area during the count visits was a single common porpoise on the 11 June 2018 visit. The animal was noted swimming in the outer part of the bay, approximately 50 m south of The Spoig skerry.

### Otter

On the basis of the field evidence and direct sightings it seems likely that at least one otter was resident on The Eileans through the survey period. It is also likely that this individual had been resident for at least several months previously.

Several large latrines of otter spraints representing several months of accumulation were found in a restricted area in the north-east corner of South Eilean on the 30 April 2018 survey visit. These were located along a grassy rock-ledge that forms a ramp from the sea and a pathway leading for about 15 m to a runnel into dense bushy undergrowth. It is considered likely that this runnel leads to an otter holt in the undergrowth (the undergrowth was too dense to investigate further).

Individual otter spraints of varying ages were also found at a number of widely spread locations on both North Eilean and South Eilean. A fresh spraint was also found on South Island on the 2 July visit. Two fresh spraints were also found on the Great Cumbrae mainland on the 17 May 2018 visit on rocky shore at Port Loy, the part of the coast closest to South Eilean.

On the 17 May 2018 visit an adult otter was watched (and photographed, Photo 9) at close range foraging in the middle of the day close to the southern shore of North Eilean. Later the same afternoon what was presumably the same individual was seen foraging on and around The Spoig, the rocky skerry approximately 200 m south-west of South Eilean.

The only otter seen between August 2018 and March 2019, was an actively foraging animal seen on South Eilean on the 24 January 2019 survey. It should be noted that no visits were made to The Eileans to search for otter signs after 2 July 2018.

## **Human disturbance**

During the survey count sessions many instances of shore-based and vessel-based human activity were logged, all of which had the potential to disturb birds and aquatic mammals in the survey area (Table 18 and Table 19).

With the exception of one workboat and a Marine Laboratory teaching vessel, all of the 56 active vessels recorded were recreational vessels, mainly kayaks (28%), RIBS (10%), small motor boats (12%) and small yachts and their tenders (20%) (Table 18). The amount of vessel activity was almost twenty times greater during the summer months (April to August) compared to the other months (Table 18).

Vessel activity was concentrated in the central part of the bay and in the vicinity of the pier. Vessel activity was regularly noted in the close vicinity (<25m) of The Eileans and the skerries and so had the potential to disturb wildlife using these sites (Photo 11). One of the kayak groups landed on South Eilean and resulted in the disturbance to some common seals, causing them to leave their haul out. Otherwise no obvious disturbance responses by birds or seals were seen. It should however be noted that it was not an aim of the survey to study the behavioural response of wildlife to human activity.

There was a large amount of shore-based human activity along the Millport foreshore (Table 19, Photo 11). The main activities noted were dog walking, walking, sunbathing, beach play and swimming. There were also single records of shore-angling and horse riding. Activity was concentrated along the beach adjacent to the town centre, and to a lesser extent at Kames Bay beach. Human activity was highest during the spring and summer months (April to August), when it was common for there to be over 20 people along the foreshore and amenity grassland areas (note, pedestrians on the promenades and pier were not counted); the peak count was 88 people. With the exception of dog walking, there was a strong tendency for human recreational activity to be greater during counts undertaken after 10:30 in the morning (Table 19).

**Table 18.** The number of vessels active in the Millport Bay survey area during count sessions from April 2018 to March 2019. Vessel activity for counts session undertaken in the early part of the day (before 10:30) is compared with sessions undertaken later in the day (after 10:30), this split reflecting the obvious increase in activity after around 10:30. ‘Early’ counts are defined as those that took place within the period 07:30 to 10:30, and ‘Late’ counts as between 10:30 and 18:30.

Time of year > Time of day counted > No. of counts >	April to August			September to March			Whole year	
	Early counts	Late counts	E & L counts	Early counts	Late counts	E & L counts	All counts	%
	3	9	12	6	8	14	26	
Kayak/ canoe	0	21 (9 groups)	21	0	2 (1 group)	2	23	28.0%
RIB	0	8	8	0	0	0	8	9.8%
Yacht	1	7	8	0	1	1	9	11.0%
Yacht tender	0	4	4	0	0	0	4	4.9%
Small motorboat (e.g. day angler)	1	9	10	0	0	0	10	12.2%
Work boat	0	1	1	0	0	0	1	1.2%
Marine Lab teaching boat	0	1	1	0	0	0	1	1.2%

**Table 19. The number of people involved in activities along shoreline recorded during count sessions of Millport Bay survey area from April 2018 to March 2019. Activity for counts session undertaken in the early part of the day (before 10:30) is compared with sessions undertaken later in the day (after 10:30), this split reflecting the obvious increase in activity after around 10:30 for all activities except dog walking. ‘Early’ counts are defined as those that took place within the period 07:30 to 10:30, and ‘Late’ counts as between 10:30 and 18:30.**

Time of year > Time of day counted > No. of counts >	April to August			September to March			Whole year	
	Early counts	Late counts	E & L counts	Early counts	Late counts	E & L counts	All counts	%
	3	5	8	6	8	14	22	
Dog walker on beach/foreshore	12 (7 groups)	10 (9 groups)	22	10 (8 groups)	29 (19 groups)	39	61	19.8%
School group on beach	0	30 (1 group)	30	0	16 (1 group)	16	46	14.9%
Angling, from rocks	0	2 (1 group)	2	0	0	0	2	0.7%
Beach recreation excl. dog walking. (walking, sunbathing, volley ball)	2	141	143	1	51	52	195	63.3%
Horse riding	0	0	0	0	1	1	1	0.3%
Scuba diving from beach	0	1	1	0	0	0	1	0.3%
Swimming from beach	0	2 (1 group)	2	0	0	0	2	0.7%

## Discussion

The survey area supports a rich birdlife throughout the year (Table 3), a reflection of the wide diversity of habitats present and the opportunities this provides birds for breeding, feeding and resting. The variety, abundance and seasonal occurrence of the bird species seen were in line with expectations. The survey area appears to have moderate regional importance (i.e., 5-20% of the NHZ-17 population) at times during the non-breeding period of the year for three species: curlew, turnstone and purple sandpiper (low/moderate) (Table 20), nevertheless the number of all these species is negligible in a national context. The survey area also appears to have low regional importance (i.e., 1-5% of the NHZ-17 population) at times during the non-breeding period of the year for four species: oystercatcher, great-black-backed gull, cormorant and European shag (year round).

The survey area (in particular The Eileans) supports small numbers of breeding oystercatcher, common eider, great-black-backed gull, herring gull, common gull, rock pipit, and several other common passerine species. However, in all cases the numbers of these species breeding in the survey area is well below 1% of the regional (NHZ-17) breeding population and the survey area is evaluated as being of only local importance as a breeding site for these bird species.

It is considered likely that the adult European shags observed roosting and feeding in the survey area during the breeding season are breeding individuals from Little Cumbrae colony. The peak numbers present in the breeding season (21 adults) represent slightly over 1% of the regional breeding population. The survey area is thus evaluated as having low importance as a roosting site for the regional breeding population of European shag.

Low numbers of other seabird species were also observed foraging in Millport Bay during the breeding season, some of which may have been breeding birds from colonies elsewhere in the region (e.g. Ailsa Craig and Little Cumbrae). In all cases, the number of individuals seen was very low and therefore the survey area is considered to have negligible importance as a feeding site for all seabird species.

Outside the breeding season, the survey area is used as a feeding site and roosting site for a variety of seabird, wader and wildfowl species and grey heron. The safe and relatively sheltered roost sites afforded by The Eileans and the three inter-tidal skerries are of particular importance to these birds. With the exception of the seven species identified at the start of the Discussion, the numbers present are evaluated to be of local importance only (e.g. all wildfowl species, most gull and wader species and grey heron).

**Table 20. Evaluation of the importance of the survey area to waterbirds and wader species**

Species	Conservation Status (BoCC 4 list)	Importance of survey area for breeding population	Importance of survey area for wintering/passage population
Curlew	Red	None	Regional - low
Turnstone	Amber	None	Regional - low
Purple sandpiper	Amber	None	Regional - low
European shag	Red	Regional – low	Regional - low
Cormorant	Green	None	Regional - low
Great-black-backed gull	Amber	Local only	Regional - low
Oystercatcher	Amber	Local only	Local only
Herring gull	Red	Local only	Local only
Common gull	Amber	Local only	Local only
Black-headed gull	Amber	Local only	Local only
Common eider	Amber	Local only	Local only
Wigeon	Amber	None	Local only
Grey heron	Green	None	Local only

### ***Human activity and disturbance***

The survey results show that Millport Bay is frequently used by townsfolk and tourists for shore-based and vessel-based recreational activities, especially in the spring and summer months after 10:30 in the morning. It was not an aim of the survey to collect information of how this activity may impact on wildlife. For example, it cannot be ascertained if the variety and abundance of species using the survey area would be different if there was less human activity. The absence of some bird species that might be expected to occur, for example absence of overwintering diver and grebe species, which might otherwise be expected, might be due to high levels of activity. The low use of the Millport beaches by overwintering and passage waders and the absence of breeding ringed plover (a species that breeds on beaches) may also be due to the high levels of human beach activity.

With the exception of fast-moving RIB vessels and occasional kayakers landing on The Eileans, all the human activity seen was considered to be benign in its nature with respect to potential disturbance of birds and aquatic mammals. Indeed, much of the local wildlife appears habituated to human activity, apparently tolerating activities at relatively close distance (to within approximately 50 m) without showing a strong disturbance response. In particular, common seals at the haul out sites allow unusually close approach before they leave their haul outs. The local eider ducks, oystercatchers and herring gulls also permit relatively close approach (to within <50m) when compared to less disturbed localities.

### ***Historical information on breeding terns***

Millport Bay is a significant location in the annals of Scottish Ornithology. It was here on the 24 June 1812 that roseate tern was first noted as a species anywhere in the world. At least four individuals were shot on The Eileans (where they were breeding) and one of these became the holotype specimen for the description of the species by Montagu in 1813. This holotype specimen is held by the British Museum of Natural History.

Historical information on the distribution of roseate tern breeding in Scotland is summarised in *The Birds of Scotland* (Forrester and Andrews, 2007). This shows that there are breeding records from four islands in the Firth of Clyde (including The Eileans), all from the first half of the 19<sup>th</sup> century. There are also much more recent historical records of Arctic tern and common tern breeding in the local area. For example, both these species are shown as breeding in the 10-km square that contains Great Cumbrae and Little Cumbrae in first BTO breeding bird atlas, covering the period 1968 to 1972 (Sharrock, 1976). However, by the time of the second BTO breeding bird atlas, covering the period 1988 to 1991 (Gibbons *et al.*, 1993), both species were no longer breeding in this 10-km square, and that continued to be the case during the 2007 to 2011 period covered by the third and most recent atlas (Balmer *et al.*, 2013). The large decline in breeding terns in south-west Scotland in recent decades has been linked to the spread of introduced North American mink and their predation of breeding birds (Craik, 1998; Ratcliffe *et al.*, 2008).

With appropriate conservation management it is possible that breeding terns could once again breed on The Eileans. Appropriate management might include mink control (though there is no evidence this species is currently present), vegetation management (e.g., removal of scrub) and provision of tern nest-boxes.

The potential for attracting back breeding roseate tern should not be ruled out. Roseate tern is the UK's rarest breeding seabird and is a Birds of Conservation Concern red-listed species (Eaton *et al.*, 2015). It is currently a very rare breeding species in the UK, being restricted to a few pairs breeding in Wales, the Firth of Forth and Northumberland, with larger numbers at colonies in Ireland. There has been recent advances in the practical methods to improve roseate tern breeding success (in particular, specially designed nest boxes), and this had led to partial population recovery (<https://www.birdlife.org/europe-and-central-asia/news/road-recovery-roseate-tern>).

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**Survey Species and behaviour codes**

Code	Explanation
Bird species (BTO codes)	
B.	Blackbird
BA	Bar-tailed godwit
BH	Black-headed gull
BZ	Buzzard
C.	Carrion crow
CA	Cormorant
CC	Chiffchaff
CD	Collared dove
CG	Canada goose
CH	Chaffinch
CM	Common gull
CS	Common sandpiper
CU	Curlew
D.	Dunnock
DN	Dunlin
E.	Eider
F.	Fulmar
GB	Great black-backed gull
GC	Goldcrest
GD	Goosander
GJ	Greylag goose
GO	Goldfinch
GR	Greenfinch
GT	Great tit
GU	Guillemot
GX	Gannet
H.	Grey heron
HG	Herring gull
HS	House sparrow
JD	Jackdaw
KI	Kittiwake
L.	Lapwing
LB	Lesser black-backed gull
LI	Linnet
LR	Lesser redpoll
MA	Mallard
MP	Meadow Pipit
MS	Mute swan
OC	Oystercatcher

Code	Explanation
PS	Purple sandpiper
PW	Pied wagtail
R.	Robin
RA	Razorbill
RB	Reed bunting
RC	Rock pipit
RE	Redwing
RK	Redshank
RM	Red-breasted merganser
RN	Raven
RO	Rook
RP	Ringed plover
SA	Shag
SG	Starling
SH	Sparrowhawk
SI	Swift
SK	Siskin
SL	Swallow
SM	Sand martin
ST	Song Thrush
SU	Shelduck
T.	Teal
TE	Sandwich tern
TT	Turnstone
TY	Black guillemot
WH	Whitethroat
WN	Wigeon
WP	Woodpigeon
WR	Wren
WW	Willow warbler
Mammal species	
POR	Harbour Porpoise
CSE	Common Seal
GSE	Grey Seal
OTT	Otter
Human disturbance activities	
KAYK	Kayak or canoe
SURV	Survey vessel
SYAC	Small (<15 m) sailing yacht
WORK	Work boat
ZODI	Zodiac/inflatable boat
DOGW	DOG Walker

Code	Explanation
MANR	huMAN Recreating
ANGL	shore ANGLer
MANB	huMAN Beach recreational
SCBA	SCuBA diver
KIDS	School KIDS
Bird plumage/age	
A	Adult
I	Immature
J	Juvenile
U	Unaged (or unrecorded)
F	Female plumage (e.g. for ducks)
T	Transition (summer to winter, or W to S)
C	Chick (dependent, e.g. eider broods)
Bird behaviour	
AL	alarming
AON	on apparently occupied nest
AOT	apparently occupied territory
AS	active searching (for food)
BR	breeding
CD	courtship/display
CF	carrying fish
DF	dip-feeding (e.g. terns, gulls)
DV	diving from surface (e.g. auks)
FE	feeding (method not noted)
FL	feed on land
FW	feed on water
FY	flying
NE	nesting / attending nest
OL	on land
OW	on water
PD	plunge diving (e.g. terns)
PR	preening/bathing
RL	roosting/resting on land
RS	roosting/resting on sea
SG	singing
Mammal behaviour	
BOT	bottling
FS	fast swim
HO	hauled out (e.g. seals)
LG	logging
NS	normal swim
SS	slow swim

## Appendix 2. Monthly visit summaries

**Table A2.1. Summary of counts of Millport Bay for 30 April 2018**

Group	Species	Mid/Low tide count 10:00-11:00	High tide count 13:30-15:05
Waterbirds	Gannet	0	8
	Shag	7	9
	Grey heron	1	0
	Mute swan	0	1
	Shelduck	3	0
	Mallard	5	2
	Eider	4	11
	Oystercatcher	24	27
	Purple sandpiper	8	0
	Common sandpiper	0	1
	Turnstone	4	5
	Common gull	0	5
	Herring gull	8	45
	Great black-backed gull	1	2
	Sandwich tern	3	2
	Guillemot	0	2
Razorbill	0	4	
Mammals	Common Seal	17	18
	Grey Seal	4	0
	Otter	0	0

**Table A2.2. Summary of counts of Millport Bay for 17 May 2018**

Group	Species	High tide count 12:30-13:40	Mid/Low tide count 17:40-18:55
Waterbirds	Gannet	2	2
	Cormorant	1	1
	Shag	13	25
	Grey heron	0	1
	Greylag goose	0	110
	Mallard	3	2
	Eider	10	8
	Oystercatcher	26	23
	Redshank	1	0
	Turnstone	0	1
	Black-headed gull	2	3
	Common gull	0	6
	Lesser black-backed gull	0	1
	Herring gull	9	43
	Great black-backed gull	1	0
	Sandwich tern	1	0
	Guillemot	1	1
Black guillemot	1	1	
Mammals	Common Seal	8	12
	Grey Seal	0	3
	Otter	0	1

**Table A2.3. Summary of counts of Millport Bay for 11 Jun 2018**

Group	Species	Mid/Low tide count 08:40-09:40	High tide count 12:00-12:50
Waterbirds	Gannet	1	1
	Cormorant	4	0
	Shag	11	6
	Mallard	5	1
	Eider	7	4
	Oystercatcher	35	26
	Ringed plover	0	2
	Lapwing	2	2
	Turnstone	0	1
	Black-headed gull	2	1
	Common gull	2	2
	Lesser black-backed gull	1	0
	Herring gull	68	72
	Great black-backed gull	2	1
Mammals	Common Seal	4	0
	Grey Seal	1	0
	Harbour porpoise	0	1
	Otter	0	0

**Table A2.4. Summary of counts of Millport Bay for 2 July 2018**

Group	Species	Low tide count 09:30-10:45	Mid/High tide count 13:45-14:20
Waterbirds	Cormorant	1	1
	Shag	6	12
	Grey heron	0	1
	Mallard	1	0
	Eider	9	10
	Red-breasted merganser	0	1
	Oystercatcher	17	22
	Redshank	0	2
	Black-headed gull	2	2
	Common gull	9	5
	Herring gull	20	22
	Great black-backed gull	3	2
Mammals	Common Seal	13	14
	Grey Seal	0	0
	Otter	0	0

Table A2.5. Summary of counts of Millport Bay for 20 August 2018

Group	Species	High tide count	Low tide count
		07:30-09:26	13:00-14:06
Waterbirds	Cormorant	5	3
	Shag	35	11
	Grey heron	2	2
	Mute swan	1	2
	Eider	2	3
	Oystercatcher	32	18
	Turnstone	4	0
	Black-headed gull	8	7
	Common gull	52	13
	Herring gull	32	28
	Great black-backed gull	6	7
Mammals	Common Seal	0	0
	Grey Seal	0	0
	Otter	0	0

Table A2.6. Summary of counts of Millport Bay for 20 September 2018

Group	Species	High tide count	Low tide count
		08:45-10:45	14:40-16:36
Waterbirds	Gannet	1	0
	Cormorant	3	5
	Shag	38	39
	Grey heron	1	1
	Mute swan	2	2
	Greylag goose	1	0
	Oystercatcher	39	40
	Bar-tailed godwit	0	1
	Curlew	2	0
	Redshank	1	0
	Turnstone	54	11
	Black-headed gull	26	7
	Common gull	37	70
	Herring gull	141	99
	Great black-backed gull	10	6
	Sandwich tern	19	0
Mammals	Common Seal	1	11
	Grey Seal	0	0
	Otter	0	0

**Table A2.7. Summary of counts of Millport Bay for 18 and 19 October 2018**

Group	Species	Low tide count	High tide count
		18/10/2018 14:06-15:17	19/10/2018 08:40-09:40
Waterbirds	Cormorant	34	0
	Shag	28	22
	Grey heron	3	6
	Mute swan	1	1
	Greylag goose	2	0
	Teal	4	0
	Mallard	5	6
	Red-breasted merganser	1	0
	Oystercatcher	39	111
	Purple sandpiper	1	1
	Dunlin	0	21
	Curlew	2	221
	Redshank	3	5
	Turnstone	9	50
	Black-headed gull	1	2
	Common gull	21	0
	Herring gull	13	15
Great black-backed gull	4	4	
Mammals	Common Seal	21	0
	Grey Seal	0	0
	Otter	0	0

**Table A2.8. Summary of counts of Millport Bay for 12 November 2018**

Group	Species	Low tide count	High tide count
		08:00-09:25	13:50-15:00
Waterbirds	Cormorant	0	0
	Shag	2	20
	Grey heron	1	3
	Greylag goose	2	0
	Wigeon	25	25
	Goosander	0	1
	Oystercatcher	25	76
	Curlew	89	232
	Redshank	1	0
	Black-headed gull	3	9
	Common gull	14	0
	Lesser black-backed gull	1	0
	Herring gull	9	7
Great black-backed gull	5	1	
Mammals	Common Seal	1	1
	Grey Seal	0	0
	Otter	0	0

**Table A2.9. Summary of counts of Millport Bay for 17 December 2018**

Group	Species	High tide count	Low tide count
		08:45-09:50	12:05-13:25
Waterbirds	Cormorant	1	1
	Shag	3	9
	Grey heron	15	4
	Wigeon	28	17
	Goosander	1	1
	Oystercatcher	87	35
	Bar-tailed godwit	0	1
	Curlew	97	231
	Black-headed gull	2	9
	Common gull	4	5
	Herring gull	4	9
	Great black-backed gull	5	3
	Mammals	Common Seal	18
Grey Seal		0	0
Otter		0	0

**Table A2.10. Summary of counts of Millport Bay for 24 January 2019**

Group	Species	Low tide count	High tide count
		08:25-09:37	13:30-14:20
Waterbirds	Cormorant	2	1
	Shag	16	17
	Grey heron	2	4
	Wigeon	22	17
	Mallard	11	12
	Eider	0	3
	Goosander	3	0
	Oystercatcher	11	64
	Bar-tailed godwit	3	0
	Curlew	218	146
	Redshank	1	0
	Turnstone	0	2
	Black-headed gull	2	0
	Common gull	2	4
	Herring gull	47	14
	Great black-backed gull	12	2
Mammals	Common Seal	9	6
	Grey Seal	0	0
	Otter	1	0

**Table A2.11. Summary of counts of Millport Bay for 20 February 2019**

Group	Species	Low tide count 07:35-08:50	High tide count 12:10-13:15
Waterbirds	Shag	12	2
	Grey heron	1	2
	Wigeon	27	20
	Mallard	5	0
	Oystercatcher	57	81
	Curlew	0	22
	Turnstone	15	2
	Herring gull	44	55
	Great black-backed gull	4	3
Mammals	Common Seal	9	9
	Grey Seal	0	0
	Otter	0	0

**Table A2.12. Summary of counts of Millport Bay for 28 March 2019**

Group	Species	Low tide count 10:30-11:25	High tide count 16:30-17:45
Waterbirds	Cormorant	1	0
	Shag	2	7
	Mute swan	1	0
	Wigeon	11	6
	Mallard	0	1
	Eider	2	0
	Oystercatcher	37	13
	Curlew	19	0
	Turnstone	3	0
	Black-headed gull	2	0
	Common gull	11	1
	Herring gull	33	53
	Great black-backed gull	4	7
	Mammals	Common Seal	40
Grey Seal		6	5
Otter		0	0

### Appendix 3. Roseate Tern

The Eileans have a significant site in the history of Scottish Ornithology. It was here on the 24 June 1812 that the roseate tern was first noted as a species anywhere in the world. At least four individuals were shot and one of these became the holotype specimen for the species first described by Montague in 1813. This type specimen is held by the British Museum of Natural History.

Birds of Scotland summaries the historical information on the distribution of this species in Scotland. There are breeding records from four islands in the Firth of Clyde (including The Eileans

Extract from J.A. Gibson 1982, 'Birdwatching on the Clyde islands'. Indicates that in the early 1980s there were no birds nesting on The Eileans. This statement suggests that at that time there were no gulls, eider or oystercatcher nesting on The Eileans (note it would be easy to detect these species nesting without accessing the islands by boat due to their relatively close proximity to Millport).

## Figures

**Figure 1. Millport Bay survey area and vantage points**

**Figure 2. Location of gull species nests/territories in Millport Bay**

**Figure 3. The location of oystercatcher and eider nests /territories in Millport Bay**

**Figure 4. The location of passerine breeding territories on The Eileans**

**Figure 5. Records of foraging and roosting herring gulls, all months**

**Figure 6. Records of foraging and roosting great black-backed gull, all months**

**Figure 7. Records of foraging and roosting oystercatcher, all months**

**Figure 8. Records of foraging and roosting curlew, all months**

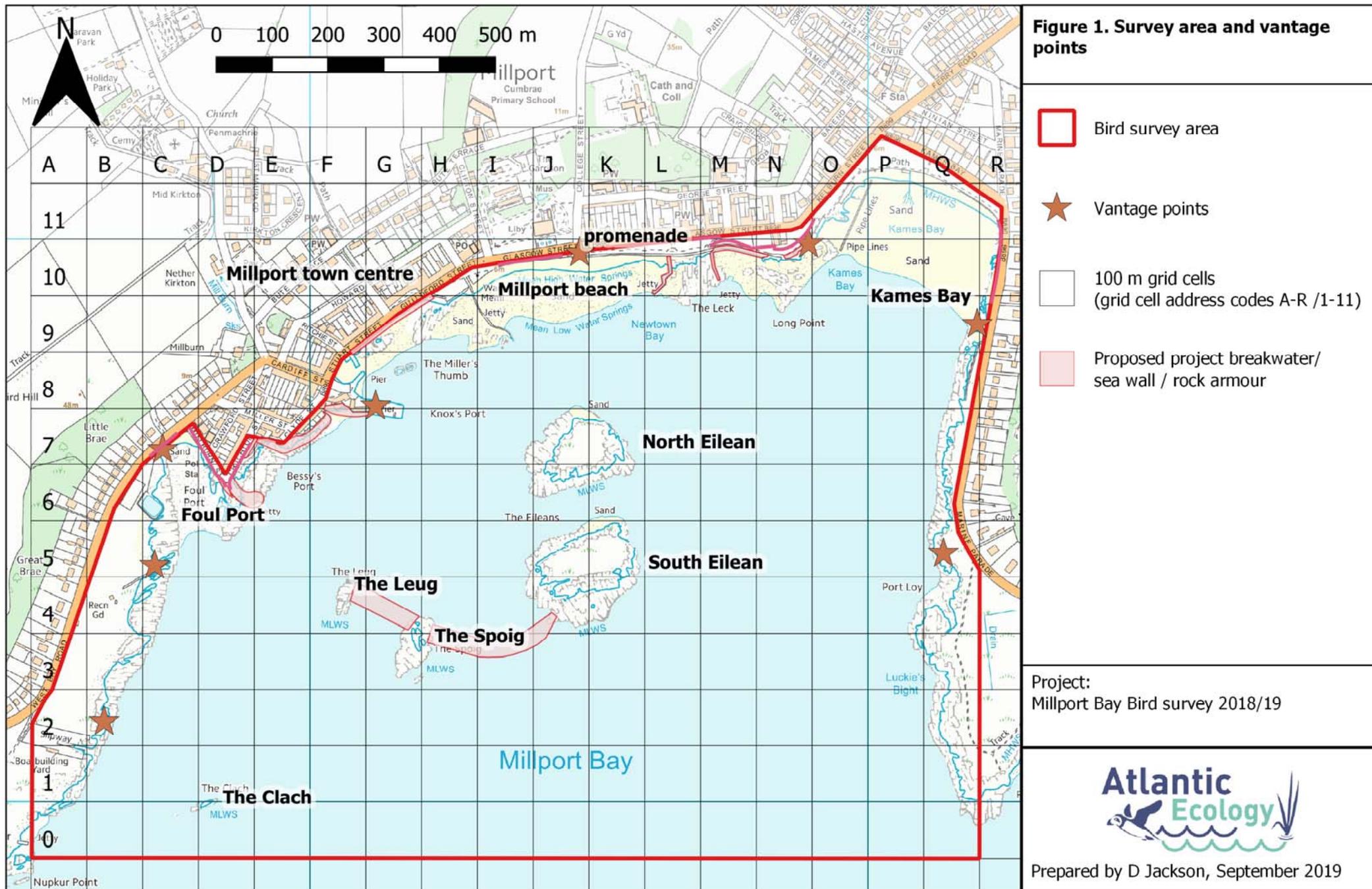
**Figure 9. Records of turnstone and purple sandpiper, all months**

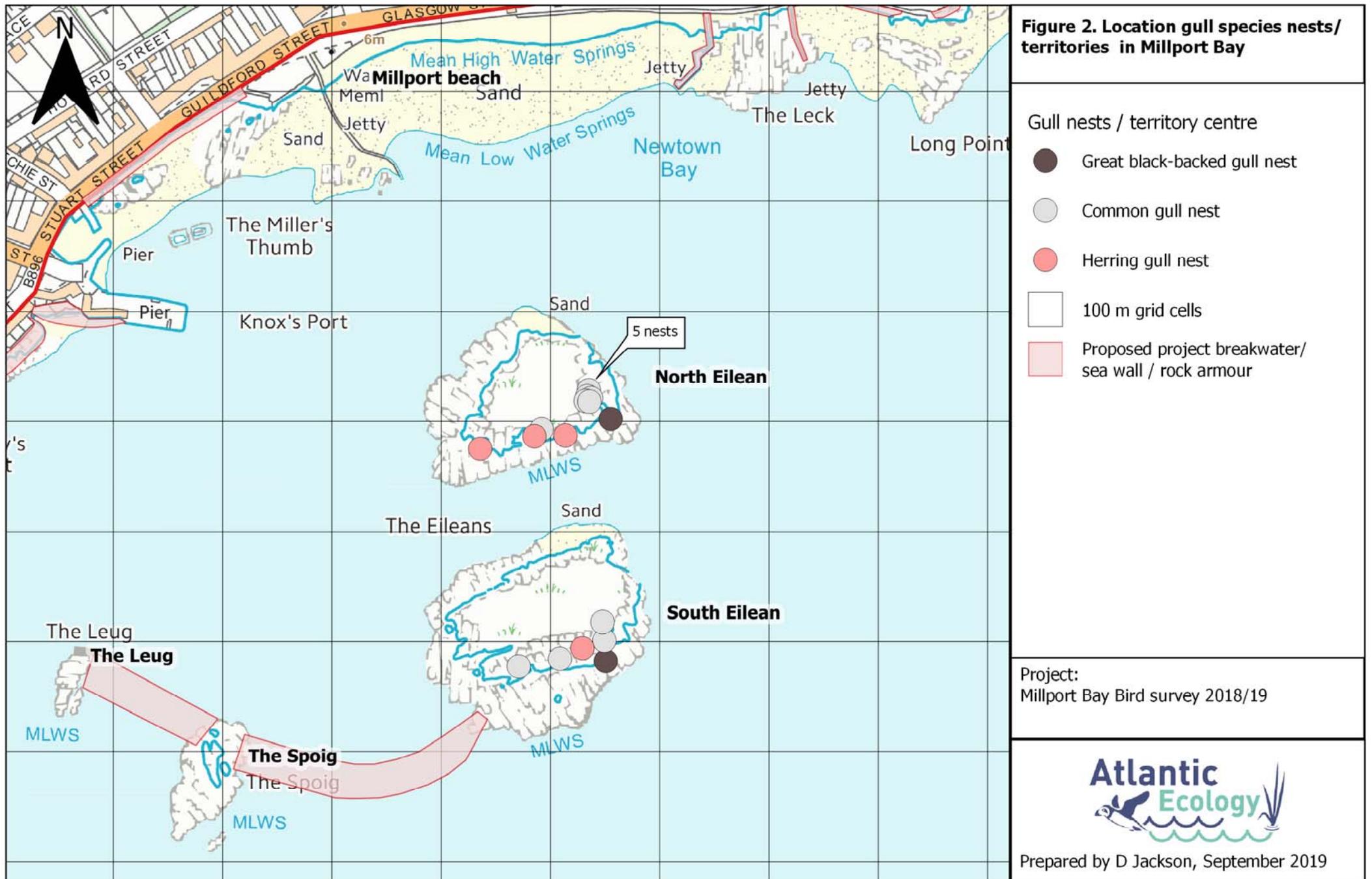
**Figure 10. Records of common eider and Eurasian wigeon, all months**

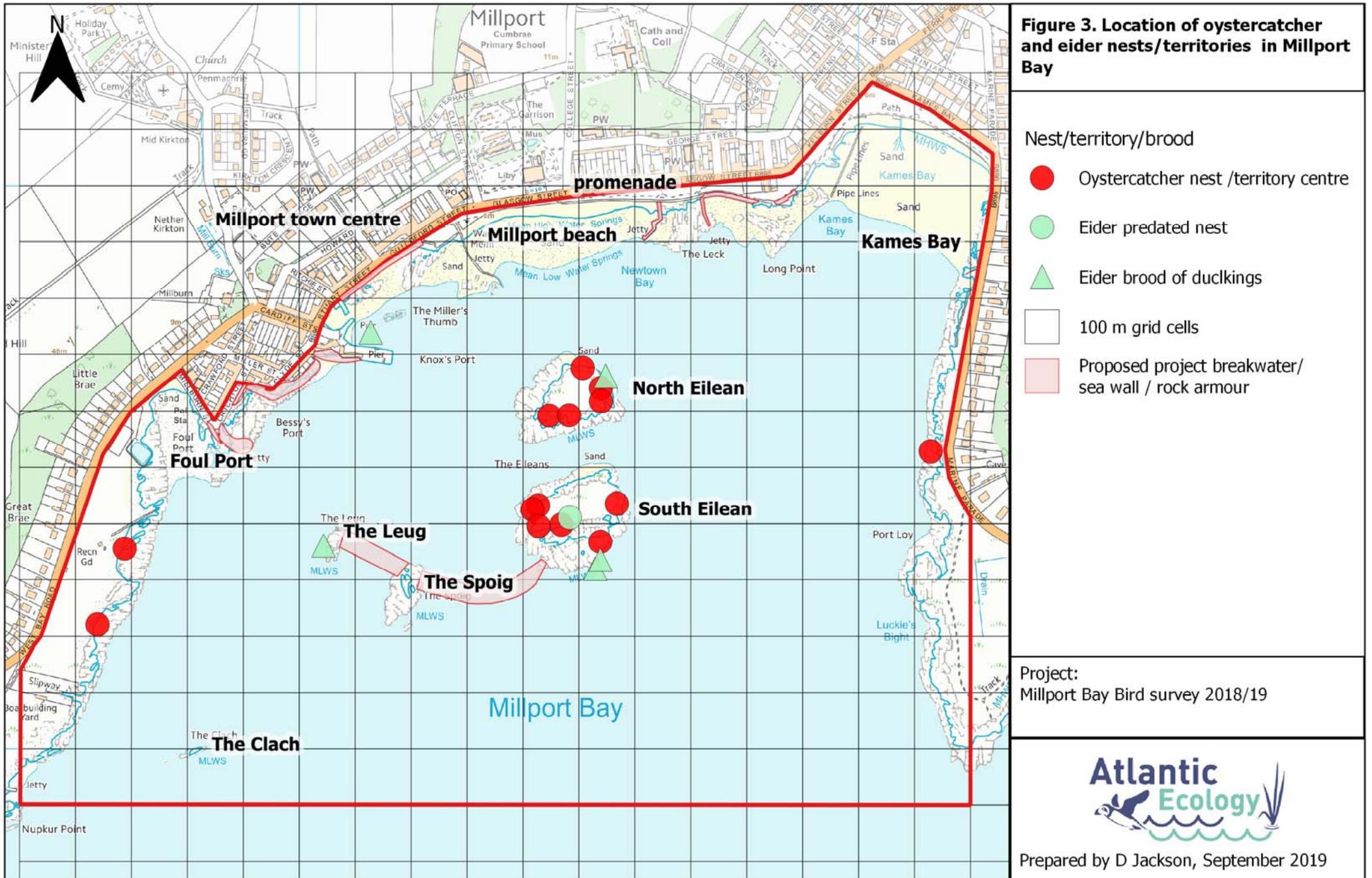
**Figure 11. Records of foraging and roosting European shag, all months**

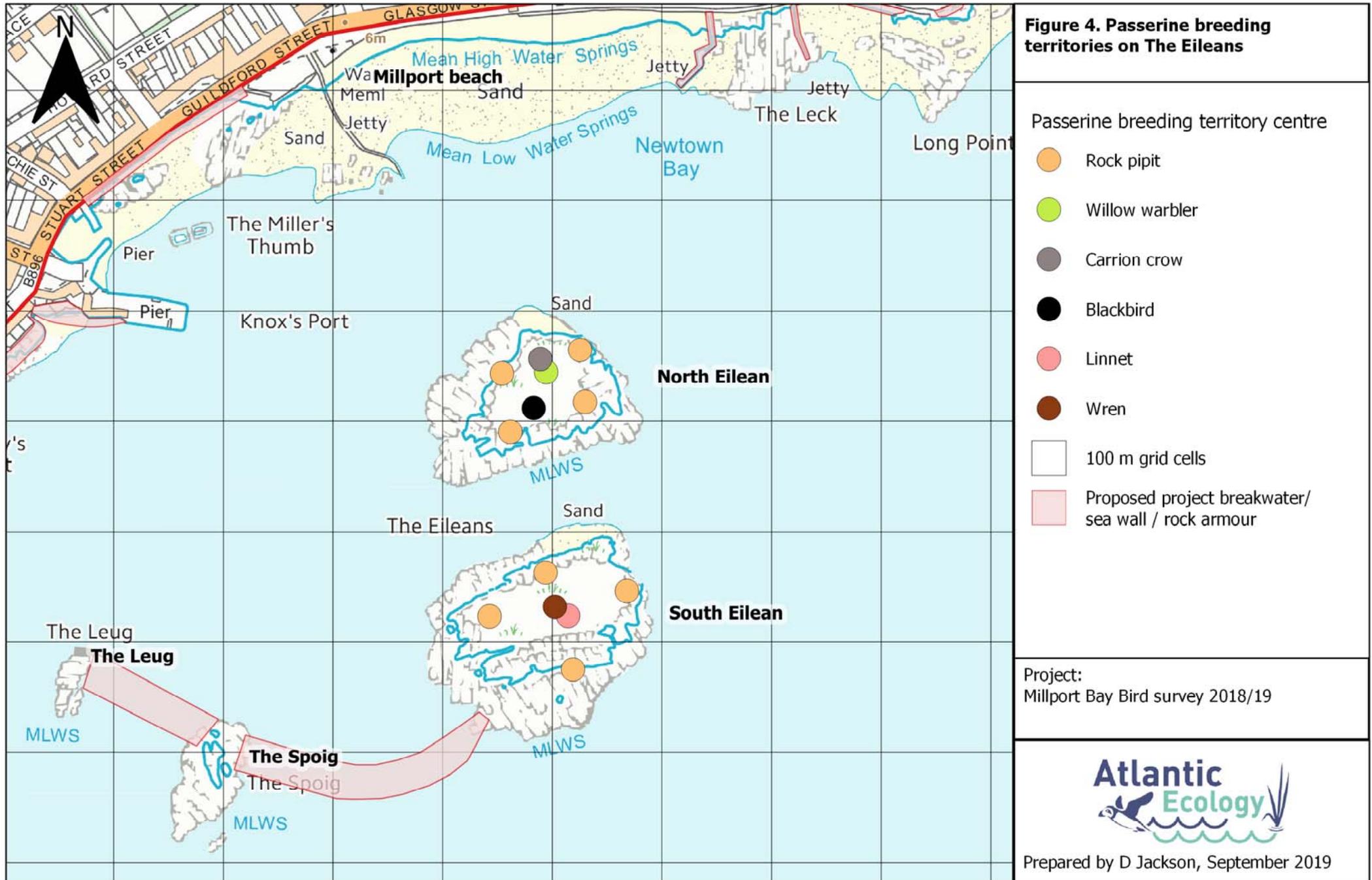
**Figure 12. Records of foraging and roosting great cormorant, all months**

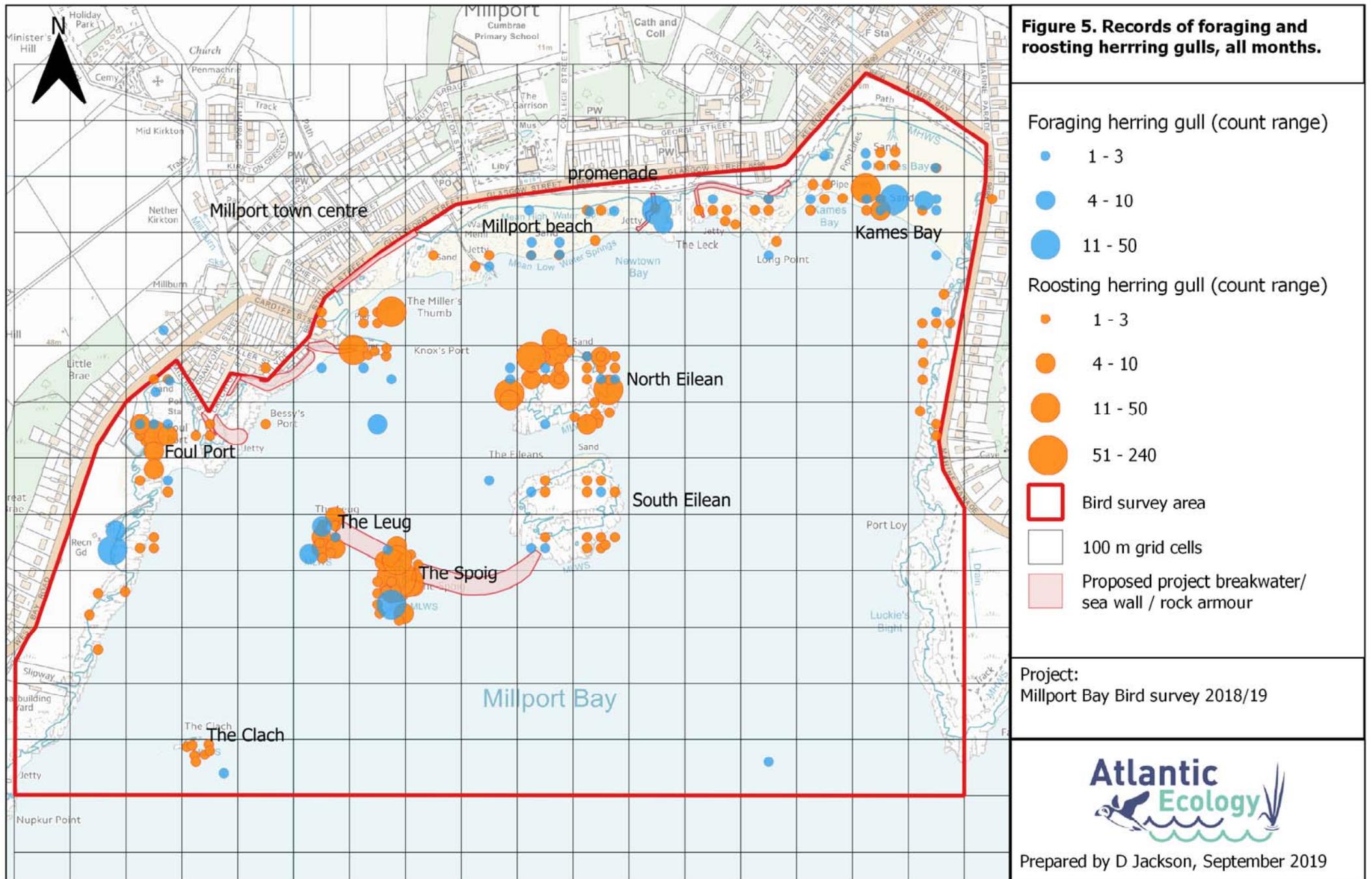
**Figure 13. Records of common seal and grey seal, all months**

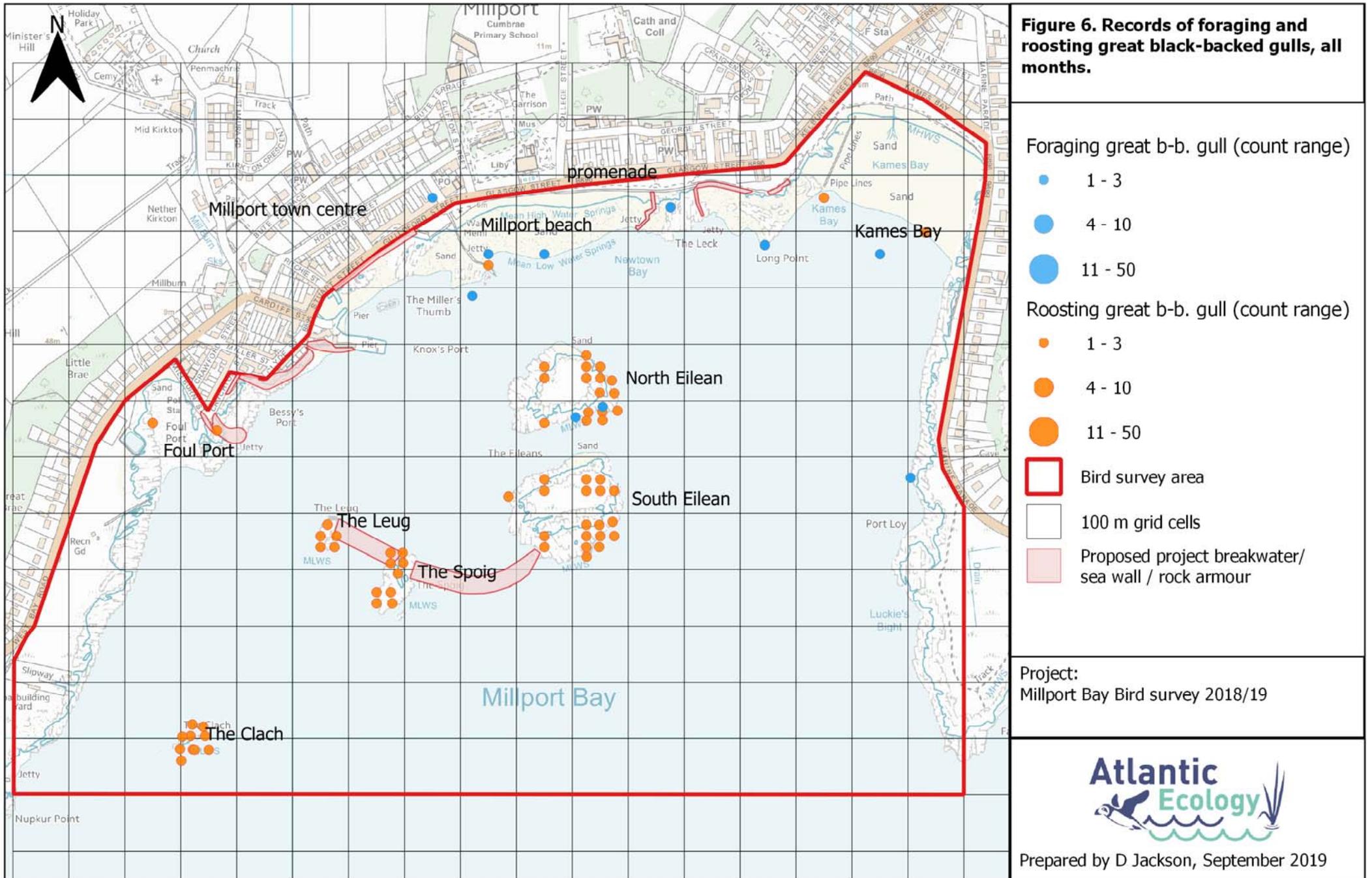


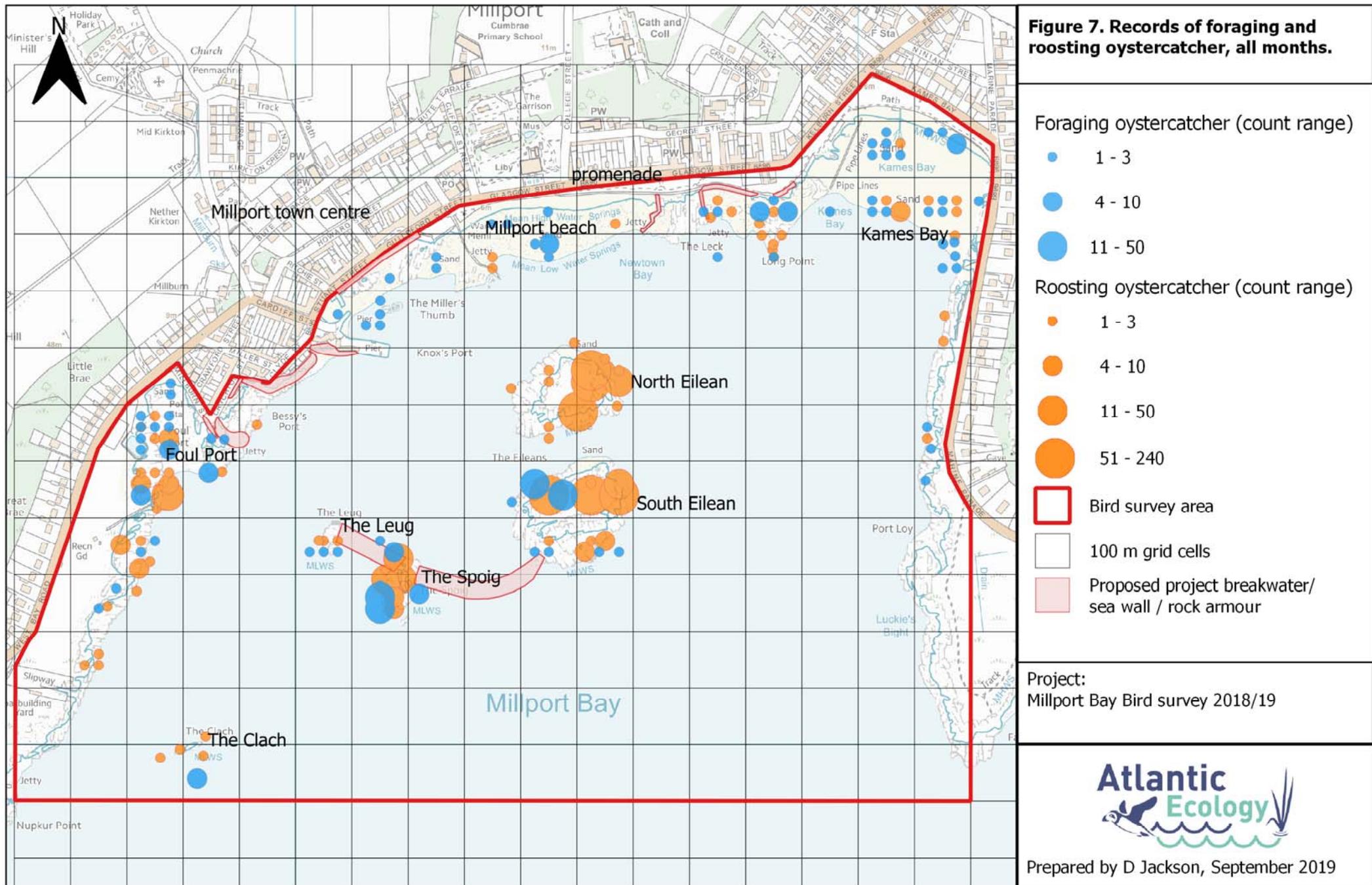


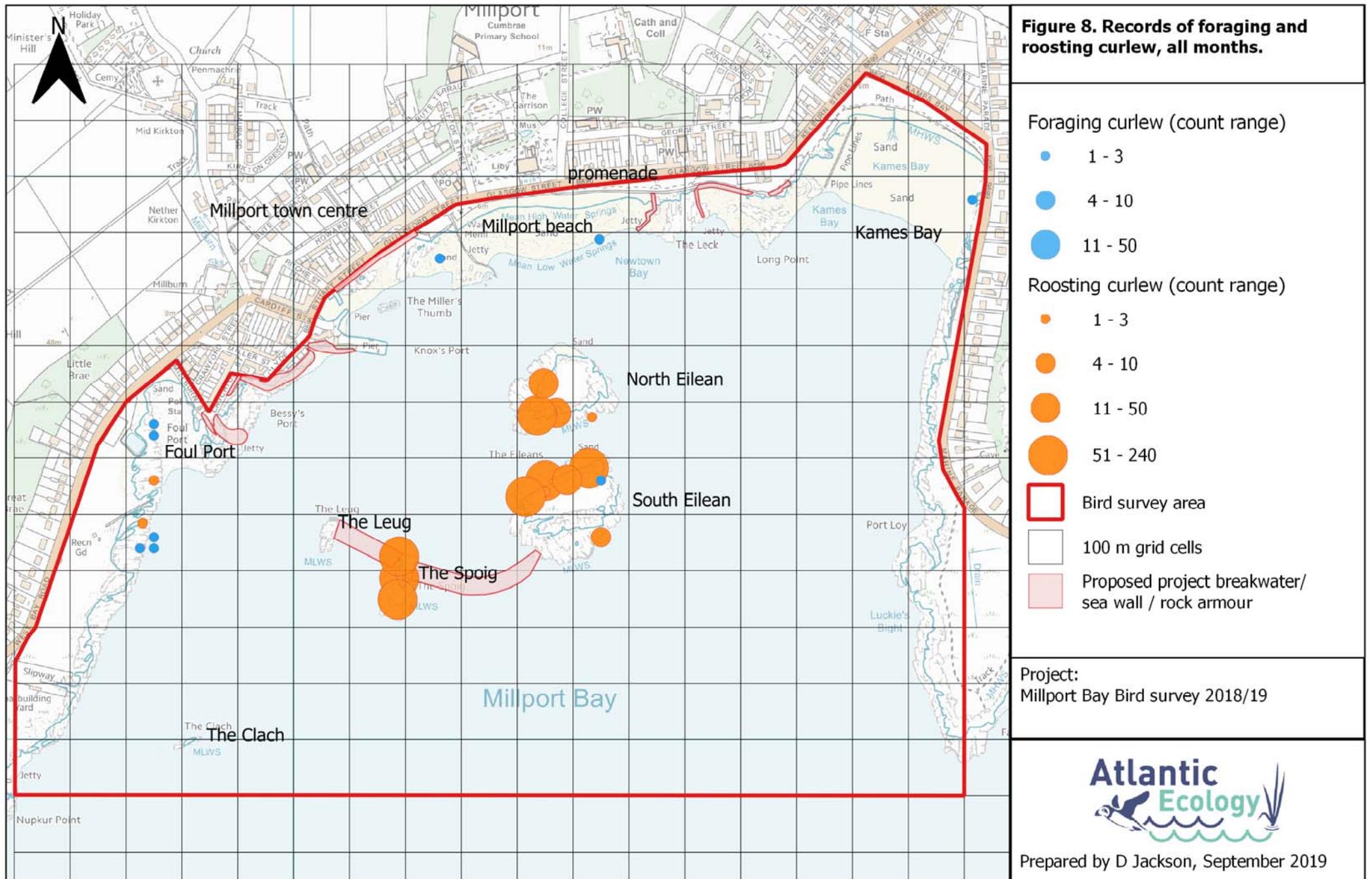


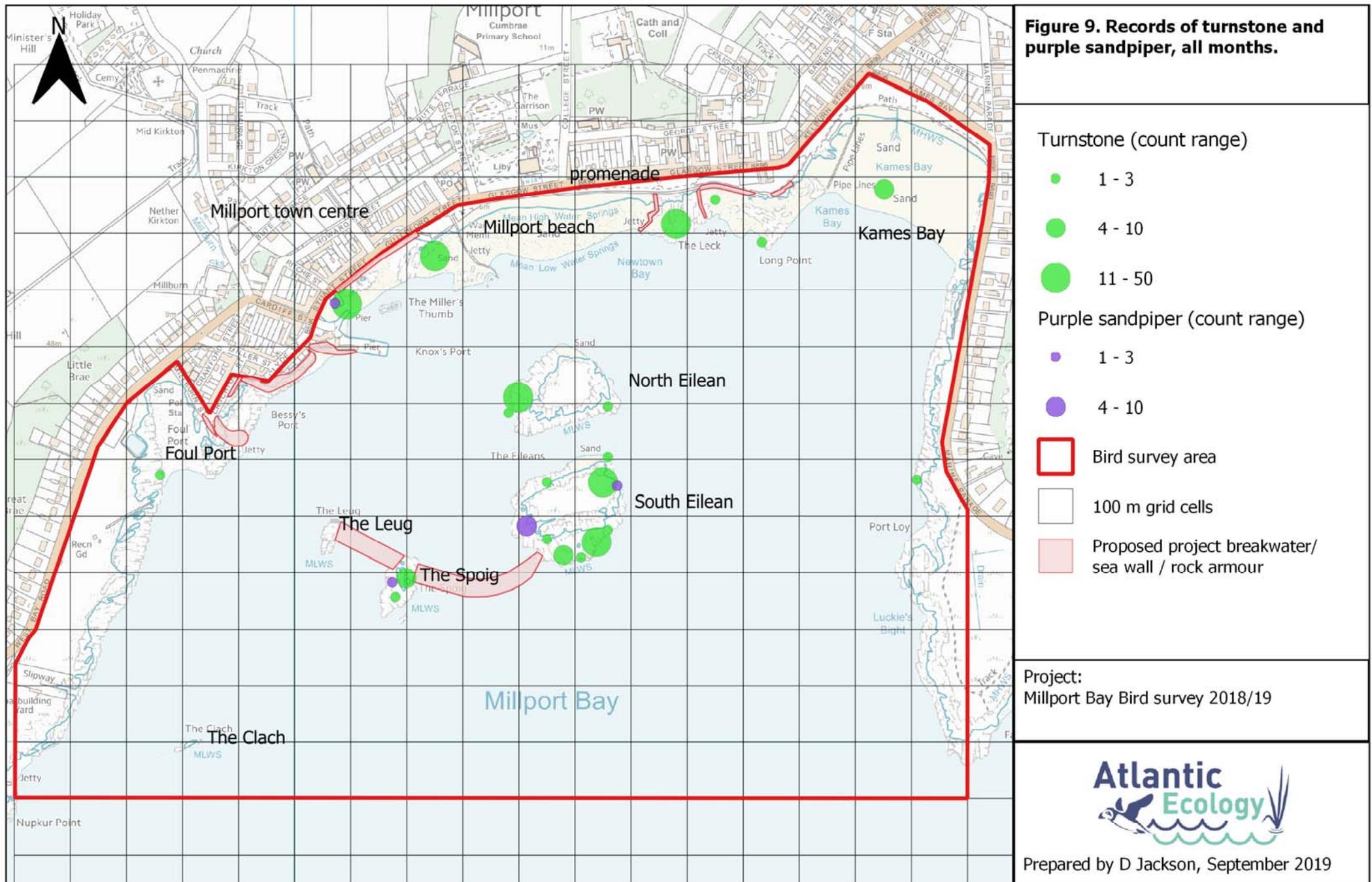


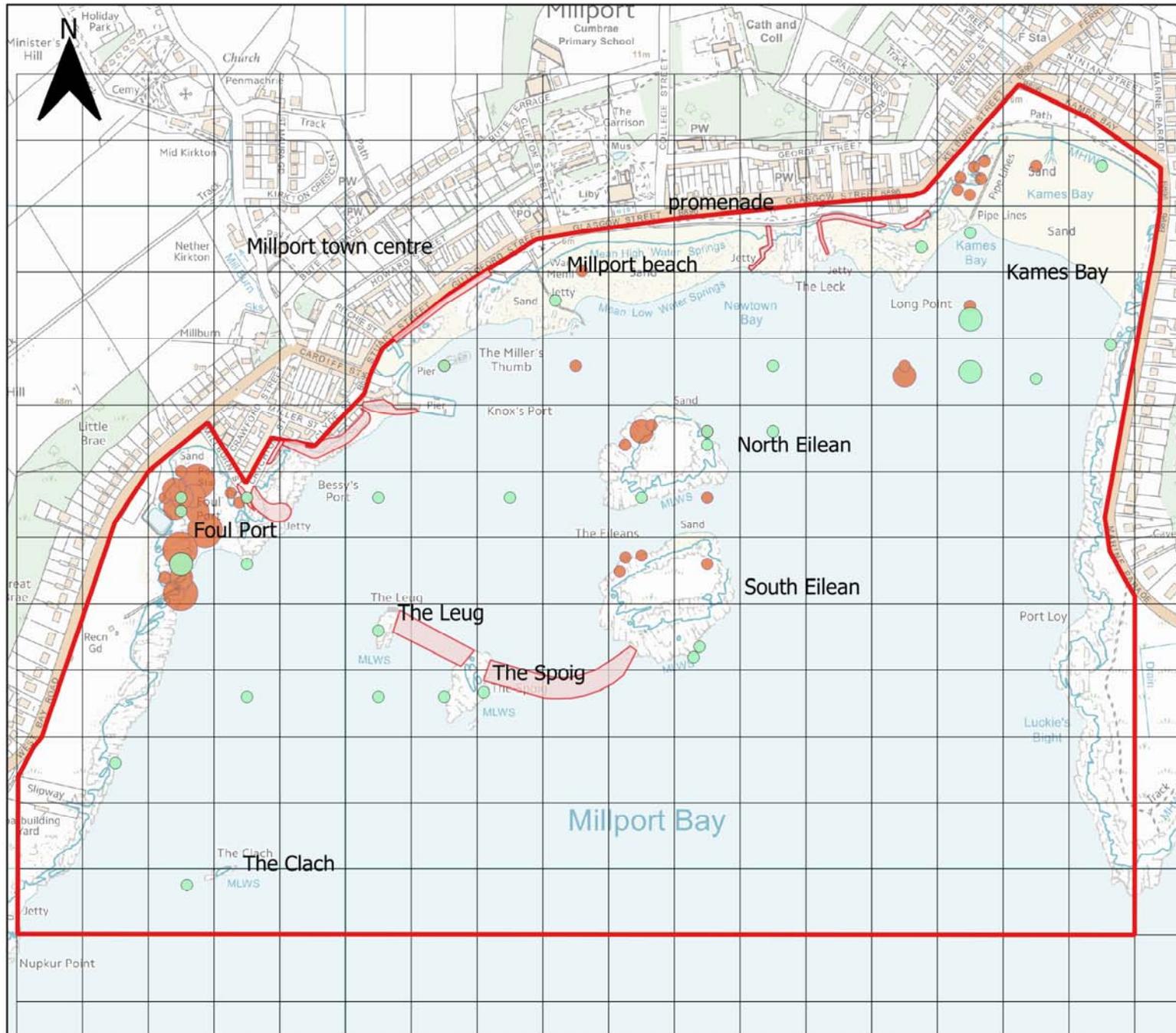












**Figure 10. Records of eider and wigeon, all months.**

**Eider (count range)**

- 1 - 3
- 4 - 10

**Wigeon (count range)**

- 1 - 3
- 4 - 10
- 11 - 50

Bird survey area

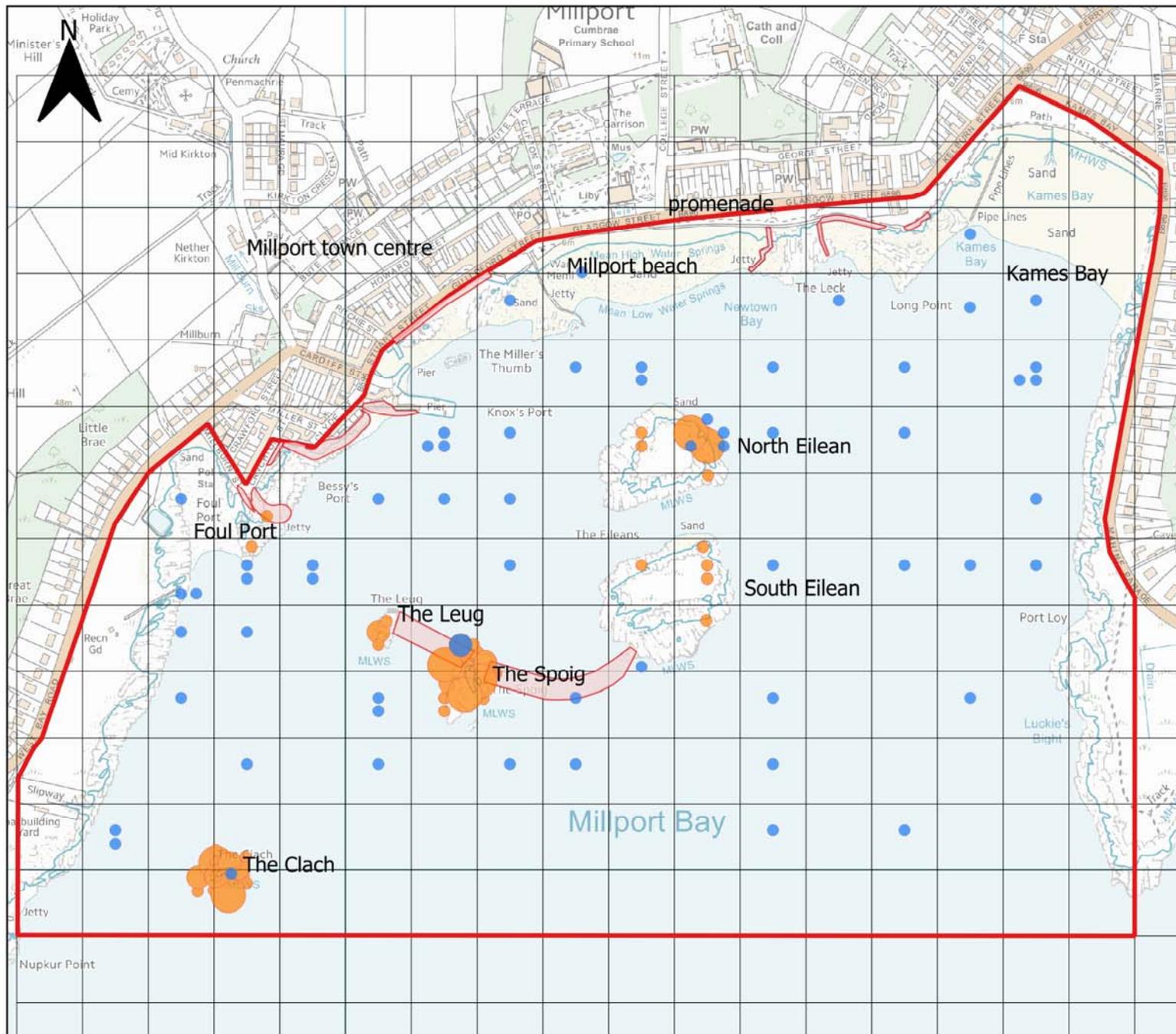
100 m grid cells

Proposed project breakwater/ sea wall / rock armour

Project:  
Millport Bay Bird survey 2018/19



Prepared by D Jackson, September 2019



**Figure 11. Records of foraging and roosting European shag, all months.**

**Foraging shag (count range)**

- 1 - 3
- 4 - 10

**Roosting shag (count range)**

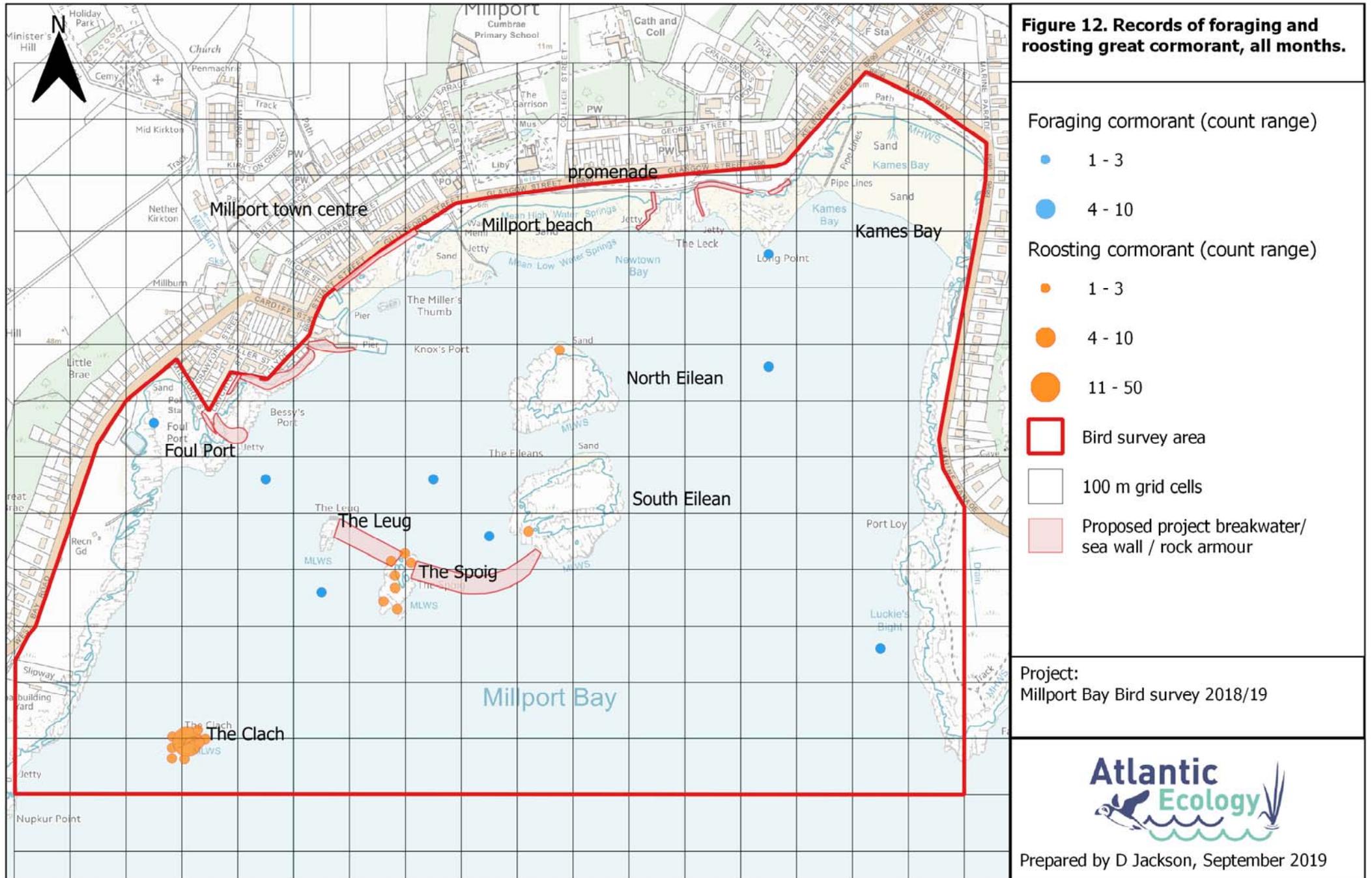
- 1 - 3
- 4 - 10
- 11 - 50

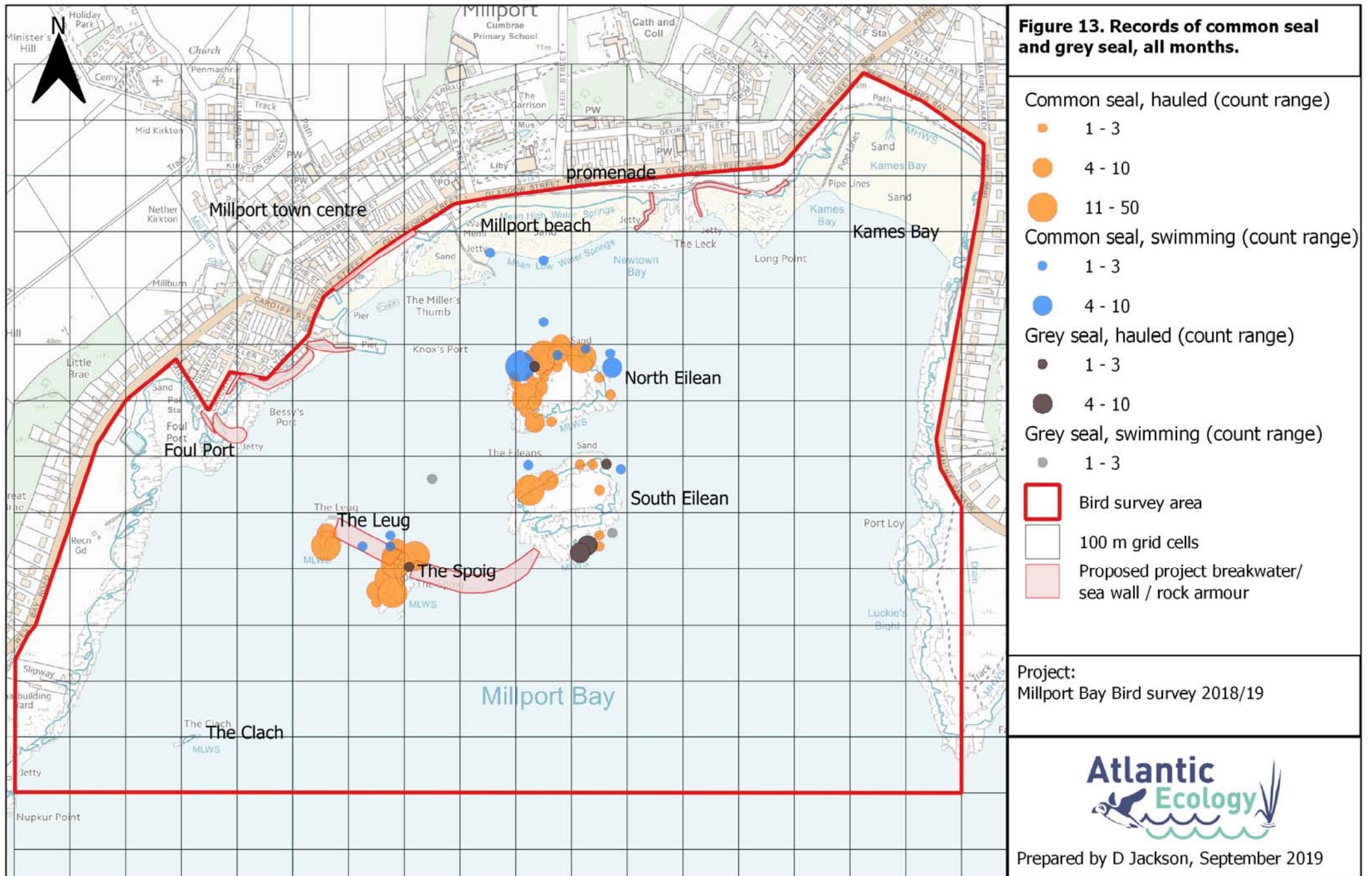
- Bird survey area
- 100 m grid cells
- Proposed project breakwater/ sea wall / rock armour

Project:  
Millport Bay Bird survey 2018/19



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## Photographs



Photo 12. Millport Bay looking SE from the west shore near Foul Port



Photo 13. Millport Bay looking SW from The Eileans (north island)



Photo 14. The Eileans (north island) taken from The Spoig looking NE

Photo 15. Pond, bare rock, rank grass and shrub habitats on The Eileans (north island)





Photo 16. Foul Port, showing extensive areas of intertidal seaweed beds and rocky shore habitats



Photo 17. Common and grey seals hauled out on The Eileans (north island)



**Photo 18. Gull species and oystercatchers on The Spoig**



**Photo 20. Otter foraging on The Eileans (north Eilean)**



Photo 21. Kayakers paddling between The Eileans



Photo 22. Recreational human disturbance on Millport beach. Note the seaweed wrack strewn over the beach, potential foraging habitat for gulls and shorebirds.