Tramore Back Strand
Special Protection Area

(Site Code 4027)

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Conservation Objectives
Supporting Document

VERSION 1

National Parks & Wildlife Service

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SUMMARY

This document presents conservation objectives for the non-breeding Special Conservation Interests of Tramore Back Strand Special Protection Area, designated under Directive 2009/147/EC on the conservation of wild birds (Birds Directive).

Part One presents an introduction to the Special Protection Area (SPA) designation process and to the site designated as Tramore Back Strand Special Protection Area, as well as introducing the concept of conservation objectives and their formulation.

Part Two provides site designation information for Tramore Back Strand SPA and Part Three presents the conservation objectives for this site.

Part Four reviews the conservation condition of the site Special Conservation Interest (SCI) species based on an analysis of wintering (non-breeding) population trends. Importantly, this section states the current conservation condition of each of the SCI species and examines these site trends in light of all-Ireland and international status and trends.

Part Five provides supporting information that will assist the interpretation of the site-specific conservation objectives. This section includes a review of the ecological characteristics of the SCI species and examines waterbird distribution recorded during the 2010/11 and 2011/12 Waterbird Survey Programme, drawing also on data from NPWS monitoring programmes (e.g. benthic surveys) and the Irish Wetland Bird Survey (I-WeBS). Part Five concludes with information on activities and events that occur in and around Tramore Back Strand which may interact with waterbirds during the non-breeding season and includes an assessment of activities that were recorded to cause disturbance to non-breeding waterbirds during the Waterbird Survey Programme.

PART ONE - INTRODUCTION

1.1 Introduction to the designation of Special Protection Areas

The over-arching framework for the conservation of wild birds within Ireland and across Europe is provided by Directive 2009/147/EC on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended) (Birds Directive). Together with the EU Habitats Directive (Council Directive 92/43/EEC), these legislative measures provide for wild bird protection via a network of protected sites across Europe known as Natura 2000 sites, of which the overriding conservation objective is the maintenance (or restoration) of 'favourable conservation status' of habitats and species.

Under Article 4 of Directive 2009/147/EC, Ireland, along with other Member States, is required to classify the most suitable territories in number and size as Special Protection Areas (SPAs) for the conservation of certain wild bird species, which are:

- species listed in Annex I of the directive
- regularly occurring migratory species

Also under Article 4, Member States are required to pay particular attention to the protection of wetlands, especially those of international importance.

The National Parks & Wildlife Service (NPWS), part of the Department of the Arts, Heritage and the Gaeltacht, is responsible for the selection and designation of SPAs in Ireland. NPWS has developed a set of criteria, incorporating information relating to the selection of wetland sites developed under the Ramsar Convention, which are used to identify and designate SPAs. Sites that meet any of the following criteria may be selected as SPAs:

- A site regularly supporting 20,000 waterbirds or 10,000 pairs of seabirds;
- A site regularly supporting 1% or more of the all-Ireland population of an Annex I species;
- A site regularly supporting 1% or more of the biogeographical population of a migratory species;
- A site that is one of the 'n' most suitable sites in Ireland for an Annex I species or a migratory species (where 'n' is a variable which is related to the proportion of the total biogeographic population of a species held by Ireland).

The biogeographic population estimates and the recommended 1% thresholds for wildfowl and waders are taken from Wetlands International (Wetlands International, 2002); thresholds reflecting the baseline data period used. The all-Ireland populations for the majority of wintering waterbirds are taken from Crowe et al. (2008).

Site specific information relevant to the selection and designation of a SPA is collated from a range of sources including the Irish Wetland Bird Survey (I-WeBS), The Wetland Bird Survey (WeBS) in Northern Ireland, species specific reports and a wide range of scientific publications, reports and other surveys. If, following collation of all the available scientific data, a site meets the relevant criteria for designation and is selected as an SPA, a list of species for which the site is nationally and internationally important is compiled. These species are known as **Special Conservation Interests** and may be one of the following:

- An Annex I species that occurs at the site in numbers that exceed the all-Ireland 1% population threshold;
- A migratory species that occurs at the site in numbers that exceed the biogeographic 1% population threshold (referred to as a species that occurs in numbers of 'international importance');
- A migratory species that occurs at the site in numbers that exceed the all-Ireland 1% threshold (referred to as a species that occurs in numbers of 'all-Ireland importance');

- A species for which the site is considered to be one of the *'n'* most suitable sites in Ireland for the conservation of that species (where *n* is a variable that is related to the proportion of the total biogeographic population held by Ireland).

The wetlands of northwest Europe are a vital resource for millions of northern and boreal nesting waterbird species that overwinter on these wetlands or visit them when migrating further south. To acknowledge the importance of Ireland's wetlands to wintering waterbirds the term Wetland & Waterbirds can be included as a Special Conservation Interest for a Special Protection Area that has been designated for wintering waterbirds, and is or contains a wetland site of significant importance to one or more of the species of Special Conservation Interest.

1.2 Introduction to Tramore Back Strand Special Protection Area

Tramore Back Strand Special Protection Area comprises the innermost part of Tramore Bay that lies to the east of Tramore in County Waterford. The inner bay, known as Tramore Back Strand, lies behind an extensive dune system (Burrow); these dunes formed as a result of a classic inshore process - the growth of a spit of shingle and sand across a shallow bay. The Back Strand, which dries out at low tide, is connected to the open sea by only a narrows at Rinneshark and is therefore well sheltered by the dune system.

The Back Strand is subdivided into an inner and outer part by the Malcolmson embankments; 19th century embankments built for the purpose of embanking and reclaiming land from the sea. Although partially reclaimed, the embankment was breached following storms in 1911 and the inner area was once more subject to twice-daily tides. The breach remains at about 100 metres wide (McGrath, 2001).

The Back Strand has limited freshwater input from three small rivers. The Keiloge flows into Clohernagh Inlet, the Glendudda into Kilmacleague and a small unnamed stream enters at the north-western corner at Ballinattin.

Intertidal mud and sand flats dominate the site. Four benthic community types are described namely 'intertidal fine sand with *Bathyporeia pilosa* and *Nephtys cirrosa* community; intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii* community complex; *Zostera*-dominated community and *Mytilus edulis*-dominated community' (NPWS, 2013). Saltmarsh is well developed and fairly extensive in the sheltered inner part of the site and large areas have been colonised by Common Cord-grass (*Spartina anglica*).

The site is very important for wintering waterbirds and provides excellent feeding grounds as well as sheltered and secure high-tide roosts. The Site Synopsis for Tramore Back Strand SPA and a map showing the SPA boundary are given in Appendix 1.

1.3 Introduction to Conservation Objectives

The overriding objective of the Habitats Directive is to ensure that the habitats and species covered achieve '*favourable conservation status'* and that their long-term survival is secured across their entire natural range within the EU (EU Commission, 2010). In its broadest sense, favourable conservation status means that an ecological feature is being maintained in a satisfactory condition, and that this status is likely to continue into the future. Definitions as per the EU Habitats Directive are given in Box 1.

Box 1

Favourable Conservation Status as defined by Articles 1 (e) and 1(i) of the Habitats Directive

The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- *its natural range and areas it covers within that range are stable or increasing; and*
- *the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and*
- *the conservation status of its typical species is favourable'.*

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- *the population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations*

Site-specific conservation objectives define the desired condition or range of conditions that a habitat or species should be in, in order for these selected features within the site to be judged as favourable. At site level, this state is termed 'favourable conservation condition.' Site conservation objectives also contribute to the achievement of the wider goal of biodiversity conservation at other geographic scales, and to the achievement of favourable conservation status at national level and across the Natura 2000 network[1].

Where relevant, conservation objectives are defined for attributes[2] relating to non-breeding waterbird species populations, and for attributes related to the maintenance and protection of habitats that support them. These attributes are:

- Population trend;
- Population distribution;
- Habitat range and area (extent).

Further guidance is given in Section 3.1 (Conservation Objectives for the Special Conservation Interests of Tramore Back Strand Special Protection Area).

[1] Note that the terms 'conservation condition' and 'conservation status' are used to distinguish between site and the national level objectives respectively.

[2]Attribute can be defined as: 'a characteristic of a habitat, biotope, community or population of a species which most economically provides an indication of the condition of the interest feature to which it applies' (JNCC, 1998).

PART TWO – SITE DESIGNATION INFORMATION

2.1 Special Conservation Interests of Tramore Back Strand Special Protection Area

The **Special Conservation Interest species**[3] for Tramore Back Strand SPA are listed below and summarised in Table 2.1. This table also shows the importance of Tramore Back Strand SPA for its SCI species, relative to the importance of other sites within Ireland, within the South East Regions and within County Waterford.

The Special Conservation Interests listed for Tramore Back Strand SPA are as follows:-

1. During winter the site regularly supports 1% or more of the biogeographic population of Light-bellied Brent Geese (*Branta bernicla hrota*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 398 individuals.

2. During winter the site regularly supports 1% or more of the all-Ireland population of Golden Plover (*Pluvialis apricaria*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 2,924 individuals.

3. During winter the site regularly supports 1% or more of the all-Ireland population of Grey Plover (*Pluvialis squatarola*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 299 individuals.

4. During winter the site regularly supports 1% or more of the all-Ireland population of Lapwing (*Vanellus vanellus*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 3,308 individuals.

5. During winter the site regularly supports 1% or more of the all-Ireland population of Dunlin (*Calidris alpina*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 1,723 individuals.

6. During winter the site regularly supports 1% or more of the all-Ireland population of Black-tailed Godwit (*Limosa limosa*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 297 individuals.

7. During winter the site regularly supports 1% or more of the all-Ireland population of Bar-tailed Godwit (*Limosa lapponica*). The mean peak number of this Annex I species within the SPA during the baseline period (1995/96 – 1999/00) was 367 individuals.

8. During winter the site regularly supports 1% or more of the all-Ireland population of Curlew (*Numenius arquata*). The mean peak number of this species within the SPA during the baseline period (1995/96 – 1999/00) was 620 individuals.

9. The wetland habitats contained within Tramore Back Strand SPA are identified of conservation importance for non-breeding (wintering) migratory waterbirds. Therefore the wetland habitats are considered to be an additional Special Conservation Interest.

[3] Special Conservation Interest species are listed in taxonomic order.

Table 2.1 Site Designation Summary: species listed for Tramore Back Strand Special Protection Area, plus site importance at national, regional and county scale

Special Conservation Interests	Annex I species	Baseline Population[a]	Population status at baseline	National Importance Rank[1]	Regional Importance Rank[2]	County Importance Rank[3]
Light-bellied Brent Goose (*Branta bernicla hrota*)		398	International Importance	14	4	2
Golden Plover (*Pluvialis apricaria*)	Yes	2,924	All-Ireland Importance	20	6	3
Grey Plover (*Pluvialis squatarola*)		299	All-Ireland Importance	7	4	2
Lapwing (*Vanellus vanellus*)		3,308	All-Ireland Importance	18	5	2
Dunlin (*Calidris alpina*)		1,723	All-Ireland Importance	18	5	3
Black-tailed Godwit (*Limosa limosa*)		297	All-Ireland Importance	20	7	3
Bar-tailed Godwit (*Limosa lapponica*)	Yes	367	All-Ireland Importance	15	5	2
Curlew (*Numenius arquata*)		620	All-Ireland Importance	18	5	3
Other conservation designations associated with the site[b]	**SAC**	**RAMSAR SITE**	**IMPORTANT BIRD AREA (IBA)**	**WILDFOWL SANCTUARY**	**OTHER**	**OTHER**
	000671	Yes	Yes			pNHA

[a] Baseline data are the 5-year mean peak counts for the period 1995/96 – 1999/00 (I-WeBS) with the exception of Light-bellied Brent Goose (Robinson et al. 2004).
[b] Note that other designations associated with Tramore Back Strand may relate to different areas and/or some of these areas may extend outside the SPA boundary.
[1] National importance rank – the number given relates to the importance of the site for the non-breeding population of a SCI species during the baseline period (1995/96 – 1999/00) relative to other sites in Ireland.
[2] Regional importance rank - the number given relates to the importance of the site for the non-breeding population of a SCI species during the baseline period (1995/96 – 1999/00) relative to other sites within the South Eastern Region.
[3] County importance rank - the number given relates to the importance of the site for the non-breeding population of a SCI species during the baseline period (1995/96 – 1999/00) relative to other sites within County Waterford.

PART THREE – CONSERVATION OBJECTIVES FOR TRAMORE BACK STRAND SPA

3.1 Conservation Objectives for the non-breeding Special Conservation Interests of Tramore Back Strand SPA

The overarching Conservation Objective for Tramore Back Strand Special Protection Area is to ensure that waterbird populations and their wetland habitats are maintained at, or restored to, favourable conservation condition. This includes, as an integral part, the need to avoid deterioration of habitats and significant disturbance; thereby ensuring the persistence of site integrity.

The site should contribute to the maintenance and improvement where necessary, of the overall favourable status of the national resource of waterbird species, and continuation of their long-term survival across their natural range.

Conservation Objectives for Tramore Back Strand Special Protection Area, based on the principles of favourable conservation status, are described below and summarised in Table 3.1. Note that these objectives should be read and interpreted in the context of information and advice provided in additional sections of this report.

Objective 1: *To maintain the favourable conservation condition of the non-breeding waterbird Special Conservation Interest species listed for Tramore Back Strand SPA.*

This objective is defined by the following attributes and targets:-

- To be favourable, the long term **population trend** for each waterbird Special Conservation Interest species should be stable or increasing.[4] Waterbird populations are deemed to be unfavourable when they have declined by 25% or more, as assessed by the most recent population trend analysis.[5]

- To be favourable, there should be no significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest, other than that occurring from natural patterns of variation.[6]

Factors that can adversely affect the achievement of Objective 1 include:

- ❖ Habitat modification: activities that modify discrete areas or the overall habitat(s) within the SPA in terms of how one or more of the listed species use the site (e.g. as a feeding resource) could result in the displacement of these species from areas within the SPA and/or a reduction in their numbers (for further discussion on this topic please refer to Section 5.4).

- ❖ Disturbance: anthropogenic disturbance that occurs in or near the site and is either singular or cumulative in nature could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and/or a reduction in their numbers (for further discussion on this topic please refer to Section 5.4).

[4] Note that 'population' refers to site population (numbers wintering at the site) rather than the species biogeographic population.

[5] Population trend analysis is presented in Section 4.

[6] Waterbird distribution from the NPWS waterbird survey programme is examined in Section 5.

- ❖ Ex-situ factors: listed waterbird species may at times use habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it. The reliance on these habitats will vary from species to species and from site to site. Significant habitat change or increased levels of disturbance within these areas could result in the displacement of one or more of the listed waterbird species from areas within the SPA, and/or a reduction in their numbers (for further information on this topic please refer to Section 5.2).

Objective 2: *To maintain the favourable conservation condition of the wetland habitat at Tramore Back Strand SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.*

This objective is defined by the following attributes and targets:-

- To be favourable, the permanent **area** occupied by the wetland habitat should be stable and not significantly less than the area of **676 ha**, other than that occurring from natural patterns of variation.

The boundary of Tramore Back Strand SPA was defined to include the primary wetland habitats of this site. Objective 2 seeks to maintain the permanent extent of these wetland habitats, which constitute an important resource for regularly-occurring migratory waterbirds. The wetland habitats can be categorised into three broad types: subtidal; intertidal; and supratidal. Over time and through natural variation these subcomponents of the overall wetland complex may vary due to factors such as changing rates of sedimentation, erosion etc. Waterbird species may use more than one of the habitat types for different reasons (behaviours) throughout the tidal cycle.

Subtidal areas refer to those areas contained within the SPA that lie below the mean low water mark and are predominantly covered by marine water. Tidal rivers, creeks and channels are included in this category. For Tramore Back Strand SPA this broad category is estimated to be **55 ha**. Subtidal areas are continuously available for benthic and surface feeding ducks and piscivorous/other waterbirds. Various waterbirds roost in subtidal areas.

The intertidal area is defined, in this context, as the area contained between the mean high water mark and the mean low water mark. For Tramore Back Strand SPA this is estimated to be **532 ha**. When exposed or partially exposed by the tide, intertidal habitats provide important foraging areas for many species of waterbirds, especially wading birds, as well as providing roosting/loafing[7] areas. When the intertidal area is inundated by the tide it becomes available for benthic and surface feeding ducks and piscivorous/other waterbirds. During this tidal state this area can be used by various waterbirds as a loafing/roosting resource.

The supratidal category refers to areas that are not frequently inundated by the tide (i.e. occurring above the mean high watermark) but contain shoreline and coastal habitats and can be regarded as an integral part of the shoreline. For Tramore Back Strand SPA this is estimated to be **89 ha**. Supratidal areas are used by a range of waterbird species as a roosting resource as well as providing feeding opportunities for some species.

The maintenance of the 'quality' of wetland habitat lies outside the scope of Objective 2. However, for the species of Special Conservation Interest, the scope of Objective 1 covers the need to maintain, or improve where appropriate, the different properties of the wetland habitats contained within the SPA.

[7] Loafing can be described as any behaviour not connected with breeding or feeding, and includes preening and resting.

Table 3.1 Conservation Objectives for the waterbird Special Conservation Interests of Tramore Back Strand SPA.

Objective 1: *To maintain the favourable conservation condition of the waterbird Special Conservation Interest species listed for Tramore Back Strand SPA, which is defined by the following list of attributes and targets:*				
Parameter	**Attribute**	**Measure**	**Target**	**Notes**
Population	Population trend	Percentage change as per population trend assessment using waterbird count data collected through the Irish Wetland Bird Survey and other surveys.	The long term population trend should be stable or increasing	Waterbird population trends are presented in Part Four of this document.
Range	Distribution	Range, timing or intensity of use of areas used by waterbirds, as determined by regular low tide and other waterbird surveys.	There should be no significant decrease in the range, timing or intensity of use of areas by the waterbird species of Special Conservation Interest other than that occurring from natural patterns of variation.	Waterbird distribution from the 2009/10 and 2010/11 waterbird survey programme is reviewed in Part Five of this document.
Objective 2: *To maintain the favourable conservation condition of the wetland habitat at Tramore Back Strand SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attributes and targets:*				
Parameter	**Attribute**	**Measure**	**Target**	**Notes**
Area	Wetland habitat	Area (ha)	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 676 ha, other than that occurring from natural patterns of variation.	The wetland habitat area was estimated as 676 ha using OSI data and relevant orthophotographs.

PART FOUR – REVIEW OF THE CONSERVATION CONDITION OF WATERBIRD SPECIAL CONSERVATION INTERESTS

4.1 Population data for waterbird SCI species of Tramore Back Strand SPA

Non-breeding waterbirds have been counted at Tramore Back Strand annually as part of the Irish Wetland Bird Survey (I-WeBS) since the survey commenced in 1994/95. With the exception of 2000/01, Tramore Back Strand has been counted at least once each I-WeBS season during the period September to March inclusive. This core survey period covers the main wintering period when many species occur in their largest concentrations, but also the autumn and spring passage periods when total waterbird numbers may be enhanced by staging/stopover birds[8]. Light-bellied Brent Geese are also the subject of species-specific surveys. Further information about I-WeBS and other waterbird surveys is given in Appendix 2.

During I-WeBS the site is divided into several count subsites. The SPA area and the I-WeBS count area are not coincident; the I-WeBS count area being larger and including polderland to the north of the Back Strand. Outer Tramore Bay and the nearby Tramore boating lake are also counted by I-WeBS.

Table 4.1 presents population[9] data for non-breeding waterbird SCIs of Tramore Back Strand. Annual maxima were identified and used to calculate the five-year mean peak for each species. The baseline period was 1995/96 – 1999/00 while the recent average relates to the five-year period 2006/07 – 2010/11. When examining waterbird data, it is standard practice to use the mean of peak counts because it reflects more accurately the importance of a site for a particular species by helping to account for inconsistencies in data gathering (i.e. differing coverage) or extraordinary fluctuations in numbers. However it is important to note that waterbird counts represent a 'snapshot' of bird numbers during a count session, so in general and taking into account all potential sources of error, resulting data are regarded to be underestimates of population size (Underhill & Prŷs-Jones, 1994).

Table 4.1 highlights where the numbers shown surpass thresholds of International or all-Ireland importance. These thresholds are different for the baseline and recent time periods used; international thresholds are outlined in Wetlands International (2002) and Wetlands International (2012) for the baseline and recent site data respectively, while all-Ireland thresholds are presented within Crowe et al. (2008).

[8] The terms 'stopover' and 'staging' are often used interchangeably. A stopover site can be defined as any place where a bird takes a break during migration. Staging areas can be defined as stopover sites that attract large numbers of individuals and play an important part in re-fuelling the birds before their onward migration (e.g. Warnock, 2010).

[9] Note that 'population' refers to site population (numbers wintering at the site) rather than a species' biogeographic population.

Table 4.1 Population data for non-breeding waterbird Special Conservation Interest Species of Tramore Back Strand SPA

Site Special Conservation Interests (SCIs)	Baseline Period[1] (1995/96 – 1999/00)	Recent Site Data[2] (2006/07 – 2010/11)
Light-bellied Brent Goose (PB)	398 (i)	791 (i)
Golden Plover (GP)	2,924 (n)	1,020
Grey Plover (GV)	299 (n)	129 (n)
Lapwing (L.)	3,308 (n)	991
Dunlin (DN)	1,723 (n)	488
Black-tailed Godwit (BW)	297 (n)	226 (n)
Bar-tailed Godwit (BA)	367 (n)	143
Curlew (CU)	620 (n)	409

[1]Baseline data is the 5-year mean peak for the period 1995/96 – 1999/00;
[2]recent site data is the 5-year mean peak for the period 2006/07 – 2010/11 (I-WeBS).
(i) denotes numbers of international importance; (n) denotes numbers of all-Ireland importance.
note that thresholds differ for the baseline and recent time periods used (refer to Crowe et al. (2008) and Wetlands International, 2002 and Wetlands International, 2012 for national and international respectively).

4.2 Waterbird population trends for Tramore Back Strand SPA

The calculation and assessment of waterbird population trends at Irish coastal SPA sites follows the UK Wetland Bird Survey 'Alerts System' which provides a standardised technique for monitoring changes in the numbers of non-breeding waterbirds over a range of spatial scales and time periods. A detailed methodology for this analysis is provided in Appendix 3. For Tramore Back Strand however, a relatively low level of annual count coverage during I-WeBS (generally once or twice only) precludes the use of this analysis process. Therefore an estimation of population change over time was calculated using the 'generic threshold method' (after JNCC, 2004). This compares population size for two different five-year time periods, the change being expressed as a proportion of the initial population, as follows:

$$\text{Change} = ((I_y - I_x) / I_x) \times 100$$

where: I_y = recent population and I_x = baseline population.

This calculation was undertaken comparing the baseline population with the series of rolling peak means shown in Table 4.2. The results (% change) are shown in Table 4.3. Species are listed by their codes; waterbird codes are given in Table 4.1 and Appendix 4.

Table 4.2 Site population data for waterbird Special Conservation Interest species of Tramore Back Strand SPA: rolling five-year means

Data period	PB	GP	GV	L.	DN	BW	BA	CU
1995/96-1999/00 (baseline)	398 (i)	2,924 (n)	299 (n)	3,308 (n)	1,723 (n)	297 (n)	367 (n)	620 (n)
1999/00 – 2003/04*	551 (i)	1,950 (n)	218 (n)	1,967	1,142 (n)	299 (n)	284 (n)	456
2000/01-2004/05*	645 (i)	2,375 (n)	204 (n)	1,430	892 (n)	337 (n)	257 (n)	455
2001/02-2005/06	693 (i)	2,700 (n)	212 (n)	1,520	853	338 (n)	255 (n)	452
2002/03-2006/07	753 (i)	2,780 (n)	227 (n)	1,560	846	355 (n)	243 (n)	509
2003/04-2007/08	822 (i)	2,780 (n)	177 (n)	1,617	667	348 (n)	201 (n)	505
2004/05-2008/09	822 (i)	2,630 (n)	188 (n)	1,494	665	328 (n)	214 (n)	517
2005/06-2009/10	804 (i)	1,750 (n)	152 (n)	1,224	507	230 (n)	154	402
2006/07-2010/11	791 (i)	1,020	129 (n)	991	488	226 (n)	143	409

(i) denotes numbers of international importance; (n) denotes numbers of all-Ireland importance; all based on recent thresholds as shown in Crowe et al. (2008) and Wetlands International (2012) for national and international respectively).
*all 5-year means except 1999/00-2003/04 and 2000/01-2004/05 which are 4-year means; data for 2000/01 missing.

Table 4.3 Site Population trends – comparison of five-year means

Data period	PB	GP	GV	L.	DN	BW	BA	CU
Baseline vs 1999/00 – 2003/04	+ 39	- 33	- 27	- 41	- 34	+ 1	- 23	- 26
Baseline vs 2000/01-2004/05	+ 62	- 19	- 32	- 57	-48	+ 13	- 30	- 27
Baseline vs 2001/02-2005/06	+ 74	- 8	- 29	- 54	-50	+ 14	- 30	- 27
Baseline vs 2002/03-2006/07	+ 89	- 5	- 24	- 53	-51	+20	- 34	- 18
Baseline vs 2003/04-2007/08	+ 107	- 5	- 41	- 51	-61	+ 17	- 45	- 19
Baseline vs 2004/05-2008/09	+ 106	- 10	- 37	- 55	-61	+ 11	- 42	- 17
Baseline vs 2005/06-2009/10	+ 102	- 40	- 49	- 63	-71	- 23	- 58	- 35
Baseline vs 2006/07-2010/11	+ 99	- 65	- 57	- 70	-72	- 24	- 61	- 34

4.3 Tramore Back Strand SPA – site conservation condition of waterbird SCI species

Conservation condition of SCI species was determined using a species estimated site trend based on the comparison of the baseline peak mean with the most recent peak mean. Conservation condition was assigned using the following criteria:

Favourable population = population is stable/increasing.

Intermediate (unfavourable) = Population decline in the range 1.0 – 24.9%.

Unfavourable population = populations that have declined between 25.0 – 49.9% from the baseline reference value.

Highly Unfavourable population = populations that have declined > 50.0% from the baseline reference value.

The threshold levels of >25.0% and >50.0% follows standard convention used for waterbirds (e.g. Lynas et al. 2007; Leech et al. 2002). The 'Intermediate' range (1.0% - 24.9% decline) allows for natural fluctuations and represents a range within which relatively small population declines have the potential to be reversible and less likely to influence conservation status in the long-term (Leech et al. 2002). Declines of more than 25.0% are deemed of greater ecological significance for the long-term.

With regards the eight waterbird species of Special Conservation Interest listed for Tramore Back Strand SPA, it has been determined that (Table 4.4):-

1. 5 species are currently considered as **Highly Unfavourable** (Golden Plover, Grey Plover, Lapwing, Dunlin & Bar-tailed Godwit);

2. 2 species are currently considered as **Intermediate Unfavourable** (Black-tailed Godwit & Curlew);

3. 1 species is currently considered as **Favourable** (Light-bellied Brent Goose).

Site conservation condition and population trends were also reviewed in light of species' national and international trends (Table 4.4). National trends were provided by the I-WeBS Office while International trends follow Wetlands International (2012).

Table 4.4 SCI species of Tramore Back Strand SPA – Current Site Conservation Condition

Special Conservation Interests	BoCCI Category[a]	Site Population Trend[b]	Site Conservation Condition	Current National Trend[c]	Current International Trend[d]
Light-bellied Brent Goose	Amber	+ 99	Favourable	+ 62	Increase
Golden Plover	Red	- 65	Highly Unfavourable	- 66	Decrease
Grey Plover	Amber	- 57	Highly Unfavourable	- 22	Decrease?
Lapwing	Red	- 70	Highly Unfavourable	- 65	Stable
Dunlin	Amber	- 72	Highly Unfavourable	- 43	Stable (*alpina*)
Black-tailed Godwit	Amber	- 24	Intermediate (unfavourable)	+ 68	Increase
Bar-tailed Godwit	Amber	- 61	Highly Unfavourable	+ 35	Increase
Curlew	Red	- 34	Intermediate (unfavourable)	- 39	Decrease

[a]After Lynas *et al.* (2007); [b] Site population trend analysis; see Table 4.3; [c]national trend (12-year) calculated for the period 1998/99 to 2010/11; [d] current international trend after Wetlands International (2012).

Table 4.4 also shows the relationship between a species' long-term site trend and the current national trend for the 12-year period 1998/99 to 2010/11. The colour coding used represents the following cases:-

- Green – species whose populations are stable or increasing at both site level and national level.
- Beige – species whose populations are declining at both site level and national level. Therefore there is a potential for factors at a larger spatial scale to be influencing the observed trend at site level.
- Orange - species whose populations are exhibiting a 1.0 – 24.9% decline at site level but are stable or increasing at national level.
- Pink - species whose populations are exhibiting a 25.0 – 49.9% decline at site level but are stable or increasing at national level.
- Red - species whose populations are exhibiting a decline of >50.0% at site level but are stable or increasing at national level.

The pink and red categories highlight where populations are stable at national level, but where significant declines are seen at site level. In these cases it would be reasonable to suggest that site-based management issues may be responsible for the observed declining site population trends (Leech et al. 2002).

PART FIVE – SUPPORTING INFORMATION

5.1 Introduction

Part Five of this report is based around the need to review, collate and disseminate site-specific information relating to the Special Conservation Interests of Tramore Back Strand SPA.

Section 5.2 provides selected ecological summary information for non-breeding waterbirds of Tramore Back Strand. Section 5.3 presents results from the 2010/11 and 2011/12 Waterbird Survey Programme. Finally, Section 5.4 provides summary information on activities and events that occur in and around Tramore Back Strand that may either act upon the habitats within the site, or may interact with waterbirds using the site.

The information provided is intended to:-

- assist the interpretation and understanding of the site-specific conservation objectives;
- facilitate the identification of conservation priorities and direct site management measures;
- inform the scope and nature of Appropriate Assessments in applying the provisions of Article 6 of the Habitats Directive.

Note however, that the information does not aim to provide a comprehensive assessment on which to assess plans and projects as required under the Habitats Directive, but rather should inform the scope of these assessments and help direct where further detailed examinations are required. The information presented in this report was compiled in April 2013.

5.2 Waterbird species – Ecological characteristics, requirements and specialities – summary information

Waterbirds, defined as '*birds that are ecologically dependent on wetlands"* (Ramsar Convention, 1971), are a diverse group that includes divers, grebes, swans, geese and ducks, gulls, terns and wading birds. During the data period 1994/95 – 2010/11 the I-WeBS database shows a total of 60 waterbird species that have been recorded across the Tramore Back Strand survey area. These species represent eleven waterbird families: *Gaviidae* (divers), *Podicipedidae* (grebes), *Anatidae* (swans, geese and ducks), *Rallidae* (Water Rail, Moorhen & Coot), *Haematopodidae* (oystercatchers), *Charadriidae* (plovers and lapwings), *Scolopacidae* (sandpipers and allies) and *Laridae* (gulls and terns) plus *Phalacrocoracidae* (Cormorants), *Ciconiiformes* (Herons) and *Alcedinidae* (Kingfisher).

As described in Section 1.1, the wetland habitats contained within this SPA are considered to be a Special Conservation Interest in their own right. The wetland habitat is an important resource for listed SCI species and for other waterbird species included in the total waterbird assemblage. These species may include those that utilise the site during passage, those that are present in months of the year outside of the non-breeding season[10] or species that use the site at certain times only (e.g. as a cold weather refuge).

25 waterbird species occurred on a regular basis within Tramore Back Strand during the I-WeBS period 1994/95 to 2010/11.[11] This calculation does not include gull species that have not been counted regularly at this site. Eight of the regularly-occurring species are listed as SCIs for the SPA; the additional 17 non-SCI species are listed in Table 5.1.

[10] Non-breeding season is defined as September – March inclusive.

[11] Regular is defined as a species that has occurred in 12 out of the 16-year data period (data for 2000/01 missing).

Table 5.1 Regularly-occurring non SCI waterbird species that occur at Tramore Back Strand during the non-breeding season

Species	Baseline Data Period[1] (1995/96 – 1999/00)	Recent Site Average[2] (2006/07 – 2010/11)
Mute Swan (*Cygnus olor*)	33	34
Shelduck (*Tadorna tadorna*)	29	55
Wigeon (*Anas penelope*)	77	88
Teal (*Anas crecca*)	134	32
Mallard (*Anas platyrhynchos*)	42	155
Red-breasted Merganser (*Mergus serrator*)	18	10
Cormorant (*Phalacrocorax carbo*)	15	23
Grey Heron (*Ardea cinerea*)	6	1
Little Egret (*Egretta garzetta*)	5	10
Oystercatcher (*Haematopus ostralegus*)	348	369
Ringed Plover (*Charadrius hiaticula*)	55	27
Knot (*Calidris canutus*)	75	95
Sanderling (*Calidris alba*)	46	25
Snipe (*Gallinago gallinago*)	83	5
Greenshank (*Tringa nebularia*)	12	8
Redshank (*Tringa totanus*)	223	130
Turnstone (*Arenaria interpres*)	24	26

Grey shading denotes an Annex I species; [1] Baseline data is the 5-year mean peak for the period 1995/96 – 1999/00 (I-WeBS); [2]recent site data is the 5-year mean peak for the period 2006/07 – 2010/11 (I-WeBS).

Although waterbirds may be linked by their dependence on water, different species vary considerably in aspects of their ecology due to many evolutionary adaptations and specialisations to their wetland habitats. Different species or groups of species may therefore utilise wetland habitats in very different ways which relates to how species are distributed across a site as a whole.

Table 5.2 provides selected ecological information for waterbird SCI species of Tramore Back Strand SPA. Information is provided for the following categories[12]:-

- waterbird family (group);
- winter distribution – species distribution range during winter (based on the period 2001/02 – 2008/09 (after Boland & Crowe, 2012);
- trophic (foraging) guild (after Weller, 1999; see Appendix 5);
- food/prey requirements;
- principal supporting habitat within the site;
- ability to utilise other/alternative habitat in/around the site;
- site fidelity (species 'faithfulness' to wintering sites).

It should be borne in mind that a single wetland site is unlikely to meet all of the ecological requirements of a diverse assemblage of waterbirds (Ma et al. 2010). Although some waterbird species will be faithful to specific habitats within the SPA, many will at times also use habitats situated within the immediate hinterland of the site or in areas ecologically connected to the SPA. These areas may be used as alternative high tide roosts, as a foraging resource or, be simply flown over, either on migration or on a more frequent basis throughout the non-breeding season as waterbirds move between different areas used (e.g. commuting corridors between feeding and roosting areas).

Reliance on alternative habitats will vary between species and from site to site. Use of alternative habitats is also likely to vary through time, from seasonally through to daily, and different habitats may be used by day and night (Shepherd et al. 2003). Different waterbirds may utilise wetland habitats in different ways. For example, while the majority of wading birds

[12] Notes to aid the understanding of categories and codes used in Table 5.2 are provided in the table sub text.

forage across exposed tidal flats, species such as Lapwing and Golden Plover are considered to be 'terrestrial waders,' typically foraging across grassland and using tidal flats primarily for roosting. When tidal flats are covered at high water, intertidally-foraging waterbirds are excluded and many will move to nearby fields to feed. Terrestrial foraging is also important when environmental factors (e.g. low temperature) reduce the profitability of intertidal foraging (e.g. Zwarts & Wanink, 1993). Some waterbird species are simply generalists, and make use of a range of habitats, for example the Black-tailed Godwit that forages across intertidal mudflats and grassland habitats. Other waterbird species such as Greenland White-fronted Goose (*Anser albifrons flavirostris*) or Bewick's Swan (*Cygnus columbianus bewickii*) are herbivores and are therefore reliant on terrestrial areas, often outside of the SPA boundary, and use the wetland site primarily for roosting. Some species switch their habitat preference as food supplies become depleted; an example being Light-bellied Brent Geese that exploit grasslands increasingly when intertidal seagrass and algae become depleted.

The topic of alternative habitat use is also applicable to benthic-foraging seaducks and divers whose foraging distribution is highly influenced by water depth and tidal conditions. Many of these species however (e.g. Great Northern Diver, Common Scoter) exhibit a widespread coastal distribution during winter utilising shallow nearshore waters to a greater degree at certain times (e.g. storms, driving onshore winds).

Thus the area designated as a SPA can represent a variable portion of the overall range of the listed waterbird species. To this end, data on waterbird use of areas adjacent to or ecologically connected to the SPA are often collected. Indeed for some species a mix of site-related and wider countryside measures are needed to ensure their effective conservation management (Kushlan, 2006). Furthermore, it is recommended that assessments that are examining factors that have the potential to affect the achievement of the site's conservation objectives should also consider the use of these '*ex-situ'* habitats, and their significance to the listed bird species.

Table 5.2 Waterbirds – Ecological characteristics, requirements & specialities

Special Conservation Interests	Family (group)	Winter distribution[A]	Trophic Guild[B]	Food/Prey Requirements[C]	Principal supporting habitat within site[D]	Ability to utilise other/alternative habitats[E]	Site Fidelity[F]
Light-bellied Brent Goose *Branta bernicla hrota*	Anatidae (geese)	Localised	1, 5	Highly specialised	Intertidal mud and sand flats, *Zostera* beds	2	High
Golden Plover *Pluvialis apricaria*	Charadriidae (wading birds)	Intermediate	4	Wide	Intertidal mud and sand flats	2	Moderate
Grey Plover *Pluvialis squatarola*	Charadriidae (wading birds)	Localised	4	Wide	Intertidal mud and sand flats	3	High
Lapwing *Vanellus vanellus*	Charadriidae (wading birds)	Widespread	4	Wide	Intertidal mud and sand flats	2	Moderate
Dunlin *Calidris alpina*	Scolopacidae (wading birds)	Intermediate	4	Wide	Intertidal mud and sand flats	3	High
Black-tailed Godwit *Limosa limosa*	Scolopacidae (wading birds)	Localised	4	Wide	Intertidal mud and sand flats	2	High
Bar-tailed Godwit *Limosa lapponica*	Scolopacidae (wading birds)	Localised	4	Wide	Intertidal mud and sand flats	3	Moderate
Curlew *Numenius arquata*	Scolopacidae (wading birds)	Widespread	4	Wide	Intertidal mud and sand flats	2	High

[A] Winter distribution: Very widespread (>300 sites); Widespread (200 – 300 sites); Intermediate (100 – 200 sites); Localised (50-100 sites); Highly restricted (<50 sites) (based on Boland & Crowe, 2012).
[B] Waterbird foraging guilds. 1 = Surface swimmer, 2 = water column diver (shallow), 3 = water column diver (deeper), 4/5 = intertidal walker (out of water), 6 = intertidal walker (in water), 7 = terrestrial walker. Further details are given within Appendix 5.
[C] Food/prey requirements - species with a wide prey/food range; species with a narrower prey range (e.g. species that forage upon a few species/taxa only), and species with highly specialised foraging requirements (e.g. piscivores).
[D] Principal supporting habitat present within Tramore Back Strand. Note that this is the main habitat used when foraging with the exception of Golden Plover and Lapwing which relates to roosting habitat.
[E] Ability to utilise alternative habitats refers to the species ability to utilise other habitats adjacent to the site. 1 = wide-ranging species with requirement to utilise the site as and when required; 2 = reliant on site but highly likely to utilise alternative habitats at certain times (e.g. high tide); 3 = considered totally reliant on wetland habitats due to unsuitable surrounding habitats and/or species limited habitat requirements.
[F] Site fidelity on non-breeding grounds: Unknown; Weak; Moderate; or High (based on published literature).

5.3 The 2010/11 and 2011/12 waterbird survey programme

5.3.1 Introduction

The waterbird survey programme was designed to investigate how waterbirds are distributed across coastal wetland sites during the low tide period. The surveys ran alongside and are complementary to the Irish Wetland Bird Survey (I-WeBS) which is a nationwide survey undertaken primarily on a rising tide or at high tide.

In 2010/11, a standard survey programme of four low tide counts and a high tide count were planned for Tramore Back Strand. However, human error resulted in complete coverage of subsites not being achieved in several of the counts and only one count (October 2010) was considered complete. In order to address this error the site was counted in the season 2011/12 when complete coverage was achieved during three low tide counts plus one high tide count[13]. Further details are provided in Cummins & Crowe (2012).

Waterbirds were counted within a series of 13 count subsites. These are listed together with the survey dates in Appendix 6. The survey area extended beyond the area designated as Tramore Back Strand SPA and included the outer area of Tramore Bay, Tramore boating lake and two areas of polderland (Lissellan and Kilmacleague) to the north of the Back Strand (please refer to the SPA boundary in Appendix 1 and the survey boundary in Appendix 6).

The behaviour of waterbirds during counts was attributed to one of two categories (foraging or roosting/other) while the position of birds was recorded in relation to one of five broad habitat types (Table 5.3). Note that these broad habitats were defined specifically for the survey programme and do not follow strict habitat-based definitions for these areas, nor follow definitions used in relation to conservation objectives outlined in Section 3.1. For a detailed survey methodology, please refer to NPWS (2011).

Table 5.3 Definition of broad habitat types used

Broad Habitat Type	Broad Habitat Description
Intertidal (area between mean high water and mean low water)	Refers to the area uncovered by the tide and most likely dominated by mudflats and sandflats. It may also include areas of rocky shoreline, areas of mixed sediment and grave/pebbles or shingle and gravel shores.
Subtidal (area that lies below mean low water)	Refers to areas that are covered by seawater during counts. During low-tide counts it will include offshore water, tidal channels and creeks as well as tidal rivers.
Supratidal	This category pertains to the shore area and habitats immediately marginal to and above the mean high-water mark. The supratidal section is an integral part of the shoreline. This broad habitat also includes areas of saltmarsh where the saltmarsh is contiguous with coastal habitats lying above. Note that patches of lower saltmarsh (e.g. *Spartina* sp.) surrounded by intertidal flats, were included in the intertidal category.
Terrestrial	Used where birds were recorded within habitats close to the shoreline but were above the intertidal and supratidal levels. Polderland.
Aquatic (terrestrial)	Used for waterbirds recorded within wet pools and channels of polderland and for Tramore boating lake.

In addition to the main survey programme described above, two high tide roost surveys were undertaken on 28th February 2011 and 18th January 2012. The former did not achieve full coverage of subsites (see above). During roost surveys waterbird roost sites were located, species and numbers of waterbirds counted and the position of roosts marked onto field maps.

[13] Complete low tide surveys were undertaken on 06/10/10, 10/11/11, 12/12/11 & 10/02/12; the high tide count was undertaken on 18/01/12.

5.3.2 Waterbird data, analyses and presentation

The aim of data analyses was to understand how waterbirds are distributed across the site of Tramore Back Strand during the autumn and winter months. By assessing patterns of waterbird distribution at low and high tide, together with examination of data on sediment and invertebrate distribution and abundance, we aimed to identify areas (subsites) within the site that are the most important for foraging and roosting on a species by species basis.

Data analyses were undertaken to determine the proportional use of subsites by each Special Conservation Interest (SCI) species, relative to the whole area surveyed on each survey occasion. Analyses were undertaken on datasets as follows:

- Total numbers (low tide surveys);
- Total numbers (high tide survey);
- Total numbers of foraging birds (low tide surveys);
- Total numbers of roosting birds (low tide and high tide surveys).

For each of the analyses listed above and for each survey date where full subsite coverage was achieved, the subsites were ranked in succession from the highest to the lowest in terms of their relative contribution to each species' distribution across all subsites surveyed. Rank positions were then converted to categories (see below) with the exception of those relating to the single high tide survey that are presented simply as rank numbers. The highest rank position/category for each subsite across any of the low tide count dates is presented in a subsite by species matrix.

Subsite Rank Position - Categories

Very High (V)	Any section ranked as 1.
High (H)	Top third of ranking placings (where n = total number of count sections species was observed in)
Moderate (M)	Mid third of ranking placings (where n = total number of count sections species was observed in)
Low (L)	Lower third of ranking placings (where n = total number of count sections species was observed in).

Intertidal foraging density was calculated for selected species and for each low tide survey occasion, by dividing the number of the species within a subsite by the area of intertidal habitat within the same subsite. Subsites were ranked based on the peak foraging density recorded. Whole site intertidal foraging density was calculated by summing the mean subsite counts for each species and dividing by the total area of intertidal habitat.

Waterbird count data for low tide surveys are also presented as species distribution maps ('dot density maps'). Dot-density maps show waterbird species distribution within intertidal or terrestrial habitat[14] divided into 'foraging' birds and 'roosting/other' birds. These maps show the number of birds represented by dots; each dot representing one, or a pre-determined number of birds. As the dots are placed in the appropriate subsites and broad habitat types for the birds counted, the resulting map is equivalent to presenting numbers and densities and provides a relatively quick way of assessing species distribution.

[14] Note that birds within supratidal or subtidal habitat are not included within these maps.

In contrast to dot-density maps, roost maps produced from roost survey data show the mapped locations of waterbird roosts, but note the limitations in relation to field mapping discussed below.

Notes on data interpretation and methodological limitations

Weather conditions during the winter of 2010/11 proved extremely challenging for fieldworkers, December 2010 being the coldest on record (Met Éireann, 2010). It should be borne in mind that the cold weather is likely to have affected the numbers and distribution of waterbirds at the site, as well as nationally, as was the case in the previous cold winter of 2009/10 (Crowe et al. 2011).

As noted above, only one survey undertaken during the 2010/11 season achieved full subsite coverage. The incomplete surveys however, still provide useful subsite data for the majority of subsites, and these data are assessed and used to describe distribution patterns where relevant.

The surveys completed in the winter season 2011/12 were also not without problems caused by weather. One survey (12/12/11) despite commencing with good weather and a reasonable forecast for the day was affected by a strong weather front that moved in 30 minutes after the count started bringing heavy rain showers and high winds. This made counting difficult at times and particularly flocks at distance in subsite 0M434.

Subsite rankings and dot-density maps relate to the distribution of waterbirds during complete surveys only. Care must be taken in the interpretation of these data, and subsite rankings in isolation should not be used to infer a higher level of conservation importance to one area over another without a detailed examination of data and understanding of each species' ecology. For instance, while some species are known to be highly site-faithful, both at site level and within-site level (e.g. Dunlin), other species may range more widely across a site(s). While some species by their nature may aggregate in high numbers, other species such as Greenshank or Grey Heron may not. It is also important to consider that distribution maps and data refer to a single season of low tide surveys. Although important patterns of distribution will emerge, these distributions should not be considered absolute; waterbirds by their nature are highly mobile and various factors including tide (e.g. spring/neap), temperature, direction of prevailing winds, changing prey densities/availabilities and degree of human activity across the site, could lead to patterns that may change in different months and years.

Dot-density maps are not intended to show the actual position of each bird; the dots are placed randomly within subsites so no conclusions can be made at a scale finer than subsite. Dots are placed in the appropriate subsites and broad habitat types for the birds counted but given that the broad habitats are based on OS mapping, there are various cases where the mapping does not accurately portray where a bird was e.g. in the case of birds associated with freshwater flows, or small creeks that are not shown on OS maps. These associations are discussed as necessary in the individual species text tables.

The mapping of flock positions or roost locations over large distances in intertidal habitats (i.e. mapping by eye) is inherently difficult and prone to error. Flock or roost positions should therefore be viewed as indicative only.

5.3.3 Summary Results

A total of 41 waterbird species were recorded at Tramore Back Strand within the survey area during the 2010/11 survey programme (incomplete data[15]) and 46 species the following year

[15] Refers to incomplete subsite coverage, see Section 5.3.1 for details.

(2011/12). Cummins and Crowe (2012) provide a summary of waterbird data collected. Note that the total survey area and the SPA area are different; the count area being considerably larger. A map showing count subsites is provided in Appendix 6.

All SCI species with the exception of Golden Plover, Grey Plover and Lapwing were recorded within all counts undertaken as part of the main survey programme. Table 5.4 shows peak numbers (whole site) for SCI species recorded during the low tide (LT) and high tide (HT) surveys.

It is interesting to note that several incomplete counts recorded during 2010/11 recorded higher numbers than peaks recorded during complete counts of 2011/12, as follows: Light-bellied Brent Goose 1,441 on 07/01/11; Golden Plover 1,478 on 25/11/10; Dunlin 569 on 25/11/10; Black-tailed Godwit 573 on 01/02/11, and Bar-tailed Godwit 395 on 01/02/11.

Average subsite occupancy, the average proportion of subsites in which a species occurred during low tide counts, ranged from 10% (Golden Plover) to 63% (Curlew) (Table 5.4). Only two species occurred, on average, in more than 50% of the subsites counted.

Average percentage area occupancy is defined as the average proportion of the whole site area that a species occurred in during low tide counts. Although this is a broad calculation across all habitat zones it presents some indication of the range of a species across the site as a whole. As the SCI species are mostly associated with the Backstrand, the subtidal subsite Tramore Bay and the aquatic subsite Tramore Boating Lake were excluded from this calculation. The highest average percentage area occupancy was recorded for Light-bellied Brent Goose (65%) and Curlew (73%). the lowest was Golden Plover (14% of count area). The distribution of Bar-tailed Godwit was far more widespread than Black-tailed Godwit (Table 5.4).

Table 5.4 Tramore Back Strand 2010/2011 & 2011/12 waterbird surveys – summary data

Site Special Conservation Interests (SCIs)	Peak number - LT surveys[I]	Peak number - HT survey[II]	Average subsite % occupancy [III]	Average % area occupancy [III]
Light-bellied Brent Goose	1,242 (i)	1,078 (i)	52 (25)	66 (26)
Golden Plover	1,225	200	10 (10)	14 (11)
Grey Plover	244 (n)	149 (n)	17 (7)	27 (11)
Lapwing	1,124	1,452	21 (16)	21 (15)
Dunlin	461	386	33 (12)	41 (11)
Black-tailed Godwit	414 (n)	182 (n)	25 (10)	22 (13)
Bar-tailed Godwit	357 (n)	147	37 (19)	47 (23)
Curlew	622 (n)	399	63 (12)	74 (10)

[I] 4 low-tide counts undertaken on 06/10/10, 10/11/11, 12/12/11 & 10/02/12; [II] High-tide count undertaken on 18/01/12; [III]Mean (± s.d.) averaged across the complete low tide surveys that the species occurred in.
(i) denotes numbers of international importance; (n) denotes numbers of all-Ireland importance.
For thresholds refer to Crowe et al. (2008) and Wetlands International, 2012 for national and international respectively.

Whole site species richness (total number of species) ranged from 30 species (October 2010 and November 2011 to 38 species (December 2011 and January 2012). 38 species were recorded during the high tide survey on 18/01/12.

During low tide surveys, average subsite species richness ranged from four (outer bay subsites 0M438 and 0M492) to a peak mean of 18 species recorded for 0M429 (Back Strand south) (Table 5.5). Of the ten intertidal/subtidal subsites, seven supported on average ten or more species during low tide surveys. The polder subsites (0M408 and 0M409) recorded up to 11 species in any one survey and averaged seven and five respectively. Seven subsites supported a greater number of species during low tides surveys than during high tide surveys.

Table 5.5 Subsite species richness

Subsite Code	Subsite name	Mean (±S.D) LT SurveyS*	HT Survey**	Peak Overall (H/L)
0M408	Tramore Back Strand: Lisselan Fields	7 (3)	11	11 (H/L)
0M409	Tramore Back Strand: Kilmacleague Fields	5 (2)	10	10 (H)
0M429	Back Strand South	18 (6)	1	20 (L)
0M430	Summerville	13 (1)	15	15 (H)
0M431	Kilmacleague & Clohernagh	12 (1)	10	13 (L)
0M432	Bass Pt to Corbally Crossroads	12 (5)	1	16 (L)
0M433	Back Strand west of sea wall	15 (2)	18	18 (H/L)
0M434	Back Strand north	15 (3)	20	20 (H)
0M435	Crobally to Ballinattin	9 (1)	9	11 (L)
0M436	Corbally south to old Landfill	12 (1)	9	13 (L)
0M438	Rinnashark Harbour	4 (4)	4	9 (L)
0M492	Outer Tramore Bay	4 (2)	4	7 (L)
0M501	Tramore Boating lake	7 (1)	8	8(H/L)

*averaged across low-tide counts undertaken on 06/10/10, 10/11/11, 12/12/11 & 10/02/12;
** High tide count undertaken on 18/02/12.

5.3.4 Waterbird distribution

Data analyses determined the proportional use of subsites by each Special Conservation Interest (SCI) species, relative to the site as a whole during both low tide and high tide surveys. Selected results from these 'subsite assessments' are shown in Tables 5.6 (a–f). The relative importance of each subsite is based on the final rank positions (see 5.3.2 for methodology). Where a box is left blank, it simply means that a species was not recorded in that subsite.

Ranked assessments relate to the broad habitat that birds were observed in. In some cases, data for different broad habitats have been combined. For example, in the case of wading birds, intertidal/subtidal habitats were combined in order to include those individuals that had their feet in water and were recorded as subtidal.

The fact that different subsites may be ranked as 'Very High' for the same species highlights the fact that several subsites may be equally important for the species being analysed. This approach, rather than averaging across all surveys, allows for equal weightings to be given for temporal differences – e.g. concentrations of foraging birds in different subsites at different times reflecting the natural pattern of distribution across time as species move in response to changing prey densities or availabilities.

Tables 5.6 (a–f) are followed by species discussion notes which provide additional information on the distribution of each SCI species, drawing upon the full extent of the data collected and analysed for Tramore Back Strand. Waterbird distribution dot-density maps are provided in Appendix 7; summary roost data are presented in Appendix 8.

Table 5.6 (a) Tramore Back Strand Subsite assessment – total numbers during LT surveys (across all behaviours and habitats) (L Low, M Moderate; H High V Very high; please see Section 5.3.2 for methods).

Species ► Subsites ▼	PB	GP	GV	L.	DN	BW	BA	CU
0M408	V			L		V		H
0M409	V			H				H
0M429	L	M	V		V	H	H	V
0M430	H			H	M	M	M	V
0M431	H			V	M	H	H	H
0M432	H					L	L	V
0M433	M	V	H		M	M	M	H
0M434	V	V	M	V	H	M	V	V
0M435	L				L	H		M
0M436	H	V	H	V	V	V	V	M
0M438	M						M	
0M492								
0M501				L				

Table 5.6 (b) Tramore Back Strand Subsite assessment – ranked total numbers HT Survey (across all broad habitats)

Species ► Subsites ▼	PB	GP	GV	L.	DN	BW	BA	CU
0M408	2					2		2
0M409	1			4				1
0M429	5							
0M430						5	2	5
0M431	6							7
0M432								
0M433	3	1	1	1	1	1	1	3
0M434	6		2	2	2			4
0M435	6							7
0M436	4							6
0M438								
0M492								
0M501				3				

Table 5.6 (c) Tramore Back Strand Subsite assessment – total numbers foraging intertidally (L Low, M Moderate; H High V Very high; please see Section 5.3.2 for methods)

Species ► / Subsites ▼	PB	GP	GV	L.	DN	BW	BA	CU
0M408				*not recorded*				
0M409								
0M429	M		V		V	H	V	V
0M430	V				M		M	H
0M431	V				H	H	H	M
0M432	V					L	L	L
0M433	H	V	V		H	M	M	H
0M434	V				H	H	V	V
0M435					M			M
0M436	M				V	V	L	M
0M438	V						M	
0M492								
0M501								

Table 5.6 (d) Tramore Back Strand Subsite assessment – ranked peak intertidal foraging densities for selected species - LT surveys.

Species ► / Subsites ▼	PB	DN	BW	BA	CU
0M408					
0M409					
0M429	9	3	4	1	1
0M430	5	7	7	7	5
0M431	1	4	2	3	3
0M432	3		6	8	8
0M433	4	6	3	4	6
0M434	6	5	5	2	4
0M435	8	2			2
0M436	2	1	1	5	7
0M438	7			6	

Table 5.6 (e) Tramore Back Strand Subsite assessment – total numbers (roosting/other behaviour) during LT surveys (Intertidal) Low, M Moderate; H High V Very high; please see Section 5.3.2 for methods).

Species ► / Subsites ▼	PB	GP	GV	L.	DN	BW	BA	CU
0M408								
0M409								
0M429		M	V		V		V	
0M430	V			H				V
0M431				V				V
0M432							V	V
0M433	V	H	H		H			H
0M434	V	V		V			H	V
0M435			V			V		H
0M436		V		V		H	V	H
0M438								
0M492								
0M501								

Table 5.6 (f) Tramore Back Strand Subsite assessment – ranked total numbers (roosting/other behaviour) during HT survey (Intertidal[I], Subtidal[II])

Species ► / Subsites ▼	PB[II]	GP[I]	GV[I]	L.[I]	DN[I]	BW[I]	BA[I]	CU[I]
0M408								
0M409								
0M429								
0M430								1
0M431	2							
0M432								
0M433	1	1	1	2	1	1	1	
0M434			2	1	2			2
0M435								
0M436								
0M438								
0M492								
0M501								

Tramore Back Strand - Waterbird Survey Programme 2010/11 & 2011/12

Waterbird distribution - discussion notes

Where mentioned, information on benthic communities or sediment is from the intertidal and subtidal sampling programme commissioned by the National Parks & Wildlife Service (NPWS) and Marine Institute and reported in NPWS (2013) and ASU (2008).

'I-WeBS' refers to count data recorded at Tramore Back Strand as part of the Irish Wetland Bird Survey.

Apart from when otherwise mentioned, the low tide count data referred to are from the four complete low tide surveys (06/10/10, 10/11/11, 12/12/11 & 10/02/12) and high tide count data are from the survey undertaken on 18/02/12. Please refer to Section 5.3.1 for further details.

Light-bellied Brent Goose *Branta bernicla hrota* - Family (group): Anatidae (geese)
Migratory Light-bellied Brent Geese (hereafter called 'Brent Geese') that spend winter within Ireland belong to the East Canadian High Arctic population. Almost all of this population spends winter within Ireland. Brent Geese begin to arrive in Ireland in late August when almost three-quarters of the biogeographic population congregate at Strangford Lough in Northern Ireland before dispersing to other sites (Robinson et al. 2004).
Numbers
The peak low tide count attained for Brent Geese (complete count coverage) was 1,242 recorded on 10/11/11. This number was exceeded however by one of the incomplete counts undertaken in 2010/11 (1,441 in January 2011). Apart from the relatively low number recorded on 06/10/10 (complete count) all other complete and partial counts recorded numbers that exceeded the threshold of international importance. Brent Geese were recorded in eleven subsites across the survey period and regularly (two low tide surveys or more) within nine subsites (0M408, 0M409, 0M429, 0M430, 0M431, 0M432, 0M433, 0M434 and 0M436. Peak numbers in October 2010 were recorded in 0M434 (Back Strand north); the only subsite to record this species on this date. The polder subsite 0M409 (Tramore Back Strand: Kilmacleague Fields) held peak numbers in November 2011 (328), while 0M408 (Tramore Back Strand: Lisselan Fields) held peak numbers in the latter two low tide surveys including the subsite peak count of 975 Brent Geese on 12/12/11.
Foraging Distribution
Brent Geese are grazers and are known for their preference for foraging in intertidal areas with the Eelgrass *Zostera* sp. (Robinson et al. 2004). They may also feed upon algae species, saltmarsh plants and may also undertake terrestrial grazing. The intertidal seagrass *Zostera noltii* is recorded at two locations within this site. The largest bed occurs along the north shore of the Backstrand (within 0M434) while the second bed is west of the Causeway and spans subsites 0M433 and 0M436. For details refer to NPWS (2013). 116 Brent Geese foraged intertidally in 0M434 (Back Strand north) on 06/10/10; these birds were positioned in two places within the *Zostera noltii* bed described above. On 10/11/11, 627 Brent foraged intertidally across seven subsites; 230 of these were located within 0M431 (Kilmacleague & Clohernagh) and 105 in 0M432 (Bass Pt to Corbally Crossroads), good numbers also in 0M433 and 0M434. In the remaining surveys, relatively few Brent Geese foraged intertidally, with terrestrial foraging dominating. 0M408 (Tramore Back Strand: Lisselan Fields) held peak numbers during the final two low tide surveys (975 and 568 respectively) while 0M409 (Tramore Back Strand: Kilmacleague Fields) held peak numbers (627) during the high tide survey. Note that these polderland subsites are outside of the SPA boundary. The roost survey on 18/02/12 recorded 377 Brent Geese foraging in 0M408 (Tramore Back Strand: Lisselan Fields).
Roosting Distribution
Relatively little roosting/other behaviour was recorded in intertidal habitat during low or high tide surveys with the exception of 167 Brent Geese recorded in 0M430 (Summerville) on 10/02/12. Subtidal roosting/other behaviour was irregularly recorded and involved relatively low numbers. The roost survey of 18/02/12 recorded just 17 roosting individuals; the majority of Brent Geese observed were foraging (see above). 15 Brent roosted subtidally in 0M433 while two roosted subtidally in 0M431. The roost survey undertaken in February 2011 recorded a greater number of roosting individuals (note this was an incomplete count in terms of subsite coverage). 166 Brent roosted intertidally at two positions, north of the main channel in 0M430 (Summerville). A further 19 individuals roosted intertidally in 0M429. Smaller numbers were in 0M432 and 0M436 (4 and 11 individuals respectively).

Golden Plover *Pluvialis apricaria* - Family (group): Charadridae (wading birds)
The Eurasian Golden Plover is a Palearctic species, occurring mainly at higher latitudes of Western Europe to north-central Siberia and wintering south in Europe, north Africa and parts of Asia. Two subspecies are currently described. *P. a. altifrons* is the 'northern' form and breeds at high latitudes in Western Eurasia from Iceland and the Faeroes across northern Scandinavia to 125^{0}E in the north Siberia lowlands south of Taymyr (Delaney et al. 2009). The nominate *P. a apricaria* breeds at more southerly latitudes including Ireland and Britain and migrates south for winter. Golden Plovers that winter in Ireland are thought to be mostly Icelandic-breeding birds *P. a. altifrons* (Wernham et al. 2002).
Numbers
Whole site numbers of Golden Plover peaked on 12/12/11 (1,225 individuals). No individuals were recorded in the final complete low tide count in February 2012. A higher peak count was attained during the counts undertaken in 2010/11 (incomplete coverage) when 1,478 Golden Plovers were counted on 25/11/10. Golden Plovers (and Lapwings) were absent from the counts undertaken in January 2011. This is likely due to the cold weather experienced in the winter of 2010/11 (particularly December 2010); Golden Plovers being known as a species that responds to cold weather events (e.g. Crowe et al. 2011; Holt et al. 2012). Overall, Golden Plovers were recorded within four subsites: 0M429 (Back Strand South), 0M433 (Back Strand west of sea wall), 0M434 (Back Strand west of sea wall) and 0M436 (Corbally south to old Landfill).
Foraging Distribution
During winter, Golden Plovers feed primarily within agricultural grassland and arable land. Tidal flats are used more as a roosting/resting habitat and the birds tend to favour large, open tidal flats. As a consequence, Golden Plovers tend to be in large aggregations when observed upon tidal flats. Intertidal feeding is observed to a greater degree during cold weather periods when grassland feeding areas are frozen over. Terrestrially, Golden Plovers eat a wide range of invertebrate species including small earthworms, beetles and millipedes (Gillings & Sutherland, 2007), but relatively little is known about their intertidal feeding patterns (Gillings et al. 2006). With the exception of two individuals on 06/10/10 (0M433) Golden Plovers were not recorded foraging intertidally. Terrestrial foraging was not recorded but is likely to occur on a regular basis outside of the SPA boundary. A recent study of Kilmacleague Fields (equivalent to subsite 0M409) found that a significant proportion of the Tramore Back Strand population of Golden Plover use this area on occasion (RPS, 2010).
Roosting Distribution
In 2010/11, Golden Plovers were recorded roosting intertidally exclusively within 0M436 (Corbally south to old Landfill); the maximum number was 1,478 individuals and this was the maximum number counted during either of the survey years. These birds (one flock) were positioned north of the landfill site. 0M436 (Corbally south to old Landfill) also held a large number (700) roosting terrestrially during the high tide survey (27/01/11); these birds, along with 1,200 Lapwing were positioned just north of the subsite and outside of the SPA boundary. In 2011/12, 0M436 held a large number on one occasion (1,000 on 10/11/11), these birds positioned in the middle of the subsite but only observed for a brief period before they flew off. 0M434 (Back Strand north) held a good number (1,225) on 12/12/11; these birds positioned centrally and close to a channel. 0M429 and 0M433 both held lower numbers on a single low tide occasion each. 0M433 also held 200 during the high tide survey (18/01/12). The roost survey on 18/01/12 recorded a single intertidal roost of 200 Golden Plovers in 0M433. These birds were positioned within the main saltmarsh roosting area along the southern edge of the subsite. A flock of over 1,000 Golden Plover was observed flying over the area during this survey but they did not land. The roost survey undertaken on 28/02/11 (note this was an incomplete count in terms of subsite coverage) recorded a single roost of 515 Golden Plovers in 0M436, these birds positioned intertidally in the north of the subsite.

Grey Plover *Pluvialis squatarola* - Family (group): Charadriidae (wading birds)

The Grey Plover is generally considered a monotypic species and has a holarctic breeding distribution across the tundra of Eurasia and North America (Delaney et al. 2009). The species migrates from breeding areas to a very wide wintering range extending to the coastlines of Africa, south and east Asia, Australasia and South America (BWPi, 2004). In Ireland, Grey Plovers occur as both passage and wintering birds and are thought to originate from Russian breeding populations (Wernham et al. 2002).

Numbers

Grey Plovers were recorded in all surveys undertaken. Whole-site numbers were variable and numbers in both 2010/11 and 2011/12 increased during the latter months of the survey period (January/February of both seasons). The peak low tide count was 244 Grey Plovers recorded on 10/02/12. The high tide count recorded 149 individuals (18/01/12); a greater number (337) had been recorded during the high tide survey a year earlier (incomplete coverage on 27/01/11). Overall only two counts of complete coverage recorded numbers that exceeded the threshold of all-Ireland importance (January 2012 HT survey and February 2012 LT survey).

Grey Plovers were recorded in four subsites overall (0M429, 0M433, 0M434 and 0M435) but numbers recorded in 0M433, 0M434 and 0M435 were low (<6 birds). 0M429 (Back Strand South) held peak numbers in all four low tide surveys and a subsite peak count of 244 on 10/02/12. 0M433 (Back Strand west of sea wall) held peak numbers and 97% of all counted during the high tide survey on 18/02/12.

Foraging Distribution

During winter Grey Plovers mainly forage intertidally and have a characteristic mode of foraging whereby they stand motionless watching the mudflat surface before snatching a prey item (often a worm) from the sediment surface. Grey Plovers take a wide range of prey species including Lugworms (*Arenicola marina*), Ragworms (*Hediste diversicolor*), amphipod crustaceans and small bivalves (e.g. *Macoma balthica and Scrobicularia plana*) (Dit Durrell & Kelly, 1990).

Grey Plovers foraged intertidally in two subsites 0M429 (Back Strand South) and 0M433 (Back Strand west of sea wall). They both held very low numbers on 10/11/11 (one and two individuals respectively). 0M429 (Back Strand South) held peak numbers on 12/12/11 and 10/02/12 (42 and 196 respectively).

0M429 has fine sand sediment and is classified as the benthic community 'intertidal fine sand with *Bathyporeia pilosa* and *Nephtys cirrosa*.' The southern section of this subsite however (upper to mid shore) was noted to be characterised by a mixed community that is an intermediate between the fine sand/muddy sand that dominates the outer Back Strand and the community that dominates the inner Back Strand (west of the embankment). 0M433 and areas west of the embankment differ in that the sediment is muddier and classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013). A number of species, including the polychaetes *Hediste diversicolor* and *Scoloplos armiger*, the bivalve *Cerastoderma edule* and the gastropod *Peringia (Hydrobia) ulvae*, have a patchy distribution within this community complex and their abundances range from high to moderate. This community was assigned the marine biotope LS.LMu.MEst.HedMacScr *(Hediste diversicolor*, *Macoma balthica* and *Scrobicularia plana* in littoral sandy mud) by ASU (2008).

The incomplete counts (in terms of subsite coverage) carried out in 2010/11 also found most Grey Plovers to be feeding in 0M429 and 0M433; with generally greater numbers in 0M429.

The highest intertidal foraging density recorded for a single subsite was 0.2 Grey Plover ha^{-1} (0D442 Ballysakeery), and is considered low. The whole site mean feeding density (intertidal habitat) was 0.01 Grey Plover ha^{-1}.

Roosting Distribution

During low tide surveys, Grey Plovers that were recorded in roosting/other behaviour were largely positioned within 0M429 (12 and 48 individuals on 10/11/12 and 10/02/12) making this subsite the most important in terms of totals numbers recorded.

During the high tide survey on 27/01/11, 337 Grey Plover roosted intertidally within 0M433 (Back Strand west of sea wall). These birds were positioned centrally north of the expansive area of saltmarsh and as part of a larger mixed-species aggregation that also included 460 Dunlin, and 79 Knot.

The high tide survey on 18/01/12 recorded three roosts. 105 Grey Plovers roosted supratidally within 0M433, these birds positioned along the embankment, a large mixed-species roost that also comprised 565 Lapwing, 221 Oystercatchers, 22 Bar-tailed Godwit, 70 Dunlin and 3 Greenshank. A further 40 Grey Plovers roosted intertidally in 0M433 (Back Strand west of sea wall), positioned within the main saltmarsh roosting area along the southern edge of the subsite. Four Grey Plover roosted intertidally (feet in water) along the north-eastern shoreline of 0M434.

Lapwing *Vanellus vanellus* - Family (group): Charadriidae (wading birds)

The Lapwing is a monotypic species and has a wide Palearctic breeding distribution from Britain and Ireland in the west to Eastern and southern Siberia in the east with a southern limit extending into Spain (Delaney et al. 2009). Birds breeding in Britain and Ireland are partial migrants with some residing over winter and some migrating south. The wintering population is enhanced by Lapwings moving in from continental Europe and northern and western Britain (Wernham et al. 2002). Cold weather movements can result in a greater flux of birds to Ireland's estuaries.

Numbers

The peak low tide count of 2011/12 was 1,124 Lapwings recorded on 10/02/12. 1,452 Lapwings were recorded during the high tide count on 18/01/12.

Whole site numbers of Lapwing were particularly low in the early part of the 2010/11 survey programme, likely due to the weather; Lapwings are known to undertake cold weather movements. No Lapwings were present during the low tide count on 07/01/11, likely due to December 2010 being the coldest on record (Met Éireann, 2010) and birds moving elsewhere, as noted by Crowe et al. (2011). Numbers picked up again in the latter part of this survey programme however with 1,208 and 1,553 (01/02/11 (LT) and 27/01/11 (HT) being higher than any respective low or high tide count recorded during the 2011/12 season, despite the 2010/11 counts failing to achieve full subsite coverage.

No count of Lapwings exceeded the threshold of all-Ireland importance.

Across the survey programme, Lapwings were recorded within eight subsites (0M408, 0M409, 0M430, 0M431, 0M433, 0M434, 0M436 and 0M501). 0M433 only recorded this species during the high tide survey.

0M436 (Corbally south to old Landfill) recorded this wader with most regularity (3 low tide surveys); several subsites recording the species only once (0M408, 0M430, 0M433). 0M433 (Back Strand west of sea wall) however held the subsite peak count of 1,007 Lapwings during the high tide survey on 18/01/12.

Peak numbers were recorded for 0M431, 0M434 and 0M436 for the low tide surveys on 10/11/111, 12/12/11 and 10/02/12 (none recorded on 06/10/10).

Foraging Distribution

Lapwings are traditionally 'inland' waders. During winter they can be observed across a wide variety of habitats, principally using lowland farmland and freshwater wetlands (e.g. turloughs and callows) but also coastal wetlands where they feed on a variety of soil and surface-living invertebrates. They are opportunistic and mobile birds and will readily exploit temporary food sources such as newly-ploughed fields. Estuaries are typically used as roosting areas where large flocks may be observed roosting upon the tidal flats but coastal areas will also be used to a greater degree during cold weather events when farmland and freshwater habitats freeze over. There is evidence in the UK that utilisation of coastal habitats has increased, coupled with an increase in intertidal feeding (Gillings et al. 2006).

Lapwings were not recorded foraging during the 2011/12 survey programme.

During the 2010/11 survey programme, small numbers were recorded foraging in three subsites (0M431, 0M435 and 0M436) and low numbers foraged terrestrially in 0M408 (Tramore Back Strand: Lisselan Fields) (outside of the SPA boundary). A recent study of Kilmacleague Fields (equivalent to subsite 0M409) found that a significant proportion of the Tramore Back Strand population of Lapwing can use this area on occasion (RPS, 2010).

Roosting Distribution

During 2011/12, intertidal roosting/other behaviour was recorded within 0M430, 0M431, 0M433, 0M434, and 0M436. Low tide peak numbers were recorded for 0M431 (Kilmacleague & Clohernagh), 0M434 (Back Strand north) and 0M436 (Corbally south to old Landfill); numbers peaking at 794 Lapwing within 0M431 (Kilmacleague & Clohernagh) on 10/02/12.

During 2010/11 (incomplete subsite coverage), Lapwings were recorded roosting/other intertidally in four subsites: 0M430, 0M434, 0M435 and 0M436.

During the high tide roost survey on 18/01/12, Lapwings were recorded roosting in four subsites (0M409, 0M433, 0M434 and 0M501). The largest number of birds (565) was positioned along the northern section of embankment of 0M433 (Back Strand west of sea wall), a large mixed-species roost that also comprised 105 Grey Plovers, 221 Oystercatchers, 22 Bar-tailed Godwit, 70 Dunlin and 3 Greenshank. 40 Lapwings also roosted with 56 Oystercatchers a little further south along the same embankment. A further 442 Lapwings roosted intertidally and supratidally (saltmarsh) in 0M433 positioned within the main saltmarsh roosting area along the southern edge of the subsite.

The third largest roost (168 Lapwing) was positioned along the north-eastern shoreline of 0M434; these birds stood with feet in water amongst a larger mixed-species flock that comprised mostly foraging birds. The birds moved up the shore to the edge of the saltmarsh with the incoming tide. In the far west of the subsite, 98 Lapwing roosted on the embankment (i.e. the other side of the embankment from those roosting in 0M433). A further 53 roosted at two intertidal roosts.

0M435 (Crobally to Ballinattin) held good numbers (125) roosting supratidally during the high tide survey on 28/01/11 (note incomplete count in terms of subsite coverage). 0M436 (Corbally south to old Landfill) held a large number (1,200) roosting terrestrially during the same high tide survey; these birds, along with 700 Golden Plover were positioned just north of the subsite and outside of the SPA boundary.

Terrestrial roosting was observed in both areas of polderland (0M408 and 0M409) (outside of the SPA boundary) and a peak number of 58 Lapwings roosted terrestrially at Tramore boating lake (0M501) on 18/01/12.

Dunlin *Calidris alpina* - Family (group): Scolopacidae (wading birds)

The Dunlin is a Holarctic and highly migratory wader, breeding widely in Arctic zones across Europe, Asia and North America. The nominate form *alpina* breeds from northern Scandinavia eastwards across European Russia and western Siberia to 85^0 E (Delaney et al. 2009). This race migrates southwest to winter along the coasts of Western Europe, south to Iberia, western Mediterranean and beyond.

The majority of Dunlin wintering in Ireland are *C. a. alpina* that originate from the western part of their breeding range and moult mainly in the Wadden Sea before starting to arrive in Ireland during October (Crowe, 2005). Ireland has a small and declining breeding population of *Calidris alpina schinzii* which are believed to winter mainly in west Africa (Delaney et al. 2009).

Numbers

Whole-site numbers of Dunlin (complete counts) peaked in December 2011 (461 Dunlin) and 386 were counted during the high tide count on 18/01/12. Despite counts in 2010/11 not achieving full subsite coverage, peak numbers were higher; a low tide peak of 596 on 25/11/10 and a high tide count of 569 on 27/01/11.

Dunlin was a relatively widespread species and recorded in seven subsites overall (0M429, 0M430, 0M431, 0M433, 0M434, 0M435 and 0M436). Four subsites recorded this wader with most regularity (three or more surveys): 0M429 (Back Strand south), 0M433 (Back Strand west of sea wall), 0M434 (Back Strand north) and 0M436 (Corbally south to old Landfill).

0M429 (Back Strand south) held peak numbers on three low tide occasions (06/10/10, 12/12/11 and 10/02/12). 0M436 (Corbally south to old Landfill) held peak numbers on 10/11/11.

No count exceeded the threshold of all-Ireland importance.

Foraging Distribution

The Dunlin diet is relatively wide and although this versatile species often shows a preference for muddier areas within sites (e.g. Hill et al. 1993; Santos et al. 2005), their distribution can often be widespread with no clear patterns.

Between 93 and 100 per cent of Dunlins counted during low tide surveys were foraging. Seven subsites were used overall (0M429, 0M430, 0M431, 0M433, 0M434, 0M435 and 0M436).

0M429 (Back Strand south) held peak numbers on 06/10/10, 12/12/11 and 10/02/12. The lower shore of 0M429 has fine sand sediment and is classified as the benthic community 'intertidal fine sand with *Bathyporeia pilosa* and *Nephtys cirrosa*.' The southern section of this subsite however (upper to mid shore) is muddier and is classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013). A number of species, including the polychaetes *Hediste diversicolor* and *Scoloplos armiger*, the bivalve *Cerastoderma edule* and the gastropod *Hydrobia ulvae*, have a patchy distribution within this community complex and their abundances range from high to moderate. This community type extends across the inner Backstrand also. While a greater proportion of foraging Dunlin on 10/11/11 were positioned in the south-east of 0M429 alongside Ringed Plover in an area with sandier sediment, almost all Dunlin the following month (220) and during the final low tide survey (10/02/12) foraged in the very south-west of the subsite in muddier sediments. This area seems particularly well-used by a variety of wader species.

0M436 (Corbally south to old Landfill) held peak numbers on 10/11/11. 0M436 and areas west of the embankment (inner Back Strand) are muddier and classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013), as described above. This community was assigned the marine biotope LS.LMu.MEst.HedMacScr *(Hediste diversicolor*, *Macoma balthica* and *Scrobicularia plana* in littoral sandy mud) by ASU (2008).

0M434 (Back Strand north) regularly held good numbers foraging intertidally and the numbers recorded were always ranked second highest. This subsite is also characterised by the intertidal benthic community 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' which grades to intertidal fine sands down shore.

The peak intertidal foraging density was 13 Dunlin ha^{-1} recorded for 0M436 (Corbally south to old Landfill) on 10/11/11. The second highest peak density recorded was 4 individuals per hectare (0M435 Crobally to Ballinattin). The whole site average intertidal foraging density was 0.5 Dunlin ha^{-1}.

Roosting Distribution

Relatively little roosting/other behaviour was recorded during low tide surveys.

During the high tide survey on 27/01/11, 460 Dunlins roosted supratidally within 0M433 (Back Strand west of sea wall). These birds were positioned in the expansive area of saltmarsh and as part of a larger mixed-species aggregation that also included 337 Grey Plover and 79 Knot.

During the high tide survey on 18/01/12, 290 Dunlins roosted supratidally within the same area of saltmarsh as noted above. This was a large roost with some birds within the saltmarsh vegetation itself, and some on the tidal flats just in front (seaward) of it. Because of the difficulty of viewing into the saltmarsh, counts are likely to be underestimates. Some of the Dunlin were observed to move into this roost from the nearby embankment. An additional 70 Dunlin roosted along the northern section of embankment (supratidal) along with 565 Lapwing, 221 Oystercatcher, 22 Bar-tailed Godwit and 105 Grey Plover. Almost the entire length of embankment appears to be used by a variety of different waterbirds from Cormorants (near the gap) to gulls and small waders. A further ten Dunlin roosted intertidally along the upper shore of 0M434; again part of a larger mixed-species roost.

Black-tailed Godwit *Limosa limosa* - Family (group): Scolopacidae (wading birds)

Black-tailed Godwits *Limosa limosa* have a widespread Palearctic breeding distribution. Four populations are recognised – three populations of the nominate *L. l. limosa* and one *L. l. islandica*, the latter of which breeds almost exclusively in Iceland and winters in Britain, Ireland, Spain, Portugal and Morocco (Delaney et al. 1999). Recoveries and sightings confirm that Black-tailed Godwits wintering in Ireland are of the *islandica* race, whereas further south (e.g. Spain and Portugal) some mixing of *limosa and islandica* occurs in the non-breeding season (Wernham et al. 2002).

Numbers

Numbers of Black-tailed Godwits during the low tide surveys of the 2011/12 season ranged from 84 (10/02/12) to a peak of 414 individuals (12/12/11). 182 were counted during the high tide survey (18/01/12).

The season of 2010/11 (incomplete subsite coverage) recorded a peak low tide count of 573 individuals (01/02/11). Numbers dropped back in early January 2011, likely due to December 2010 being the coldest on record (Met Éireann, 2010) and birds moving elsewhere. 235 Black-tailed Godwits were counted during the high tide survey (27/01/11).

Black-tailed Godwits were recorded in nine subsites overall (0M408, 0M429, 0M430, 0M431, 0M432, 0M433, 0M434, 0M435 and 0M436) but seven of these only recorded the species once. 0M436 (Corbally south to old Landfill) recorded this wader in all surveys and recorded the peak number in all except one survey (12/12/11) when 411 were recorded in the polderland of 0M408 (Tramore Back Strand: Lisselan Fields).

Foraging Distribution

Black-tailed Godwits are relatively large long-billed wading birds that forage within intertidal flats for their preferred prey of bivalves such as *Macoma balthica*, *Scrobicularia plana* and *Mya arenaria*. At some sites, polychaete worms form a larger proportion of the diet and the species is relatively adaptable, utilising other habitats for foraging where available, such as terrestrial grassland, coastal marshes and freshwater callows.

During the first three complete low tide surveys (06/10/10, 10/11/11 & 12/12/11) almost all Black-tailed Godwits foraged in subsite 0M436 (Corbally south to old Landfill) (proportions ranging from 94% to 100%). On 10/02/12, 85 Black-tailed Godwits foraged across five subsites, the largest proportion (39%) in 0M436, with smaller numbers in 0M431, 0M432, 0M433 and 0M434. From this pattern of distribution it appears that Black-tailed Godwits distribute across the muddier sediments at this site.

A large proportion of the site is classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013). A number of species, including the polychaetes *Hediste diversicolor* and *Scoloplos armiger*, the bivalve *Cerastoderma edule* and the gastropod *Peringia (Hydrobia) ulvae*, have a patchy distribution within this community complex and their abundances range from high to moderate. Count subsites west of the embankment (0M436, 0M433 and 0M435) are particularly muddy and were assigned the marine biotope 'LS.LMu.MEst.HedMacScr (*Hediste diversicolor*, *Macoma balthica* and *Scrobicularia plana* in littoral sandy mud) by ASU (2008). Of further note is subsite 0M431 which is the estuary of the Keiloge River and was assigned the biotope 'LS.LSa.MuSa.HedMacEte (*Hediste diversicolor*, *Macoma balthica* and *Eteone longa* in littoral muddy sand' (ASU, 2008).

The incomplete counts (in terms of subsite coverage) carried out in 2010/11 also found most Black-tailed Godwits to be feeding in 0M436.

Terrestrial foraging was recorded in 0M408 (Tramore Back Strand: Lisselan Fields) during both low and high tide surveys. Note that this subsite is outside of the SPA boundary. A recent study of Kilmacleague Fields found that a significant proportion of the Tramore Back Strand population of Black-tailed Godwit use this area on occasion (RPS, 2010).

The peak intertidal foraging density was 15 Black-tailed Godwits ha^{-1} recorded for 0M436 (Corbally south to old Landfill) on 06/10/10. This subsite also recorded a peak density of 13 Black-tailed Godwits ha^{-1} on 10/11/11. No other subsite attained a density of over 1 individual ha^{-1}. The whole site average intertidal foraging density was 0.3 Black-tailed Godwits ha^{-1}.

Roosting Distribution

Very few records were made of individuals in roosting/other behaviour during low tide surveys and this behaviour was recorded for 0M435 and 0M436 only.

During the high tide survey on 18/01/12, 98 Black-tailed Godwits roosted in 0M433 (Back Strand west of sea wall). These birds were positioned in the inner south-west corner of the subsite (near the old partially submerged racecourse stand). A further ten individuals roosted supratidally in the same subsite. 73 individuals were recorded foraging on this day; a greater proportion doing so terrestrially in 0M408 (Tramore Back Strand: Lisselan Fields).

The 2010/11 surveys (incomplete subsite coverage) recorded terrestrially roosting Black-tailed Godwits in 0M408 (Tramore Back Strand: Lisselan Fields).

Bar-tailed Godwit *Limosa lapponica* - Family (group): Scolopacidae (wading birds)

The Bar-tailed Godwit has a widespread breeding distribution across the sub-arctic and low Arctic zones of the Palearctic and extending into western Alaska (Delaney et al. 2009). The taxonomy of the species is complex but five subspecies are generally recognised. The nominate subspecies *L. l. lapponica* breeds in northern Fennoscandia and Northern European Russia, east to the Kanin Peninsula, and winters mainly in Western Europe, including Ireland. The Wadden Sea is used by *L. l. lapponica* and other populations as a staging and moulting area in autumn and spring.

Numbers

The peak low tide count recorded was 357 Bar-tailed Godwits on 06/10/10. 147 individuals were recorded during the high tide survey on 18/01/12. These peaks however are lower than those recorded during the incomplete counts made during 2010/11 when a peak low tide number of 395 Bar-tailed Godwits were recorded.

Two of the complete counts (on 06/10/10 and 10/02/12) exceeded the threshold of all-Ireland importance.

Bar-tailed Godwits were relatively widespread and recorded in eight subsites overall (0M429, 0M430, 0M431, 0M432, 0M433, 0M434, 0M436 and 0M438). Only 0M429 (Back Strand South) recorded the species in all four low tide surveys with numbers ranked second or third highest in all. Low tide peak numbers were recorded for 0M436 (Corbally south to old Landfill) (06/10/10) (subsite peak count of 260), and 0M434 (Back Strand north) (10/11/11, 12/12/11 & 10/02/12).

Foraging Distribution

Bar-tailed godwits are a wader species considered characteristic of coastal wetland sites dominated by sand. The birds forage by probing within intertidal sediment for invertebrate species, predominantly large polychaete worms such as *Arenicola marina* and *Nepthys* sp. The species is characteristic of sites with sandy substrates (e.g. Hill et al. 1993; Summers et al. 2002).

Bar-tailed Godwits were recorded foraging within 8 subsites overall (see above) but subsite use ranged from one to eight for individual low tide surveys. Peak numbers on 06/10/10 were foraging in 0M429 (Back Strand South), thereafter 0M434 (Back Strand north) held peak numbers in all low tide surveys. Numbers recorded in other subsites were much lower and less than 11 individuals in all cases.

A large proportion of 0M429 is classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013). A number of species, including the polychaetes *Hediste diversicolor* and *Scoloplos armiger*, the bivalve *Cerastoderma edule* and the gastropod *Peringia (Hydrobia) ulvae*, have a patchy distribution within this community complex and their abundances range from high to moderate. The Lugworm *Arenicola marina* is also a distinguishing species of this community. Bar-tailed Godwits were often observed to forage in the mid-shore region of the subsite and often close to a water channel. The mid to low shore is classified as the intertidal community 'intertidal fine sand with *Bathyporeia pilosa* and *Nephtys cirrosa*.' *Nephtys cirrosa* occurs in the intertidal and shallow subtidal range and is a highly sought after prey item.

A recent study of Kilmacleague Fields (equivalent to subsite 0M409) found that a significant proportion of the Tramore Back Strand population of Bar-tailed Godwits can use this area on occasion (RPS, 2010). No terrestrial foraging was recorded during the 2010/11 or 2011/12 Waterbird Survey Programme.

The highest intertidal foraging density recorded for a single subsite was 0.8 Bar-tailed Godwits ha^{-1} (0M429 Back Strand South) on 06/10/10. This was followed closely by 0M434 (Back Strand north) which recorded a density of was 0.7 Bar-tailed Godwits ha^{-1}. The whole site mean feeding density (intertidal habitat) was 0.2 Bar-tailed Godwits ha^{-1}.

Roosting Distribution

During low tide surveys, Bar-tailed Godwits were rarely recorded roosting intertidally; one exception being 260 individuals that roosted intertidally within 0M436 (Corbally south to old Landfill) on 06/10/10.

65 Bar-tailed Godwits were recorded roosting in 0M433 (Back Strand west of sea wall) during the high tide survey on 18/01/12. These birds were positioned in the expansive area of saltmarsh along the southern section of the subsite, and as part of a larger mixed-species aggregation that also included 40 Grey Plover, 290 Dunlin and 200 Golden Plover. A further 22 Bar-tailed Godwits roosted supratidally along the northern section of embankment (together with 565 Lapwing, 221 Oystercatcher and 105 Grey Plover). 60 Bar-tailed Godwits roosted supratidally in 0M430 (Summerville); an upper shore roost that also supported 250 Oystercatcher and a single Redshank.

2010/11 low tide surveys recorded once-off records of intertidally roosting Bar-tailed Godwits in 0M429, 0M430 and 0M436.

Curlew *Numenius arquata* - Family (group): Scolopacidae (wading birds)

The Curlew has a widespread breeding range across temperate latitudes of the Palearctic region, occurring across Europe and Asia from Ireland in the west to northern China in the east (Delaney et al. 2009). The nominate subspecies breeds across Europe and winters in Europe. Ireland supports a small and declining population of breeding Curlew. Irish breeding Curlew are thought to make only short migrations and be mainly resident during winter. Wintering numbers are enhanced by birds moving in from breeding grounds in Fennoscandia, the Baltic and northwest Russia (Delaney et al. 2009) and Britain (Wernham et a. 2002).

Numbers

Whole-site numbers of Curlew varied between months from a relatively low count of 150 on 12/12/11 to a peak low-tide count of 622 on 10/02/12. 399 Curlew were counted during the high tide survey on 18/01/12. Only one whole-site count (622 on 10/02/12) exceeded the threshold of all-Ireland importance. The peak number of Curlew recorded during the 2010/11 counts was 425 individuals (incomplete counts with the exception of 06/10/10).

Curlews were widespread and occurred in ten subsites overall (0M408, 0M409, 0M429, 0M430, 0M431, 0M432, 0M433, 0M434, 0M435 and 0M436). Five subsites recorded this wader in all four low tide surveys (0M429, 0M431, 0M433, 0M434 and 0M436). Peak numbers for the four low tide surveys (complete surveys) were recorded for: 0M429, 0M430, 0M434 and 0M432. 0M432 recorded the subsite peak count of 354 Curlews.

Foraging Distribution

Curlews are the largest intertidal wader to spend the non-breeding season within Ireland. Within intertidal areas they seek out larger prey items such as crabs, large worms and bivalves. Their de-curved bill is ideally suited to extracting deep-living worms such as Lugworms (*Arenicola marina*). Curlews rely on large prey that takes more time to handle (long handling time) in contrast to many other wader species that swallow prey relatively quickly upon finding it (short handling time). As a consequence, Curlews are territorial foragers and tend to occur widely spaced from each other to avoid competitive conflicts.

Overall, eight subsites supported intertidally foraging Curlews (0M429, 0M430, 0M431, 0M432, 0M433, 0M434, 0M435 and 0M436). 0M429 (Back Strand South) and 0M434 (Back Strand north) recorded foraging individuals in all four low tide surveys and both supported peak numbers; 0M429 on 06/10/10 and 10/11/11, and 0M434 on 12/12/11 and 10/02/12. 0M433 (Back Strand west of sea wall) supported lower numbers in all four low tide surveys. 0M429 and 0M434 comprise the main tidal flats of the outer back strand. A large proportion of these subsites is classified as 'intertidal muddy sand with *Pygospio elegans* and *Tubificoides benedii*' (NPWS, 2013). A number of species, including the polychaetes *Hediste diversicolor* and *Scoloplos armiger*, the bivalve *Cerastoderma edule* and the gastropod *Peringia (Hydrobia) ulvae*, have a patchy distribution within this community complex and their abundances range from high to moderate. The Lugworm *Arenicola marina* is also a distinguishing species of this community. The mid to low shore is classified as the intertidal community 'intertidal fine sand with *Bathyporeia pilosa* and *Nephtys cirrosa*.'

Terrestrial foraging was recorded in 0M408 (Tramore Back Strand: Lisselan Fields) and 0M409 (Tramore Back Strand: Kilmacleague Fields), during both low and high tide surveys; with peak counts of 172 (18/01/12) and 179 (01/02/11) for these two subsites respectively. Note that these subsites are outside of the SPA boundary.

A recent study of Kilmacleague Fields also found Curlew to use this area regularly (RPS, 2010). Indeed, data collected between 2004 and 2008 suggests that a significant proportion of the Tramore Back Strand populations of Curlew use Kilmacleague fields on occasion.

The highest intertidal foraging density recorded within a subsite was 2.3 Curlew ha^{-1} (0M429 Back Strand South). 0M435 (Crobally to Ballinattin) also recorded a density greater than 1 individual ha^{-1} on one occasion and 0M431 (Kilmacleague & Clohernagh) was ranked third with a peak density of 0.7 Curlew ha^{-1} on 06/10/10. The whole site mean feeding density (intertidal habitat) was 0.2 Curlew ha^{-1}.

Roosting Distribution

Intertidal roosting/other behaviour was recorded widely across the site but usually involved relatively low numbers of birds. Notable exceptions were 219 Curlew that roosted in 0M430 (Summerville) on 10/11/11 and 354 within 0M432 (Bass Pt to Corbally Crossroads) on 10/02/12. 0M434 (Back Strand north) recorded good numbers regularly (maximum number 45).

During the high tide survey on 18/01/12 few Curlews roosted intertidally but 48 roosted supratidally in 0M433 (Back Strand west of sea wall). These birds were positioned in the expansive area of saltmarsh along the southern section of the subsite, and as part of a larger mixed-species aggregation. A further 43 Curlew roosted terrestrially within 0M408 (Tramore Back Strand: Lisselan Fields). Low numbers (<3 individuals) were recorded roosting across a further six subsites (0M409, 0M430, 0M431, 0M434, 0M435 and 0M436).

Terrestrial roosting was recorded in 0M408 (Tramore Back Strand: Lisselan Fields) and 0M409 (Tramore Back Strand: Kilmacleague Fields).

5.4 Tramore Back Strand – Activities and Events

5.4.1 Introduction

The overriding objective of the Habitats Directive is to ensure that the habitats and species covered achieve '*favourable conservation status'* and that their long-term survival is secured across their entire natural range within the EU (EU Commission, 2010). In its broadest sense, favourable conservation status means that an ecological feature is in a satisfactory condition, and that this status is likely to continue into the future.

At site level, the concept of 'favourable status' is referred to as 'conservation condition.' This can relate not only to species numbers, but importantly, to factors that influence a species abundance and distribution at a site. The identification of activities and events that occur at a designated site is therefore important, as is an assessment of how these might impact upon the waterbird species and their habitats, and thus influence the achievement of favourable condition. Site-based management and the control of factors that impact upon species or habitats of conservation importance are fundamental to the achievement of site conservation objectives.

Section 5.4 provides information on activities and events that occur in and around Tramore Back Strand that may either act upon the habitats within the site, or may interact with the Special Conservation Interest species and other waterbirds using the site.

5.4.2 Assessment Methods

Information on 'activities' and 'events' across the site was collected during a desk-top review which included NPWS site reporting files, County Development and other plans (e.g. Waterford County Council, 2011a,b), South-Eastern River Basin District documents, and other available documents relevant to the ecology of the site.

In addition, information was collected during the 2010/11 and 2011/12 waterbird survey programme (NPWS, 2011) as field workers recorded activities or events that occurred at the site during their survey work. This information, together with results from a 'site activity questionnaire' provides valuable information gained from 100+ hours of surveyor effort across the site. All data collected were entered into a database but as the dataset will be subject to change over time, the assessment should be viewed as a working and evolving process.

The 'activities' and 'events' were categorised using the standard EU list of pressures and threats as used in Article 12 reporting under the EU Bird's Directive. Only factors likely to directly or indirectly affect waterbirds were included but the resulting list is broad and includes built elements (e.g. man-made structures such as roads and bridges that are adjacent to the site), factors associated with pollution (e.g. discharges from waste water treatment plants), various recreational and non-recreational activities as well as biological factors such as the growth of the invasive plant species *Spartina anglica*.

Data are presented in three ways:-

1. Activities and events identified as occurring in and around Tramore Back Strand (through either the desk-top review or field survey programme) are listed in relation to the subsite within which they were observed or are known to occur. The activities/events are classified as follows:

   O observed or known to occur within Tramore Back Strand;
   U known to occur but unknown spatial area hence all potential subsites are included (e.g. fisheries activities);
   H historic, known to have occurred in the past.
   P potential to occur in the future.

2. Of the activities and events identified to occur in and around Tramore Back Strand, those that have the potential to cause disturbance to waterbird species are highlighted.

3. Data from the 2010/11 and 2011/12 waterbird survey programme were used to inform an assessment which examined the level of disturbance caused by activities recorded during field surveys. The methodology was adapted from that used for monitoring Important Bird Areas (IBAs) (Birdlife International, 2006) and involved assigning scores which ranged between 0 and 3, to three selected attributes of each disturbance event (1) frequency/duration; (2) intensity and (3) likely response of waterbirds (after Hill et al. 1997) (Table 5.7). The rationale for scoring is provided in Appendix 10.

Table 5.7 Scoring system for disturbance assessment

Frequency/Duration	(A) Timing Score	Intensity	(B) Scope Score	Response	I Severity Score	TOTAL SCORE A + B + C
Continuous	3	Active, high-level	3	Most birds disturbed all of the time	3	9
Frequent	2	Medium level	2	Most birds displaced for short periods	2	6
Infrequent	1	Low-level	1	Most species tolerate disturbance	1	3
Rare	0	Very low-level	0	Most birds successfully habituate to the disturbance	0	0

The scores assigned to the three attributes were then added together to give an overall 'disturbance score' which is used to define the extent of the impact as follows:-

Scores 0 – 3 = Low
Scores 4 – 6 = Moderate
Scores 7 – 9 = High

The attributes (1) frequency/duration and (3) response were scored based on field survey observations. Attribute (2) intensity was scored based on a combination of field survey observations and best expert opinion.

5.4.3 Overview of activities at Tramore Back Strand

Activities and events identified to occur in and around Tramore Back Strand are shown in Appendix 9, listed in terms of the subsites surveyed during the NPWS Waterbird Survey Programme. Activities highlighted in grey are those that have the potential to cause disturbance to waterbirds (see Section 5.4.4).

The following pages outline the range of activities and events that occur across the site using the following headings: (1) habitat loss, modification and adjacent landuse; (2) water quality; (3) fisheries and aquaculture; (4) recreational disturbance; and (5) others.

Habitat loss, modification and adjacent landuse

Tramore Bay is an almost rectangular basin which on its landward side has a 5km beach backed by clay cliffs on its north-western side, sea walls, a shingle embankment and a large dune system. The dunes reach a height of 26 metres. In the north-east, the narrow Rinnashark channel drains an extensive intertidal area that lies behind the dunes called the Back Strand (McGrath, 2001). Three small rivers discharge into the Back Strand; the Keiloge flows into the Clohernagh Inlet (subsite 0M431), the Glendudda into Kilmacleague (0M431), and a small unnamed river enters in the north-western corner at Ballinattin (0M435).

The landscape around the head of Tramore Bay is hilly, and cliffs begin to form south of Tramore Town. The northern side of the Back Strand contains several hills that separate low-lying areas. Landuse is predominantly agricultural, a former municipal landfill and Tramore Town lies to the west of the inner Back Strand along with several caravan parks.

Tramore Back Strand has been subject to a considerable amount of land claim over the past 150 years. Land claim of the inner Back Strand commenced in the mid 1800's facilitated by the building of the Malcolmson Embankment, linking the beach to Ballinattin. The inner Back Strand was used for horse racing (around 1855). In the very inner section of 0M433 the remains of a former racecourse can still be seen sticking out of the mud. The Malcolmson Embankment was damaged by a storm in April 1911 and then again in December the same year. The latter breach was not repaired and the claimed area flooded again. The breach is currently about 100m wide (McGrath, 2001).

Waterford County Council began using the south-western corner of the inner Back Strand (claimed land) as a landfill site in the 1940's. The site was extended in a north-westerly direction in 1996. As a result of vertical dumping as opposed to lateral, the landfill formed a raised mound in the inner site, although some infilling around it has lessened the effect (McGrath, 2001). While open, the landfill attracted an abundance of gull species. Methods to deter gulls, such as the use of falconry were used at the site. The landfill site was closed in 2005 and has since undergone an extensive capping and restoration programme.

A large intertidal area along the north side of the Back Strand (Lisselan Fields 0M408) was enclosed by a tall embankment in the 19th century. This polderland now supports improved grassland. A second large area in the north-east corner of the Back Strand (Kilmacleague Fields 0M409) was similarly enclosed.

The largest area of saltmarsh in the site lies along the southern boundary of subsite 0M433. The saltmarsh topography has been damaged by old drainage works. Deep creek-like drains were dug on the mudflats, this drainage was probably carried out in association with the infilling around the landfill. These drains have assisted the spread of Common Cordgrass (*Spartina anglica*) into the lower saltmarsh zone along some of the drains. The west side and adjacent to an infilled area is quite disturbed and this has affected the transition zone along the landward boundary. There are several tracks along the landward boundary of the saltmarsh as it undergoes the transition into disturbed coastal grassland (McCorry & Ryle, 2009).

Saltmarsh at Lisselan (along northern shore of subsite 0M434) is considered in very good condition although there are signs that it has been grazed in the past (McCorry & Ryle, 2009).

Overall, the main disturbance to saltmarsh habitats has been through reclamation activities. The embankment, for example, is likely to have affected sedimentation processes. It is likely that these earlier activities are still having some residual impacts although these have not been assessed (McCorry & Ryle, 2009).

Waterford County Council are undertaking the creation of wetland habitat at Tramore Bay by way of compensation for environmental damage caused to dune and intertidal habitats as a result of operations at Tramore Landfill (RPS, 2010). A case against Ireland was brought to the European Court of Justice (ECJ) and in response to the ECJ ruling, Ireland gave an undertaking to compensate for any damage caused to the SAC/SPA through the provision of a created wetland at lands located adjacent Tramore Back Strand (The Tramore Wetland Restoration Project). 22ha within Kilmacleague Fields will be inundated with seawater by the creation of breaches in the existing seawall. The lands surrounding the new wetland will be protected by the creation of a new seawall embankment to the north of the new wetland. The design incorporates measures to retain habitat for grazing geese as well as providing new intertidal habitat (RPS, 2011).

The introduced and invasive species *Spartina anglica* is present at several locations around the Back Strand. As mentioned above, the largest area is in the inner Back Strand, along the southern boundary of subsite 0M433. A dense *Spartina* sward has developed on soft mud in this area at the seaward side of the saltmarsh (Atlantic salt meadows). This area has been disturbed in the past by the creation of deep drains crossing the mudflats (McCorry & Ryle, 2009).

Tramore Strand and dune system have been subject to wave and tidal erosion as part of coastal morphological changes across both short and long-term time scales. The dune system has suffered impacts due to human use (trampling, erosion) and this has contributed to the occurrence of blowouts as a result of wind erosion (Gault et al. 2006). Comparison made between OS maps from 1920 and photographs from 2000 and 2005 reveal that there has been accretion at the eastern end of the spit with a difference of 120m between 1920 and 2006, while over the same period erosion as a result of natural coastal processes has occurred at Bass Point with a retreat of up to 210m (Gault et al. 2006).

There have been many and various attempts to control dune erosion such as armouring and wooden fencing, plus the fencing-off of blowout areas. The extent of Tramore's previous coastal protection works is reviewed by Gault et al. (2006).

There has been considerable migration of channels across the back strand over time which may be leading to increased erosion of the northern side of the dunes (Gault et al. 2006).

Water quality

The South Eastern River Basin District (SERBD) River Basin Management Plan 2009 – 2015 covers the implementation of the Water Framework Directive (WFD) (2000/60/EEC) for the south east coast of Ireland and covers Tramore Bay and its inflowing rivers.

The South Eastern River Basin Transitional and Coastal Waters Action Programme (SERBD, 2010a) does not provide a status classification for Tramore Bay; the site being listed as 'yet to be determined.'

Water quality has been an issue at this site in the past and linked most often to inadequate waste water treatment; wastewater from Tramore being collected and pumped untreated into the bay via a short outfall pipe below low water level. This issue was addressed when in 2008, a new 22 million euro Waste Water Treatment Plant (WWTP) was opened. This plant is designed to serve a PE of 20,000 with provisions made in the design of the plant to allow for expansion to 35,000 PE should it be required in future. This project involved modifications and extensions to the existing stormwater and wastewater sewer network and a primary 2km sea outfall pipe that was laid from the treatment plant at Crobally Upper, out into Tramore Bay. There are a total of five discharge points from the agglomeration. The primary discharge (SW1) is via an outfall pipe and diffuser into Tramore Bay. The remaining discharge points include 1 emergency overflow and 3 storm water overflows, which also discharge into Tramore Bay. Tramore WWTP provides primary and secondary treatment (Waterford County Council, 2010).

Improvements in WWTP treatment are aimed at meeting objectives of the Urban Waste Water Treatment Regulations (EU Council Directive 91/271/EEC, as transposed by S.I. No. 254 of 2001 as amended by S.I. 48 of 2010) and the Water Framework Directive (2000/20/EC as transposed by the European Communities (Water Policy) (Amendment) Regulations, 2010)). However a reduction in organic and nutrient loading to an estuary may have various consequences for the ecology of the estuarine system including a reduction in the abundances of some benthic invertebrates that form prey species for waterbirds (e.g. Burton et al. 2002). This could have knock-on effects upon waterbird foraging distribution, prey intake rates, and ultimately upon survival and fitness.

Related to this is the subject of macroalgal mats which are a common feature across Tramore Back Strand. Macroalgal mats of species such as *Ulva* spp[16] can have both negative and positive effects upon waterbird foraging ecology; some species avoiding them or being negatively affected by lowered invertebrate abundances beneath them (Lewis & Kelly, 2001; Lopes et al. 2006) while herbivores such as Light-bellied Brent Geese and Wigeon benefit from the algae being a source of food. Given that sustained high levels of macroalgal growth is linked to organic enrichment, there is a potential for a reduction in macroalgal abundance as a result of improvements to sewage discharges. Although such factors are complex and may operate over the long-term, it is advised that they be considered in future assessments of waterbird distribution patterns at this site.

Fisheries & aquaculture

Fishing in Tramore Bay is largely recreational (McGrath, 2001). Various commercial inshore fishing activities are likely to occur adjacent to the site (detail and spatial scale unknown). Shore angling occurs off Bass Point (0M438), from the beach (0M492) and was observed taking place from the sloping edge of the former landfill site in 0M433.

Bait-digging occurs widely and was recorded from four subsites during the Waterbird Survey Programme.

Commercial exploitation of Cockles (*Cerastoderma edule*) was banned by the Cockle (Fisheries Management and Conservation) (Tramore Bay) Regulations 2007 which prohibits the collection of Cockles (by any method) for public sale. The hand-gathering of Cockles still occurs across the Back Strand and while low levels of this activity have a relatively benign impact on the estuarine system unregulated groups of gatherer's impart an un-assessed impact, upon both the target species and indirectly upon waterbirds, in terms of disturbance.

Recreational disturbance

According to the Tramore Local Area Plan 2007-2013 (Waterford County Council, 2006) the population of Tramore town has grown considerably in recent years due to the town's popularity as a commuter town, in close proximity to Waterford City and other urban areas. The population of Tramore grew by 16% during the period 2002 to 2006 (Waterford County Council, 2011b).

Historically Tramore has been classified as the premier seaside resort in the south-east (Desmond et al. 2008). Consequently, the designated SPA is subject to considerable pressure from recreational activity because of its proximity to Tramore town.

The 5-km long beach (Tramore Strand) and associated dune system (the Burrow) are a local amenity and are used extensively for walking and dog walking by both locals and many visitors during key holiday periods. Loose dogs are a regular occurrence.

[16] includes species formerly classified as *Enteromoropha* (Hayden, 2003).

Swimming is popular off Tramore Strand and the site is popular with surfers. Kite surfing also occurs.

Recreational use of the beach appears dominated by walking and watersports with activities such as horse riding or quad bikes in the minority (Gault et al. 2006). Mechanical beach cleaning occurs and Tramore Strand achieved Blue Flag status in 2012.

The training of greyhounds occasionally occurs across the Back Strand (McGrath, 2001) and this activity was observed during the Waterbird Survey Programme. The shoreline along the north of the outer Back Strand (i.e. between the two estuary channels) is regularly used for driving tractors, presumably for gaining access to fields.

Others

Wildfowling was not recorded at the site during the Waterbird Survey Programme. In response to the freezing conditions experienced in the winter of 2010, the Department of the Environment, Heritage and Local Government extended a temporary closure of the hunting season for wild birds (8^{th} – 30^{th} December 2010 inclusive).

5.4.4 Disturbance Assessment

During the 2011/12 Waterbird Survey Programme, six activities/events were recorded that had the potential to cause disturbance to waterbirds. These were: aircraft, bait diggers, walking (including with dogs), motorised vehicles, hand-gathering of molluscs (winkle picking), and water-based recreation (e.g. surfers) (Table 5.8).

Walking (including with dogs) was by far the most widespread activity occurring in seven subsites overall and accounting for the peak disturbance score in all of these. The presence of dogs generally led to a higher score as a result of the higher 'intensity' of the activity. Walking as a recreational activity occurs frequently along Tramore strand (0M492) but was not reported to cause major disturbance as the strand did not support large numbers of birds. Walking along the inner side of the dune system (southern shore of 0M429) is favoured because the dunes provide protection from the prevailing winds. Walkers and dogs in this area are likely to cause a greater disturbance to birds that are feeding across the mudflats.

The activities recorded in 0M409 (Kilmacleague Fields) were related directly to the Tramore Wetland Restoration Project (as described further in Section 5.4.3).

A summary of the disturbance assessment is shown in Table 5.8 and full results are shown in Appendix 10. As a final review, Table 5.9 shows the peak disturbance scores overlaid on the subsite assessment table (total waterbird numbers, LT surveys).

Table 5.8 Disturbance Assessment Summary Table
Number of activities recorded during field surveys (2011/12 waterbird survey programme) observed to cause disturbance to waterbirds. The calculated peak disturbance score is shown (see text for explanation).
Scores 0 – 3 = Low Scores 4 – 6 = Moderate Scores 7 – 9 = High. Grey shading = no activity recorded.

Subsite Code	Subsite Name	Number Activities	Peak Disturbance Score	Activity Responsible
0M408	Tramore Back Strand: Lisselan Fields	-	-	
0M409	Tramore Back Strand: Kilmacleague Fields	2	6	• Walking (incl. with dogs) • Motorised vehicles
0M429	Back Strand South	2	7	• Walking (incl. with dogs)
0M430	Summerville	1	6	• Walking (incl. with dogs)
0M431	Kilmacleague & Clohernagh	2	6	• Aircraft
0M432	Bass Pt to Corbally Crossroads	1	6	• Walking (incl. with dogs)
0M433	Back Strand west of sea wall	1	6	• Walking (incl. with dogs)
0M434	Back Strand north	4	6	• Walking (incl. with dogs)
0M435	Crobally to Ballinattin	-	-	
0M436	Corbally south to old Landfill	1	3	• Hand-gathering of molluscs
0M438	Rinnashark Harbour	-	-	
0M492	Outer Tramore Bay	2	4	• Walking (incl. with dogs)
0M501	Tramore boating lake	-	-	

Table 5.9 Tramore Back Strand – subsite rankings based on total numbers of waterbirds (LT surveys) by peak disturbance score

Species ► / Subsites ▼	PB	GP	GV	L.	DN	BW	BA	CU
0M408	V			L		V		H
0M409	V			H				H
0M429	L	M	V		V	H	H	V
0M430	H			H	M	M	M	V
0M431	H			V	M	H	H	H
0M432	H					L	L	V
0M433	M	V	H		M	M	M	H
0M434	V	V	M	V	H	M	V	V
0M435	L				L	H		M
0M436	H	V	H	V	V	V	V	M
0M438	M						M	
0M492								
0M501				L				

5.4.5 Discussion

Many of the 'activities' identified at the Tramore Back Strand may act so as to modify the wetland habitats. While physical loss might be considered more historic in nature (e.g. land claim), on-going modifications to intertidal and coastal habitats may occur due to changes in natural processes (e.g. sedimentation or erosion rates) as a result of former physical events and these are evident at this site (McCorry & Ryle, 2009).

Land claim has influenced this site to a relatively large degree. While the Tramore Wetlands Restoration Project is designed to provide some mitigation for these historical activities, only on-going monitoring will determine their success.

Human recreational activities at coastal sites occur less frequently during winter months and the range of activities is much reduced. At Tramore Bay, recreational activities are centred largely on areas outside of the SPA (e.g. along Tramore strand), but walking is a popular and regular activity along the Back Strand.

Any activity that causes disturbance can lead to the displacement of waterbirds. The significance of the impact that results from even a short-term displacement should not be underestimated. In terms of foraging habitat, displacement from feeding opportunities not only reduces a bird's energy intake but also leads to an increase in energy expenditure as a result of the energetic costs of flying to an alternative foraging area. Displacement also has knock-on ecological effects such as increased competition (within and/or between different species) for a common food source. In areas subject to heavy or on-going disturbance, waterbirds may be disturbed so frequently that their displacement is equivalent to habitat loss. When disturbance effects reduce species fitness[17] (reduced survival or reproductive success) consequences at population level may result.

Whilst the nature and the frequency of disturbance-causing activities are key factors when assessing likely impacts, many aspects of waterbird behaviour and ecology will influence a species response. Waterbird responses are likely to vary with each individual event and to be species-specific. The significance of a disturbance event upon waterbirds will vary according to a range of factors including:-

- Frequency/duration of disturbance event;
- Intensity of activity;
- Response of waterbirds.

And be influenced by:-

- Temporal availability – whether waterbirds have the opportunity to exploit the food resources in a disturbed area at times when the disturbance does not occur;
- Availability of compensatory habitat – whether there is suitable alternative habitat to move to during disturbance events;
- Behavioural changes as a result of a disturbance – e.g. degree of habituation;
- Time available for acclimatisation – whether there is time available for habituation to the disturbance. (there may be a lack of time for waterbirds during the staging period);
- Age – for example when feeding, immature (1st winter birds) may be marginalised by older more dominant flocks so that their access to the optimal prey resources is limited. These individuals may already therefore be under pressure to gain their required daily energy intake before the effects of any disturbance event are taken into account;
- Timing/seasonality – birds may be more vulnerable at certain times e.g. pre- and post-migration, at the end of the winter when food resources are lower;

[17] defined as a measure of the relative contribution of an individual to the gene pool of the next generation.

- Weather – birds are more vulnerable during periods of severe cold weather or strong winds;
- Site fidelity – some species are highly site faithful at site or within-site level and will therefore be affected to a greater degree than species that range more widely;
- Predation and competition – a knock-on effect of disturbance is that waterbirds may move into areas where they are subject to increased competition for prey resources, or increased predation – i.e. the disturbance results in an indirect impact which is an increased predation risk.

Knowledge of site activities and events is important when examining waterbird distribution and understanding the many factors that might influence a species' distribution across a site. The above points also highlight the complex nature of waterbird behaviour and species specificity, as well as the need for careful consideration of the impacts of disturbance upon waterbird species when undertaking Appropriate Assessments or other environmental assessments. This review could therefore form the starting point for any future study aiming to quantify the effects of activities/disturbance events across the site, as well as to help identify the extent to which existing use and management of the site are consistent with the achievement of the conservation objectives described in Part Three of this document.

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APPENDIX 1

SITE NAME: TRAMORE BACK STRAND SPA

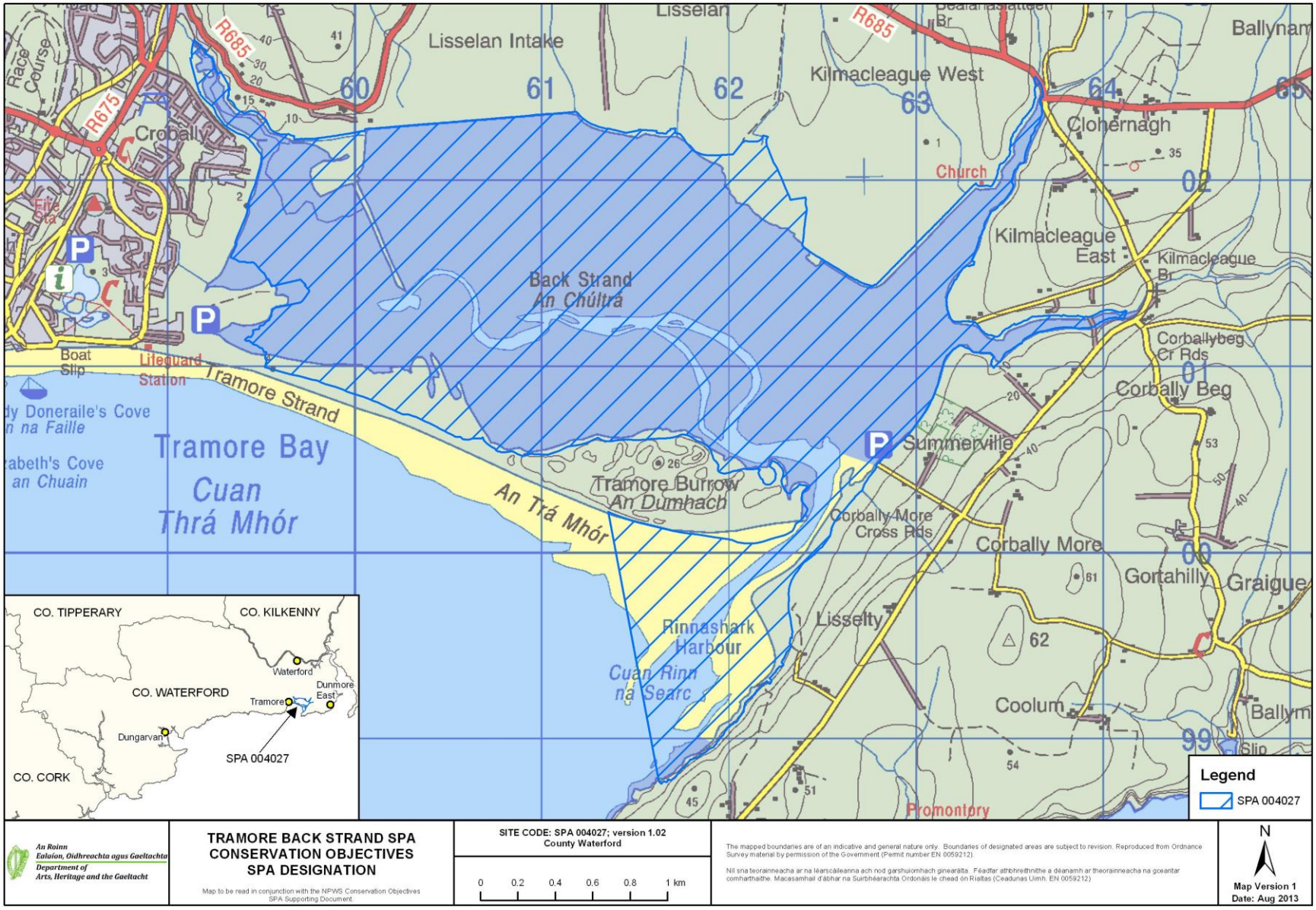
SITE CODE: 004036

This site lies a little east of Tramore town in County Waterford. It comprises a medium sized estuary sheltered from the open sea by a long, shingle spit, with high dunes. The area of the SPA, known as the Back Strand, empties almost completely at low tide. It is connected to the outer bay and sea by narrows at Rinneshark. The intertidal mud flats and sand flats are an important habitat and are listed on Annex I of the E.U. Habitats Directive. The macrofauna is well developed, with Lugworm (*Arenicola marina*), Furrow Shell (*Scrobicularia plana*), Ragworm (*Hediste diversicolor*) and Common Cockle (*Cerastoderma edule)* being common, and with large patches of Common Mussel (*Mytilus edulis*) and Edible Periwinkles (*Littorina littoralis*) also present. A feature of this habitat is the presence of Eelgrass (*Zostera noltii and Z. angustifolia*), an important food item for herbivorous wildfowl. Salt marsh, another habitat on Annex I of the E.U. Habitats Directive, is well developed and fairly extensive in the sheltered inner part of the site. It is the lagoon type of salt marsh, the rarest type in Ireland. The communities found are characteristic of both Atlantic and Mediterranean salt marshes. The main species include Thrift (*Armeria maritima*), Common Saltmarsh-grass (*Puccinellia maritima*), Lax-flowered Sea-lavender (*Limonium humile*), Sea Plantain (*Plantago maritima*), Sea Aster (*Aster tripolium*), Sea-purslane (*Halimione portulacoides*) and Sea Rush (*Juncus maritimus*). The scarce Hard-grass (*Parapholis strigosa*) occurs and a feature of this salt marsh is the presence of Golden-samphire (*Inula crithmoides*), a species rarely found on salt marshes in Ireland. Glasswort (*Salicornia* spp.) and other annuals such as Annual Sea Blite (*Suaeda maritima*) occur in channels and pans and also on the mudflats. Common Cord-grass (*Spartina anglica)* is frequent on parts of the salt marshes and on the mudflats.

The Back Strand is an important site for wintering waterfowl, providing both feeding and roosting areas. Counts are available for the 1970s and 1980s and for the 5 winters 1995/96 to 1999/00 (figures given are average peaks for the 90s). Of particular importance is that the site supports an Internationally Important population of Brent Geese (393). A further seven species occur in Nationally Important numbers: Golden Plover (2,924), Grey Plover (299), Lapwing (3,308), Dunlin (1,723), Sanderling (46), Black-tailed Godwit (289) and Bar-tailed Godwit (367). A range of other species also occur in significant numbers, including Wigeon (77), Teal (135), Red-breasted Merganser (18), Oystercatcher (347), Ringed Plover (55), Knot (75), Snipe (83), Curlew (620), Redshank (223), Greenshank (12) and Turnstone (24). In recent times Little Egret has become a regular visitor, with an average peak of six for the period. The regular occurrence of Little Egret, Golden Plover and Bar-tailed Godwit is of particular note as these are listed on Annex I of the E.U. Birds Directive. A potential threat to the intertidal habitat is seepage of leachate from a landfill site adjacent to the estuary.

Tramore Back Strand SPA is of high ornithological importance for wintering waterfowl, with one species having a population of International Importance and a further seven species having populations of National Importance. In addition, three of the species are listed on Annex I of the E.U. Birds Directive i.e. Golden Plover, Bar-tailed Godwit and Little Egret.

2002.


Lisselan Intake
Kilmacleague West
Clohernagh
Church
Kilmacleague East
Kilmacleague Br
Corballybeg Cr Rds
Corbally Beg
Summerville
Back Strand
An Chúltrá
Tramore Strand
Boat Slip
Lifeguard Station
Tramore Bay
Cuan Thrá Mhór
Tramore Burrow
An Dumhach
An Trá Mhór
Corbally More Cross Rds
Corbally More
Gortahilly
Graigue
Lisselty
Rinnashark Harbour
Cuan Rinn na Searc
Coolum
Promontory
Corbally
Race Course
R685
R675
CO. TIPPERARY
CO. KILKENNY
CO. WATERFORD
CO. CORK
Waterford
Dunmore East
Tramore
Dungarvan
SPA 004027
Legend
SPA 004027
An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht
TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION
Map to be read in conjunction with the NPWS Conservation Objectives SPA Supporting Document.
SITE CODE: SPA 004027; version 1.02
County Waterford
0 0.2 0.4 0.6 0.8 1 km
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).
Nil sna teorainneacha ar na léarscáileanna ach nod garshuiomhach gineárálta. Féadfar athbhreithnithe a dhéanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. EN 0059212)
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Map Version 1
Date: Aug 2013

APPENDIX 2

Waterbird data sources

Irish Wetland Bird Survey (I-WeBS)
I-WeBS began in the Republic of Ireland in 1994/95 and aims to monitor wintering (non-breeding) waterbird populations at the wetland sites upon which they rely. Counts are carried out by volunteers and professional staff of the partner organisations across the months September to March of each year. I-WeBS counts take place on a rising tide or close to high tide. For further information please refer to Crowe (2005) and Boland & Crowe (2012).

The I-WeBS Programme monitors the larger coastal wetland sites together with inland lakes, turloughs, rivers and callows. However the resulting dataset is incomplete for some waterbird species that utilise other habitats such as non-wetland habitat (e.g. grassland used by many species and particularly foraging geese, and swans), non-estuarine coastline, small and ephemeral wetlands and the open sea; the latter of which is obviously difficult to monitor from land-based surveys (Crowe, 2005).

A number of additional and special surveys are therefore conducted on an annual or regular basis and data collected are, where appropriate, integrated into the I-WeBS database. These surveys include those undertaken for swan and geese species that forage typically during daylight hours across terrestrial habitats (e.g. grassland, arable fields) using coastal wetlands sites at night when they congregate to roost. Some of the additional surveys are carried out at certain times, aimed at providing a better estimate of numbers (e.g. Greylag Geese) and for some species an assessment of breeding success during the previous summer (e.g. Light-bellied Brent Geese). These surveys are introduced briefly below and more information is provided in Crowe (2005).

- Swan Surveys

Coordinated international censuses are carried out of the wintering populations of Whooper Swan (*Cygnus ygnus*) and Bewick's Swan (*Cygnus columbianus bewickii*) at four or five-yearly intervals. The surveys are organised by I-WeBS, the Irish Whooper Swan Study group (IWSSG) and WWT.

- Greenland White-fronted Goose

Greenland White-fronted Geese are concentrated at relatively few sites during winter, many of which are non-wetland habitats. The species is therefore not covered adequately by the I-WeBS programme. The Greenland White-fronted Goose census was initiated in the late 1970's and is carried out by NPWS in Ireland and by JNCC and Scottish Natural Heritage (SNH) in Scotland.

- Greylag Geese

Data for the Icelandic breeding population of Greylag Goose that winters in Ireland are taken from special surveys organised through I-WeBS and undertaken during November each year. The surveys aim to assess the distribution and status of the migratory flocks wintering in Ireland and focus on known feeding areas (grassland & agricultural land). When calculating population estimates of the Icelandic birds, data collected are adjusted to account for feral flocks that also occur within Ireland.

- Barnacle Goose (*Branta leucopsis*)

A wintering population from the northeast Greenland breeding population winters mainly on offshore islands along the west coast of Ireland. An aerial survey is conducted of the principal wintering areas every four to five years.

- Light-bellied Brent Geese

Special autumn surveys of this species have been conducted since 1996, organised in Ireland by the Irish Brent Goose Research Group (IBGRG). The survey is currently conducted on a bi-annual basis during the month of October which coincides with the autumn arrival of the species. Data collected are integrated into the I-WeBS database.

APPENDIX 3

Analysing population trends: a synopsis

Monitoring of non-breeding waterbirds has been undertaken by the Irish Wetland Bird Survey (I-WeBS) and its partner, WeBS in Northern Ireland, since the mid 1990's. For such long-term count data, there is clearly a need to assess long-term trends in a consistent and objective manner (Atkinson et al. 2006).

The first stage in the analytical process involves the use of the Underhill Program (Underhill & Prŷs-Jones, 1994) which models the raw monthly counts using a Generalised Linear Model (GLM). As part of this process, it accounts for changes in numbers at the site and the timing of the count (month, year) while also taking into account completed counts and trends at other sites. When counts at a site are flagged as poor quality (e.g. due to poor visibility) or where there are missing values in a given month, then the modelled values are used. This imputation process is used widely to replace missing data points (e.g. Houlahan et al. 2000; Atkinson et al. 2006; Leech et al. 2002; Gregory et al. 2005; Crowe et al. 2008). The resulting dataset is therefore complete for all months and seasons and comprises a combination of actual count data and imputed count data.

This complete dataset is then modelled using a Generalised Additive Models (GAM) which fits a smoothed curve to the counts. GAMs are non-parametric and flexible extensions of the generalised linear model where the linear predictor of the GLM is replaced by a general additive predictor which allows mean abundance to vary as a smooth function of time. Count data are assumed to follow independent Poisson distribution with 0.3T degrees of freedom (e.g. after Atkinson et al. 2006). The application of GAMs to analyse population trends was applied to UK farmland birds by Fewster et al. (2000) and has since been adopted for modelling waterbird trends elsewhere, for example, the UK WeBS Alert system (Leech et al. 2002).

Smoothed count data for a site are then indexed to assess population trends over time. An index number can be defined as a measure of population size in one year expressed in relation to the size of the population in another selected year (Leech et al. 2002). Changes in the index numbers can therefore explain the pattern of population change over time (Underhill & Prŷs-Jones, 1994).

Annual indices are calculated separately for each species at a site. For each year included in an analysis, a total is obtained by summing the number of birds present in a predetermined number of months. The final year in the series of totals is then scaled to equal 100 (please see example in table). Index values in any given year therefore represent the number of individuals relative to those present in the final year. As this process is the same across all species and all sites analysed it allows for some useful comparisons.

Count Data	Index
264.41	128.11
262.21	127.04
234.0	113.37
126.0	61.05
197.23	95.56
206.4	100.00

Un-smoothed indices are also calculated and provide a means of examining ('eye-balling') the variation across time and can also be used to provide a measure of the mean annual change over the entire period. However, the GAM extension to the methodology and resultant smoothed indices allows for the calculation of proportional change in population size between one season and another. This latter calculation is used in Section 4.2 whereby trends are calculated for the 'long-term' 12-year period (1995–2007) and the recent five-year period (2002-2007). The values given represent the percentage change in index (population) values across the specified time period, calculated by subtracting the smoothed index value at the start of the time-frame (1995) from the smoothed index value in the reference year (2007):-

$$\text{Change} = ((I_y - I_x) / I_x) \times 100$$

where I_y is the index from the current year and I_x is the index value at the start of the selected time period (see example below)

The reference year is the penultimate year in the time series because, when smoothing, the GAM takes into account values from both the preceding and following year. The last value in the smoothed dataset (2008) is therefore likely to be the least robust because it has no following year.

The final result is therefore % change in population size across a specified time period. Larger values indicate larger proportional changes in population size; positive values indicating relative increases while negative values indicate relative decreases over the specified time period.

Worked example

Year	Unsmoothed Index	Smoothed Index
1994	0.715	0.753
1995	0.604	0.804
1996	0.739	0.835
1997	0.594	0.826
1998	0.711	0.782
1999	0.745	0.727
2000	0.618	0.691
2001	0.694	0.692
2002	0.300	0.739
2003	0.530	0.827
2004	1.348	0.936
2005	0.836	1.028
2006	0.773	1.069
2007	0.734	1.051
2008	1	1.000

Term	Change
5YR	**+ 42.80**
10YR	**+ 27.24**
ALL YR	**+ 30.72**

Further information on population indexing and trend analysis can be found in various references; for particular reference to waterbirds see Leech et al (2002) and Atkinson et al. (2006). For information on the UK WeBS Alerts system, please see Thaxter et al. (2010).

Limitations

The months chosen for the calculation of population indices aim to reflect the months when the populations at a site are the most stable, excluding months when there may be fluctuations due to passage populations. Despite this, some datasets still present a high degree of variability or fluctuation both within and between years. Because of this, we assess each species separately and take into account where a species shows a history of wide fluctuations between years (within national dataset), or where a species naturally exhibits within-season fluctuations (e.g. species considered to have weak site faithfulness). Where necessary the results of the trend analysis are assigned necessary caution.

A high proportion of imputed counts can limit the effectiveness of the analysis to aid in the interpretation of the dataset. Species for which 50% or more of the monthly count values are imputed are excluded from analysis. But sometimes the calculation of population change may involve a comparison between winters where, at least one has a value based on a high proportion of imputed data. Where data for adjacent winters are relatively complete this is not a serious concern because of the smoothing technique used. However, where data for a number of consecutive winters rely heavily on imputed data then the resulting result is considered less reliable (Thaxter et al. 2010). Where necessary the results of the trend analysis are assigned necessary caution.

Despite the smoothing effects of the GAM analysis, interpretation of population trends may sometimes still be difficult. Therefore we calculate proportional change in the population across differing time periods (e.g. 12-year, 10-year and 5-year periods) to assess more effectively how the population has fared over time.

APPENDIX 4

Waterbird species codes

AE	Arctic Tern	*Sterna paradisaea*
BY	Barnacle Goose	*Branta leucopsis*
BA	Bar-tailed Godwit	*Limosa lapponica*
BE	Bean Goose	*Anser fabalis*
BS	Bewick's Swan	*Cygnus columbianus*
AS	Black Swan	*Cygnus atratus*
BH	Black-headed Gull	*Chroicocephalus ridibundus*
BN	Black-necked Grebe	*Podiceps nigricollis*
BW	Black-tailed Godwit	*Limosa limosa*
BV	Black-throated Diver	*Gavia arctica*
BG	Brent Goose	*Branta bernicla*
CG	Canada Goose	*Branta canadensis*
CM	Common Gull	*Larus canus*
CS	Common Sandpiper	*Actitis hypoleucos*
CX	Common Scoter	*Melanitta nigra*
CN	Common Tern	*Sterna hirundo*
CO	Coot	*Fulica atra*
CA	Cormorant	*Phalacrocorax carbo*
CU	Curlew	*Numenius arquata*
CV	Curlew Sandpiper	*Calidris ferruginea*
DN	Dunlin	*Calidris alpina*
GA	Gadwall	*Anas strepera*
GP	Golden Plover	*Pluvialis apricaria*
GN	Goldeneye	*Bucephala clangula*
GD	Goosander	*Mergus merganser*
GB	Great Black-backed Gull	*Larus marinus*
GG	Great Crested Grebe	*Podiceps cristatus*
ND	Great Northern Diver	*Gavia immer*
NW	Greenland White-fronted Goose	*Anser albifrons flavirostris*
GK	Greenshank	*Tringa nebularia*
H.	Grey Heron	*Ardea cinerea*
GV	Grey Plover	*Pluvialis squatarola*
GJ	Greylag Goose	*Anser anser*
HG	Herring Gull	*Larus argentatus*
JS	Jack Snipe	*Lymnocryptes minimus*
KF	Kingfisher	*Alcedo atthis*
KN	Knot	*Calidris canutus*
L.	Lapwing	*Vanellus vanellus*
LB	Lesser Black-backed Gull	*Larus fuscus*
PB	Light-bellied Brent Goose	*Branta bernicla hrotra*
ET	Little Egret	*Egretta garzetta*

LG	Little Grebe	*Tachybaptus ruficollis*
AF	Little Tern	*Sterna albifrons*
MA	Mallard	*Anas platyrhynchos*
MU	Mediterranean Gull	*Larus melanocephalus*
MH	Moorhen	*Gallinula chloropus*
MS	Mute Swan	*Cygnus olor*
OC	Oystercatcher	*Haematopus ostralegus*
PG	Pink-footed Goose	*Anser brachyrhynchus*
PT	Pintail	*Anas acuta*
PO	Pochard	*Aythya ferina*
PS	Purple Sandpiper	*Calidris maritima*
RM	Red-breasted Merganser	*Mergus serrator*
RH	Red-throated Diver	*Gavia stellata*
RK	Redshank	*Tringa totanus*
RP	Ringed Plover	*Charadrius hiaticula*
RU	Ruff	*Philomachus pugnax*
SS	Sanderling	*Calidris alba*
TE	Sandwich Tern	*Sterna sandvicensis*
SP	Scaup	*Aythya marila*
SU	Shelduck	*Tadorna tadorna*
SV	Shoveler	*Anas clypeata*
SY	Smew	*Mergus albellus*
SN	Snipe	*Gallinago gallinago*
NB	Spoonbill	*Platalea leucorodia*
DR	Spotted Redshank	*Tringa erythropus*
T.	Teal	*Anas crecca*
TU	Tufted Duck	*Aythya fuligula*
TT	Turnstone	*Arenaria interpres*
WA	Water Rail	*Rallus aquaticus*
WM	Whimbrel	*Numenius phaeopus*
WG	White-fronted Goose	*Anser albifrons*
WS	Whooper Swan	*Cygnus Cygnus*
WN	Wigeon	*Anas penelope*
WK	Woodcock	*Scolopax rusticola*

APPENDIX 5

Waterbird foraging guilds (after Weller, 1999)

Guild	Foods	Tactics	Examples…
(1) Surface swimmer	Invertebrates, vegetation & seeds	Strain/sieve/sweep/dabble/grab/up-ending	'Dabbling ducks'; e.g. Shoveler, Teal, Mallard, Pintail, Wigeon, Gadwall
(2) Water column diver – shallow[a]	Fish & Invertebrates;	Search/grab	'Diving ducks' e.g. Pochard, Tufted Duck, Scaup, Eider,
(3) Water column diver – greater depths	Fish & Invertebrates	Search/grab	Common Scoter, divers, grebes, Cormorant
(4) Intertidal walker, out of water	Invertebrates	Search (probe)/grab	Sandpipers, plovers
(5) Intertidal walker, out of water	Invertebrates, vegetation	Sieve/grab/graze	Shelduck, Avocet, Spoonbill, Wigeon, Light-Bellied Brent Goose,
(6) Intertidal walker, in water	Fish	Search/strike	Grey Heron
	Fish, Invertebrates	Probe, scythe, sweep/grab	Spoonbill, Greenshank
	Fish	Stalk	Little Egret
	Invertebrates	Probe	Several sandpiper species
(7) Terrestrial, walker (e.g. grassland/marsh)	Vegetation (inc. roots, tubers & seeds)	Graze, peck, probe	Many geese species

[a] dives <3m.

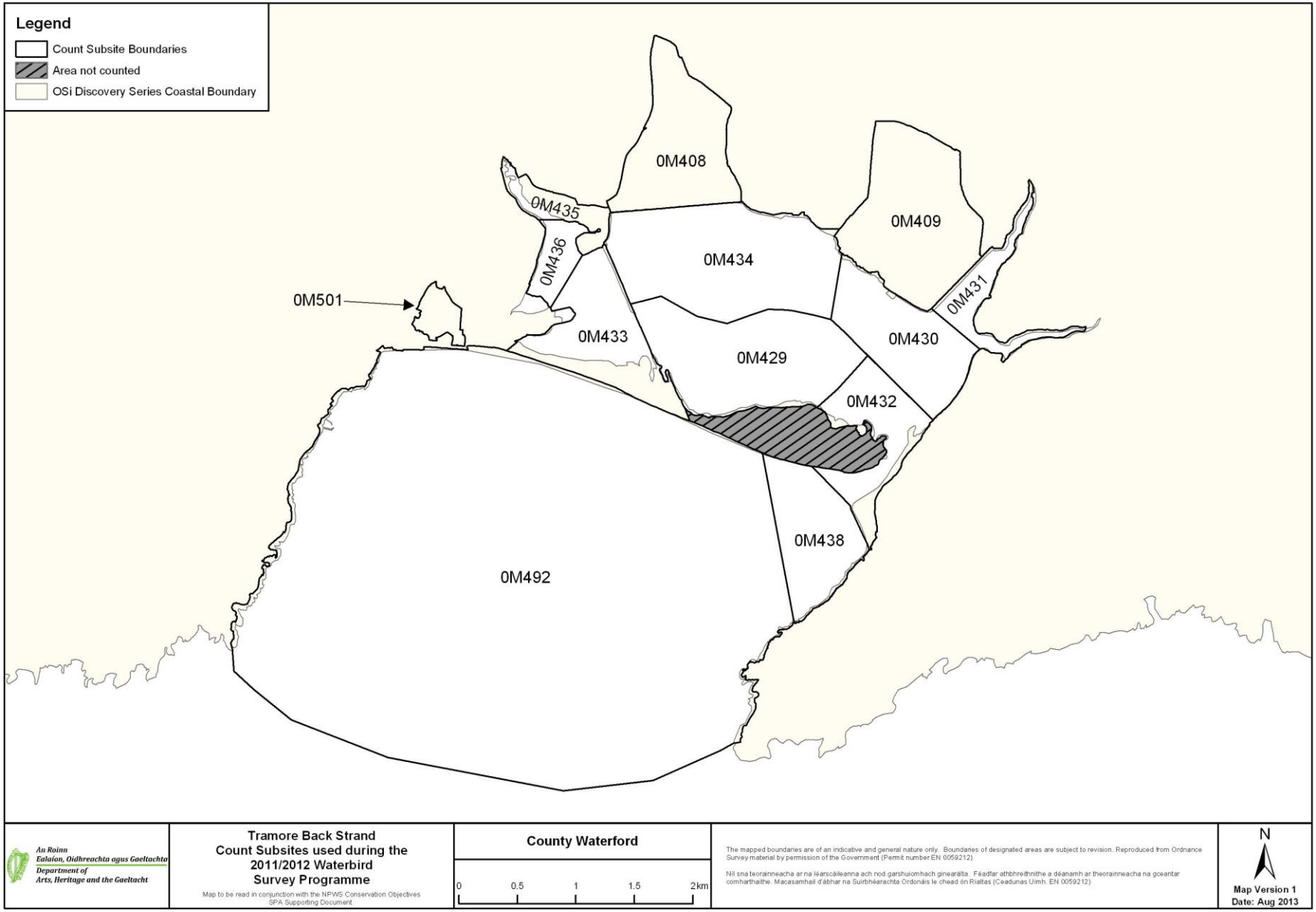
Please note that this table refers to generalised foraging strategies and is meant as a guide only. There is a great deal of variation between sites, seasons, tidal states and indeed, individual birds themselves. For example, some waterbird species may deploy several of the methods, e.g. Shelduck may forage by sieving intertidal mud (5) or by up-ending (1) and Pintail, although generally known as a 'dabbling' duck, does occasionally dive for food.

APPENDIX 6

Tramore Back Strand – Waterbird Survey Programme 2010/11 & 2011/12 – Count Subsites

Code	Subsite Name	Subsite Area (ha)
0M408	Tramore Back Strand: Lisselan Fields	96
0M409	Tramore Back Strand: Kilmacleague Fields	128
0M429	Back Strand South	135
0M430	Summerville	83
0M431	Kilmacleague & Clohernagh	35
0M432	Bass Pt to Corbally Crossroads	63
0M433	Back Strand west of sea wall	87
0M434	Back Strand north	163
0M435	Crobally to Ballinattin	25
0M436	Corbally south to old Landfill	22
0M438	Rinnashark Harbour	73
0M492	Outer Tramore Bay	1,371
0M501	Tramore boating lake	14
	Total Count Area	**2295**

Survey Dates and subsite coverage		
2010/11	**Date**	**Coverage**
LT1	06.10.10	Complete
LT2	25.11.10	Incomplete
LT3	07.01.11	Incomplete
LT4	01.02.11	Incomplete
HT1	27.01.11	Incomplete
2011/12	**Date**	**Coverage**
LT2	10.11.11	Complete
LT3	12.12.11	Complete
LT4	10.02.12	Complete
HT1	18.01.12	Complete


Legend
Count Subsite Boundaries
Area not counted
OSi Discovery Series Coastal Boundary
0M408
0M435
0M436
0M409
0M434
0M431
0M501
0M433
0M429
0M430
0M432
0M438
0M492
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Tramore Back Strand
Count Subsites used during the 2011/2012 Waterbird Survey Programme
Map to be read in conjunction with the NPWS Conservation Objectives SPA Supporting Document
County Waterford
0 0.5 1 1.5 2km
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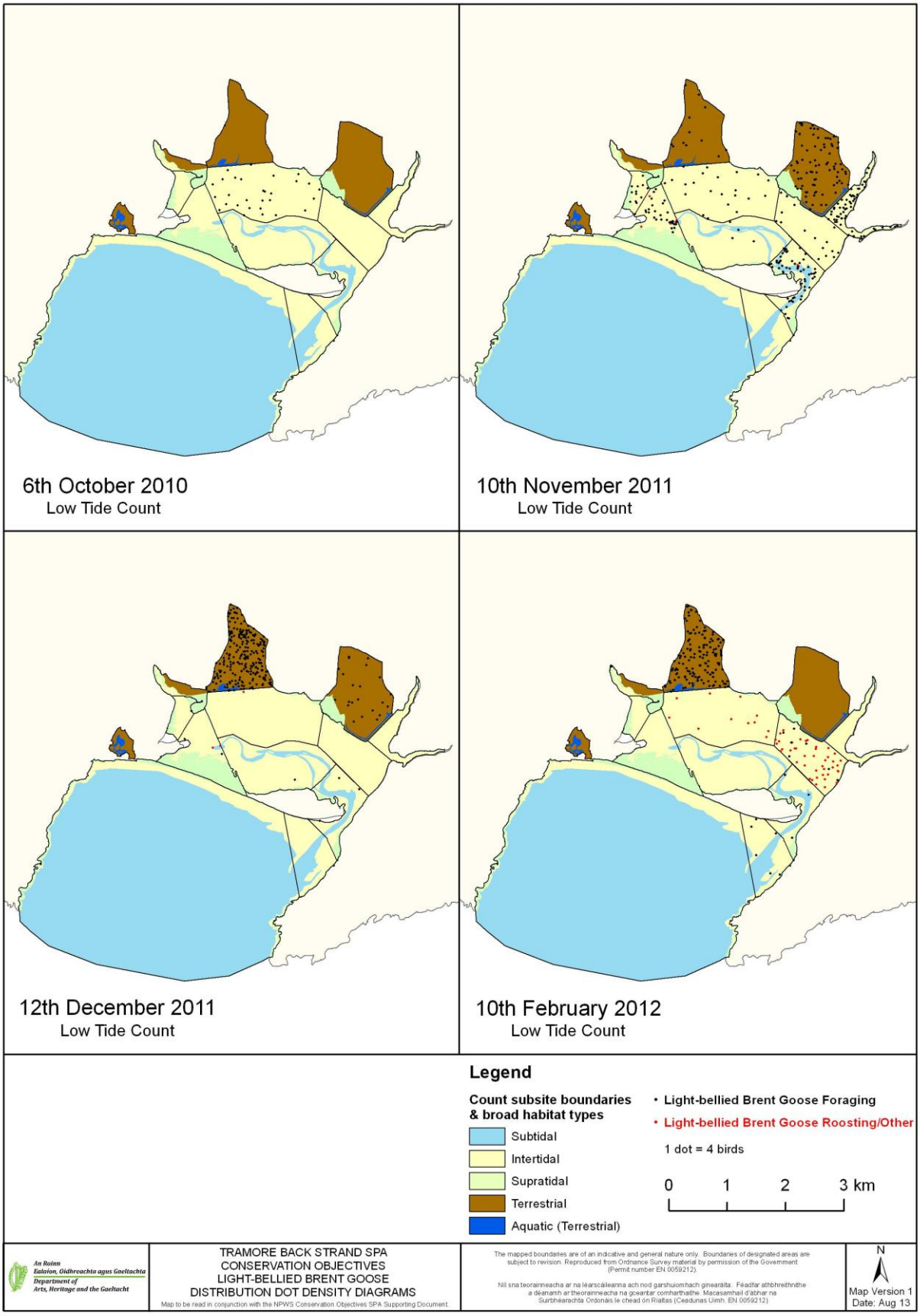
Nil sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadunas Uimh. EN 0059212)
N
Map Version 1
Date: Aug 2013

APPENDIX 7

Tramore Back Strand

Waterbird distribution (dot-density diagrams) recorded during low tide surveys (October 2010, November 2011, December 2011 & February 2012)

(NB data are presented for birds located in intertidal and terrestrial habitats only)


6th October 2010
Low Tide Count
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
• Light-bellied Brent Goose Foraging
• Light-bellied Brent Goose Roosting/Other
1 dot = 4 birds
0 1 2 3 km
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TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
LIGHT-BELLIED BRENT GOOSE
DISTRIBUTION DOT DENSITY DIAGRAMS
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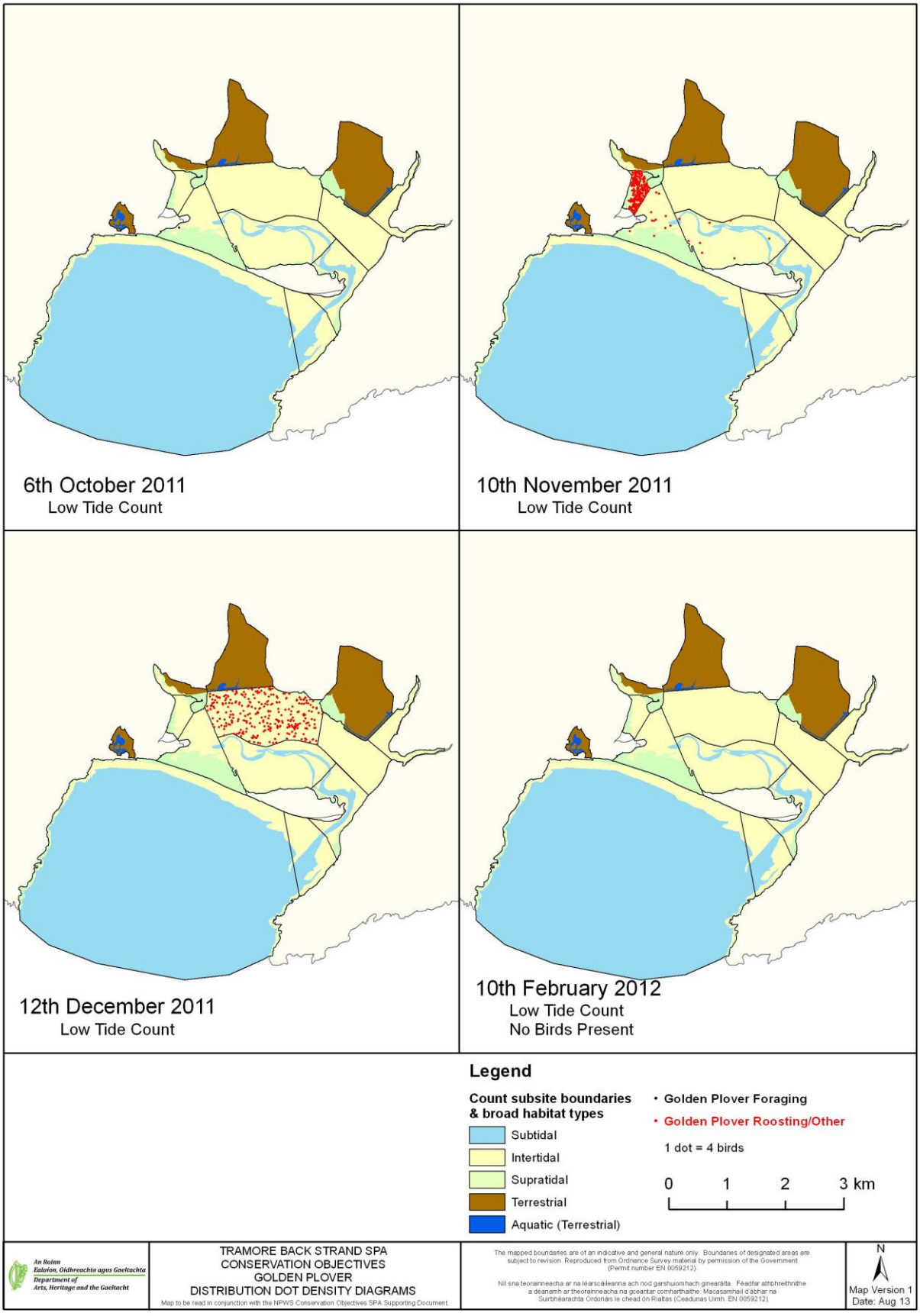
Map Version 1
Date: Aug 13


6th October 2011
Low Tide Count
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
No Birds Present
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Golden Plover Foraging
Golden Plover Roosting/Other
1 dot = 4 birds
0 1 2 3 km
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TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
GOLDEN PLOVER
DISTRIBUTION DOT DENSITY DIAGRAMS
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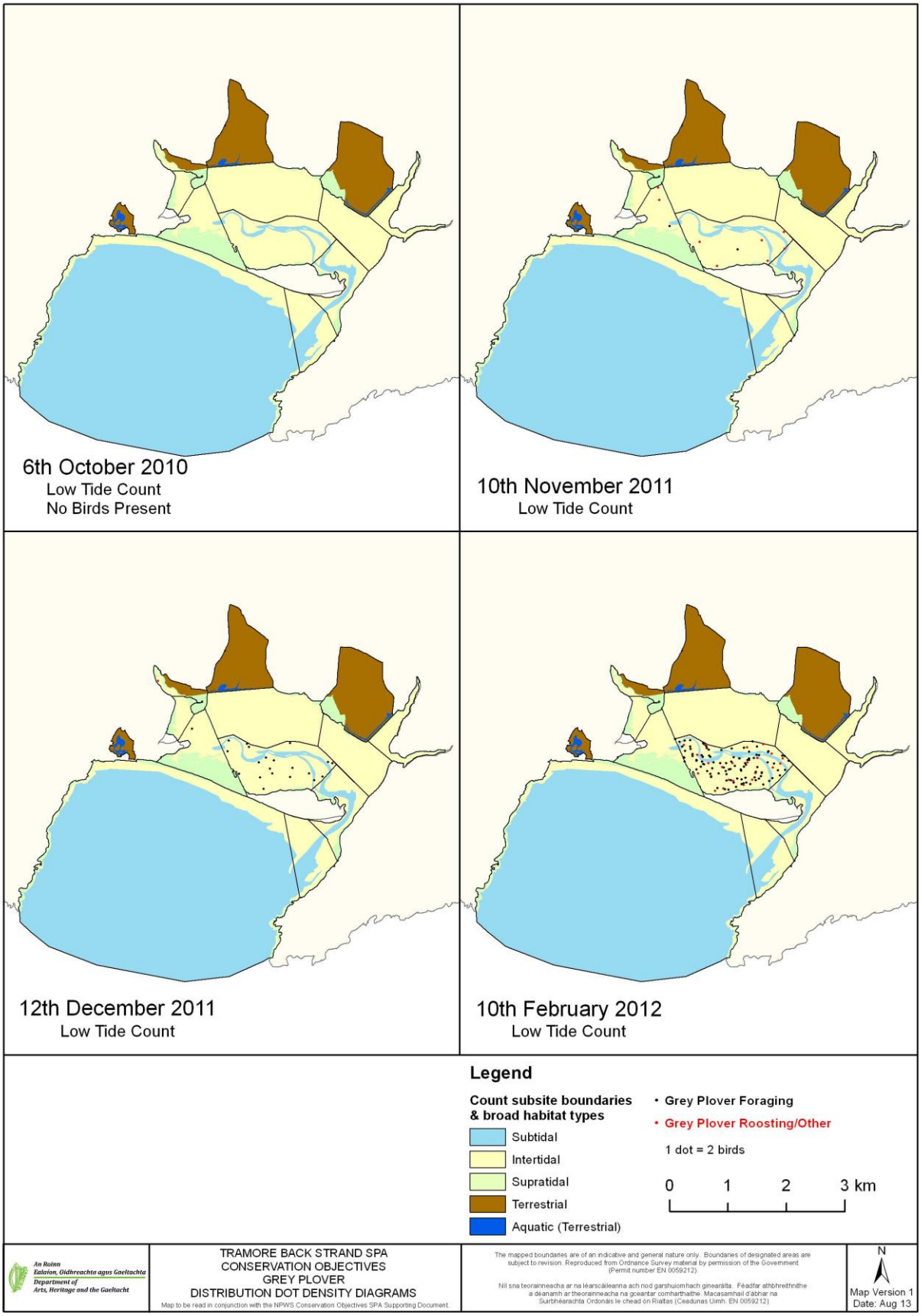
N
Map Version 1
Date: Aug 13


6th October 2010
Low Tide Count
No Birds Present
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Grey Plover Foraging
Grey Plover Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
GREY PLOVER
DISTRIBUTION DOT DENSITY DIAGRAMS
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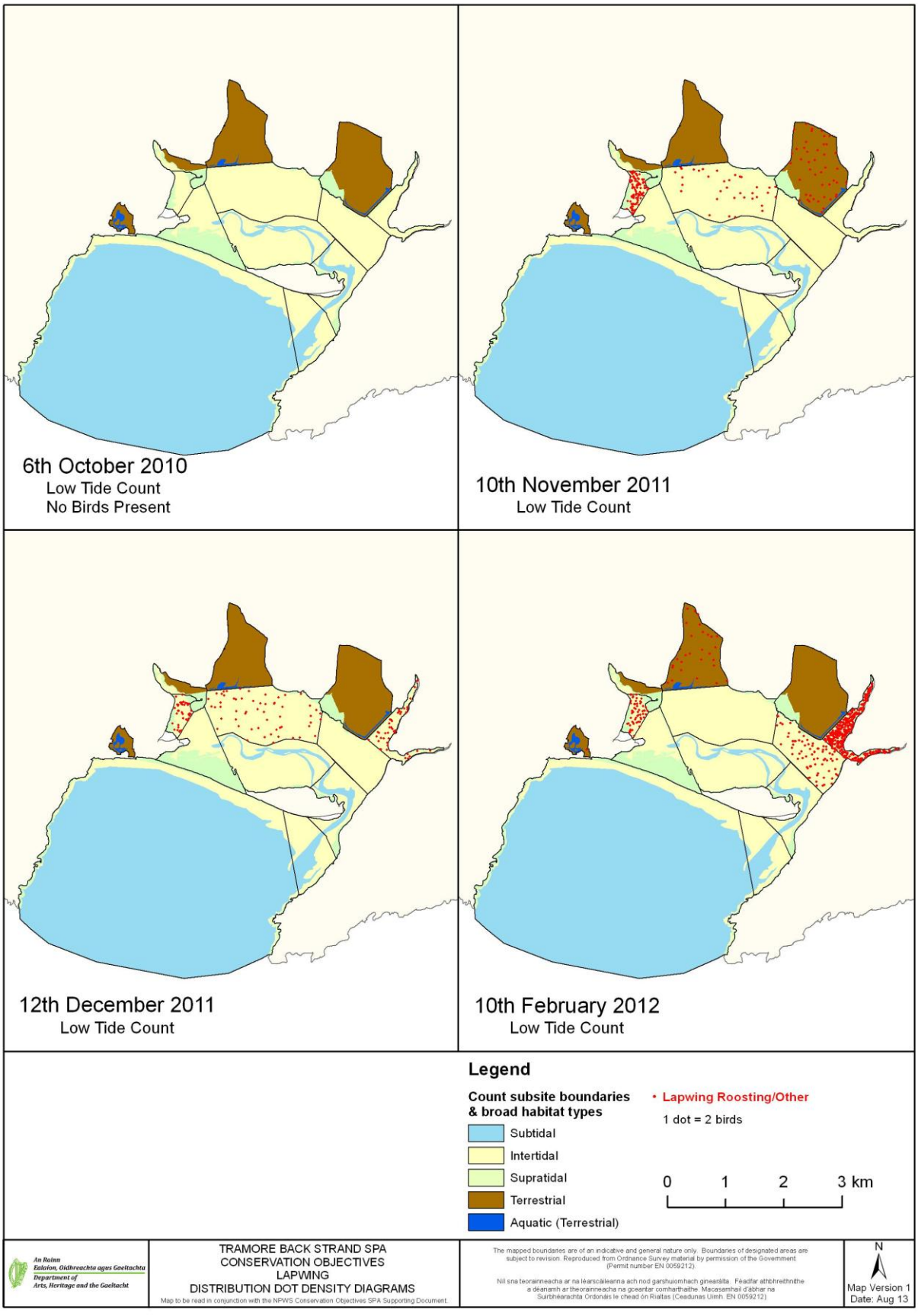
Map Version 1
Date: Aug 13


6th October 2010
Low Tide Count
No Birds Present
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
• Lapwing Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
LAPWING
DISTRIBUTION DOT DENSITY DIAGRAMS
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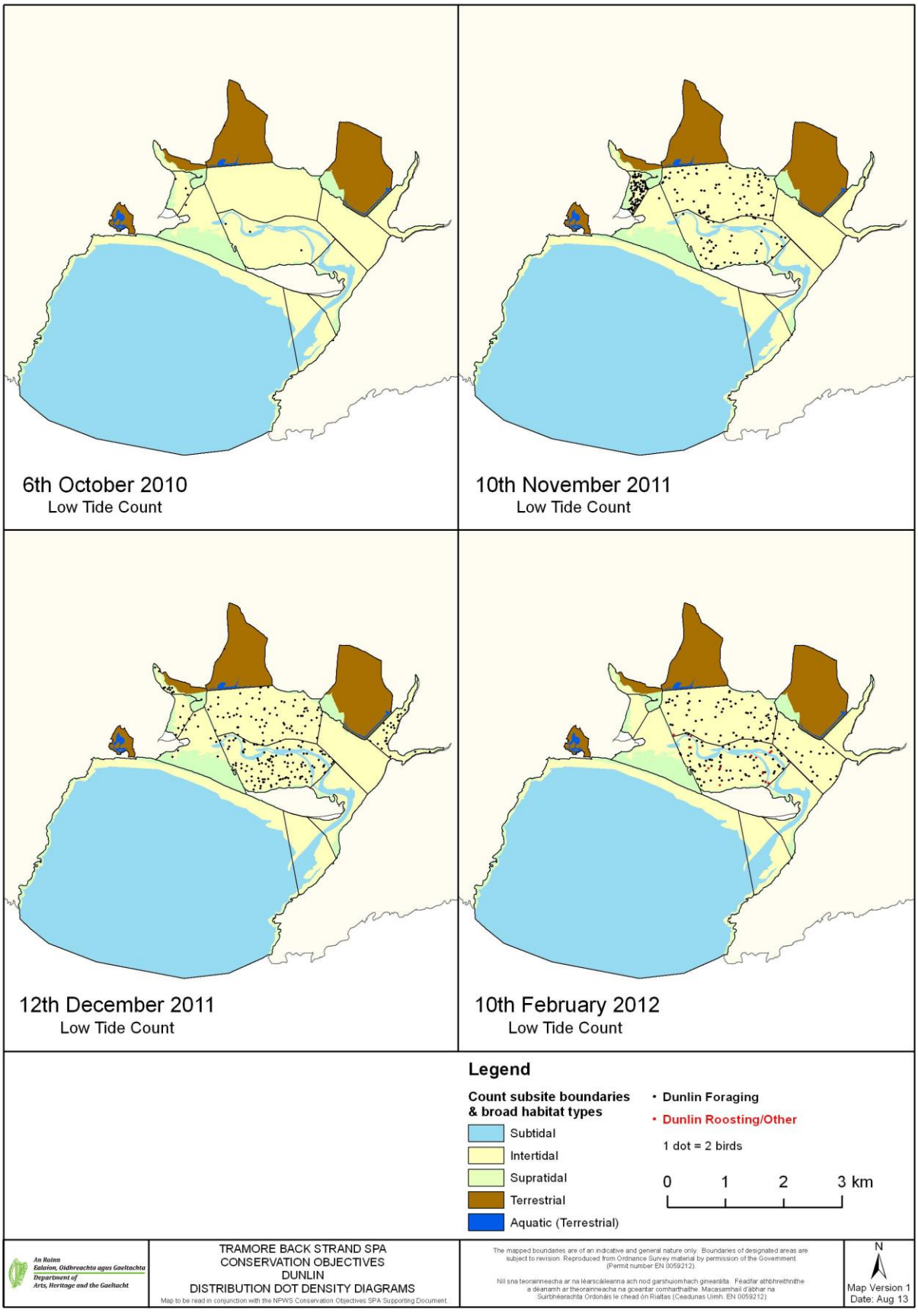
Date: Aug 13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Low Tide Count
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Dunlin Foraging
Dunlin Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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CONSERVATION OBJECTIVES
DUNLIN
DISTRIBUTION DOT DENSITY DIAGRAMS
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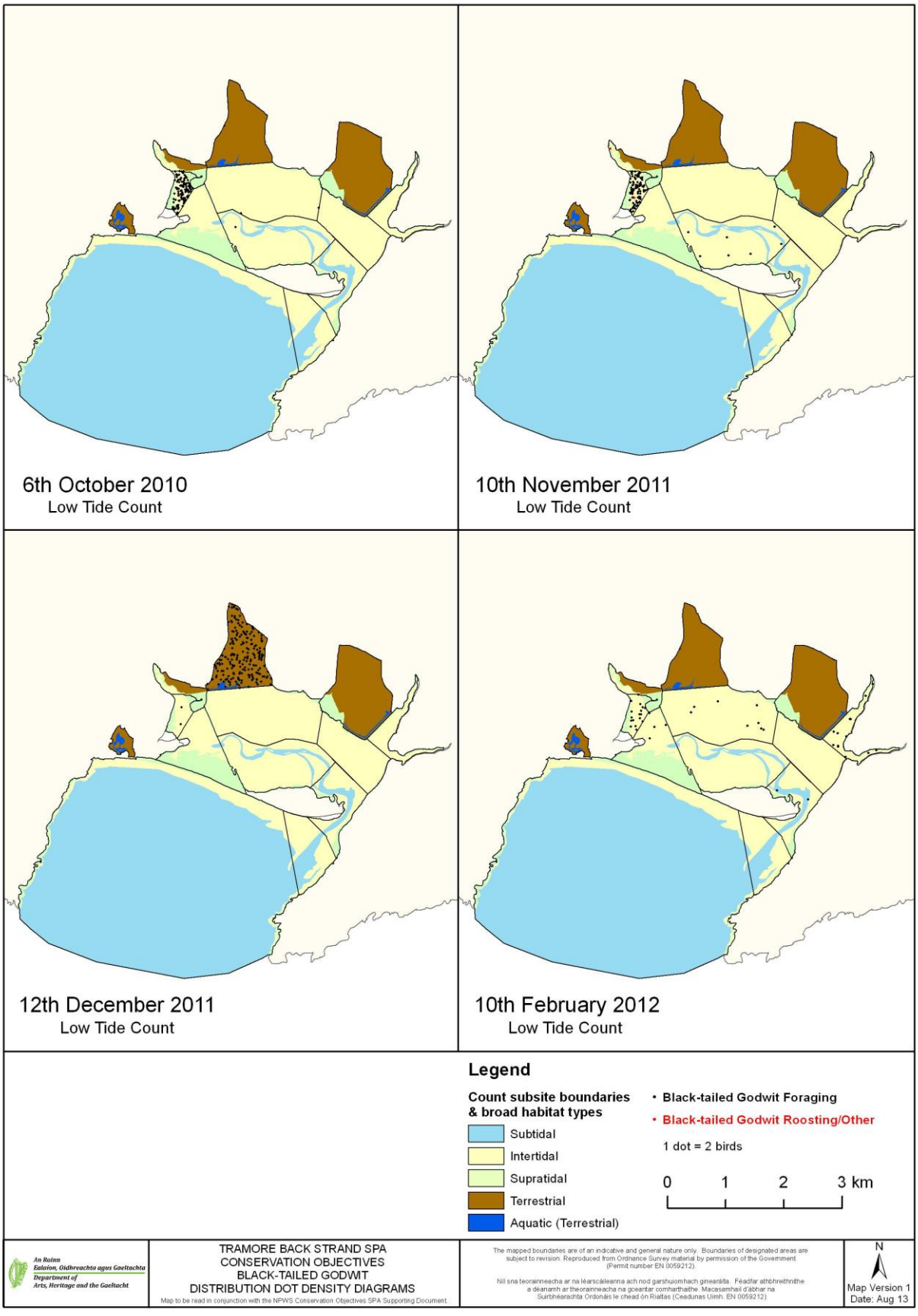
Date: Aug 13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10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Black-tailed Godwit Foraging
Black-tailed Godwit Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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TRAMORE BACK STRAND SPA
CONSERVATION OBJECTIVES
BLACK-TAILED GODWIT
DISTRIBUTION DOT DENSITY DIAGRAMS
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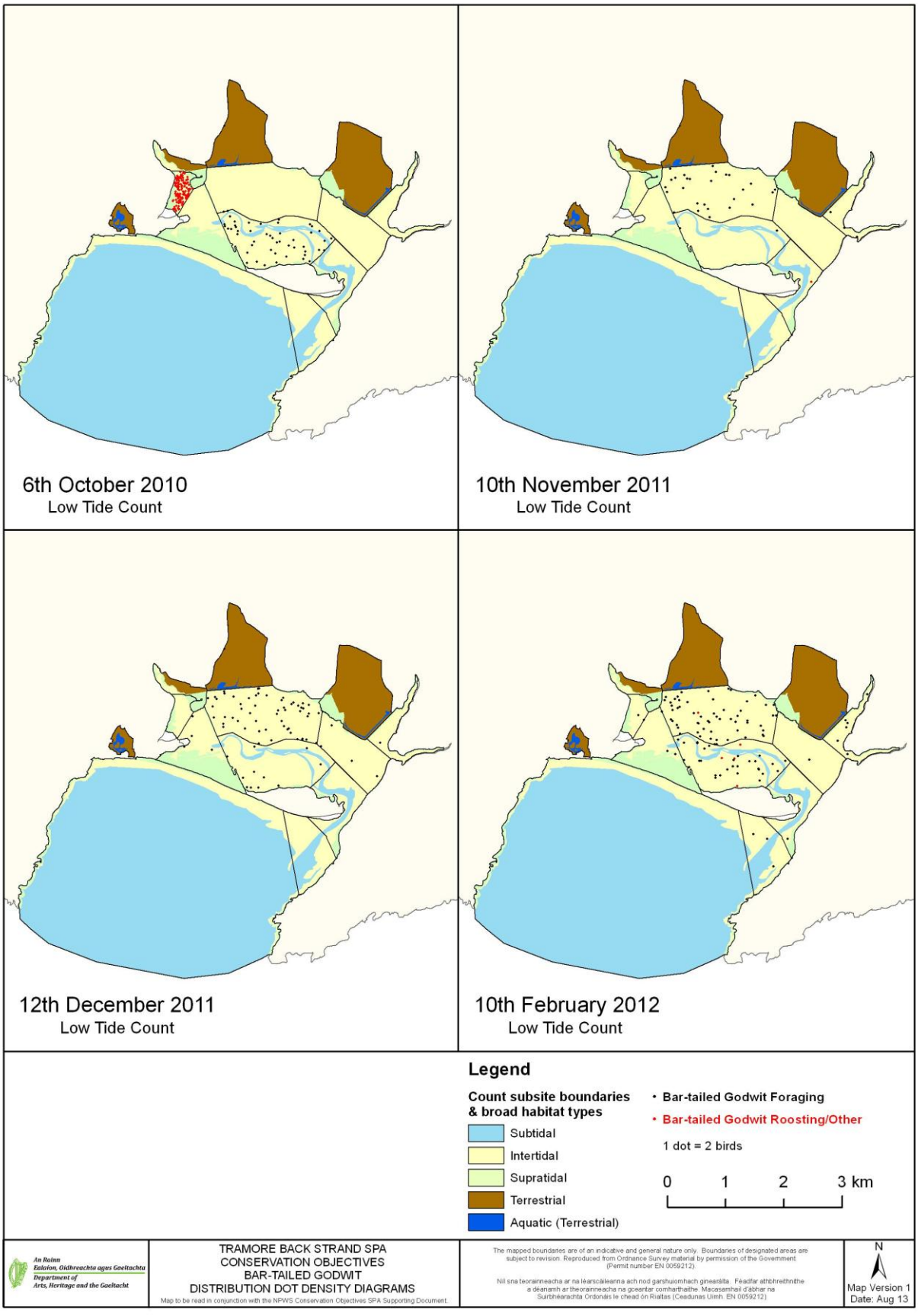
Date: Aug 13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10th February 2012
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Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Bar-tailed Godwit Foraging
Bar-tailed Godwit Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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CONSERVATION OBJECTIVES
BAR-TAILED GODWIT
DISTRIBUTION DOT DENSITY DIAGRAMS
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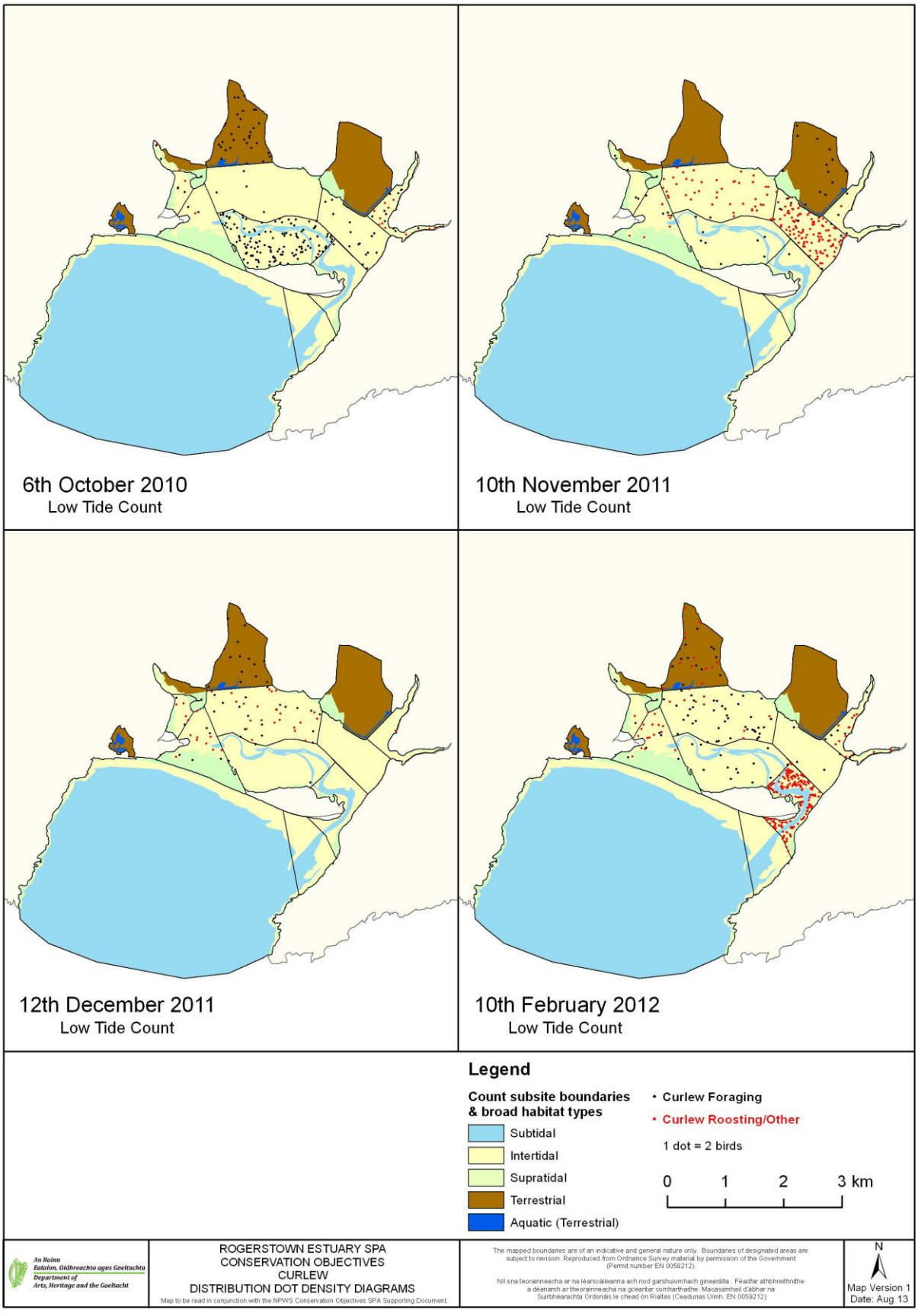
Date: Aug 13


6th October 2010
Low Tide Count
10th November 2011
Low Tide Count
12th December 2011
Low Tide Count
10th February 2012
Low Tide Count
Legend
Count subsite boundaries & broad habitat types
Subtidal
Intertidal
Supratidal
Terrestrial
Aquatic (Terrestrial)
Curlew Foraging
Curlew Roosting/Other
1 dot = 2 birds
0 1 2 3 km
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Department of Arts, Heritage and the Gaeltacht
ROGERSTOWN ESTUARY SPA
CONSERVATION OBJECTIVES
CURLEW
DISTRIBUTION DOT DENSITY DIAGRAMS
Map to be read in conjunction with the NPWS Conservation Objectives SPA Supporting Document.
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision. Reproduced from Ordnance Survey material by permission of the Government (Permit number EN 0059212).
Nil sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe. Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. EN 0059212).
N
Map Version 1
Date: Aug 13

APPENDIX 8

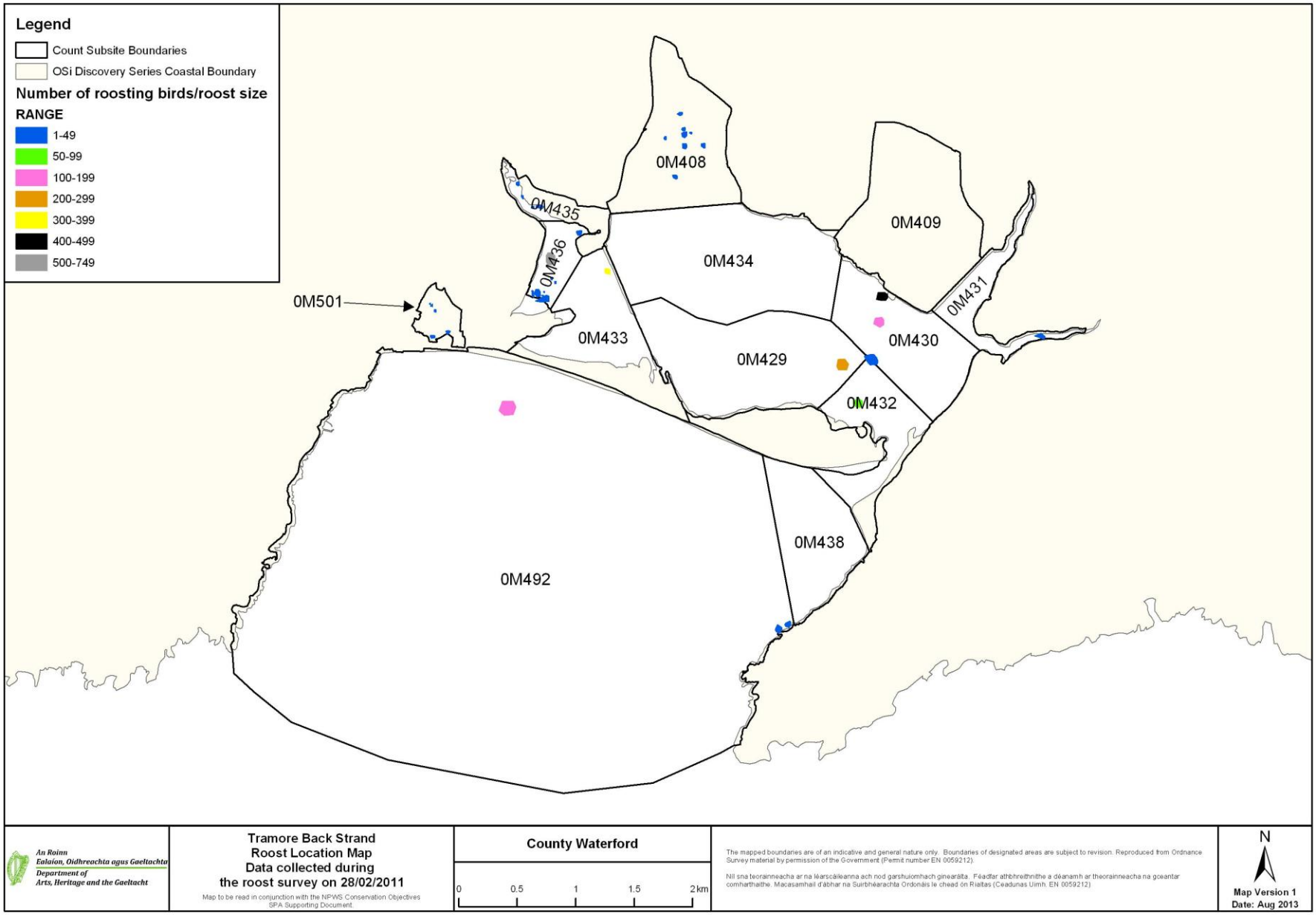
Tramore Back Strand

(1a) Summary data and roost location maps from the roost survey 28th February 2011 (note incomplete coverage of subsites) (Please see Sections 5.3.1 and 5.3.2 for further details on methods/limitations)

Subsite Code	Subsite Name	No. roost locations	No. species	Species
0M408	Tramore Back Strand: Lisselan Fields	8	9	BH, BW, CA, CO, CU, ET,MA, MS, SU
0M409	Tramore Back Strand: Kilmacleague Fields	NOT COUNTED		
0M429	Back Strand South	1	11	BA, CA, CM, GA, GB, KN, MA, PB, RM, SA, SU
0M430	Summerville	3	4	BA, DN, OC, PB
0M431	Kilmacleague & Clohernagh	1	1	CA
0M432	Bass Pt to Corbally Crossroads	1	7	CA, CM, GB, LB, OC, PB, WN
0M433	Back Strand west of sea wall	1	5	CA, DN, GA, MA, OC
0M434	Back Strand north	NOT COUNTED		
0M435	Crobally to Ballinattin	4	2	BH, OC
0M436	Corbally south to old Landfill	9	8	BH, BW, CU, ET, GP, HG, PB, SU
0M438	Rinnashark Harbour	NOT COUNTED		
0M492	Outer Tramore Bay	3	6	BH, CU, GB, HG, OC, RP
0M501	Tramore boating lake	5	3	BH, HG, MA

(1b) Tramore Back Strand SPA (4027) SCI species and recorded roosts 28/02/11 – shows number of roost locations within subsite, and in brackets, the peak number recorded at a single roost location (note incomplete coverage of subsites)

Subsite Code	PB	GP	GV	L.	DN	BW	BA	CU
0M408			None recorded	None recorded		1 (1)		1 (8)
0M409								
0M429	1 (19)							
0M430	2 (105)				1 (70)		1 (290)	
0M431								
0M432	1 (11)							
0M433					1 (280)			
0M434								
0M435								
0M436	1 (4)	1 (515)				1 (15)		1 (6)
0M438								1 (1)
0M492								
0M501								



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Tramore Back Strand
Roost Location Map
Data collected during the roost survey on 28/02/2011

Map to be read in conjunction with the NPWS Conservation Objectives SPA Supporting Document.

County Waterford

0 0.5 1 1.5 2 km

N

Map Version 1
Date: Aug 2013

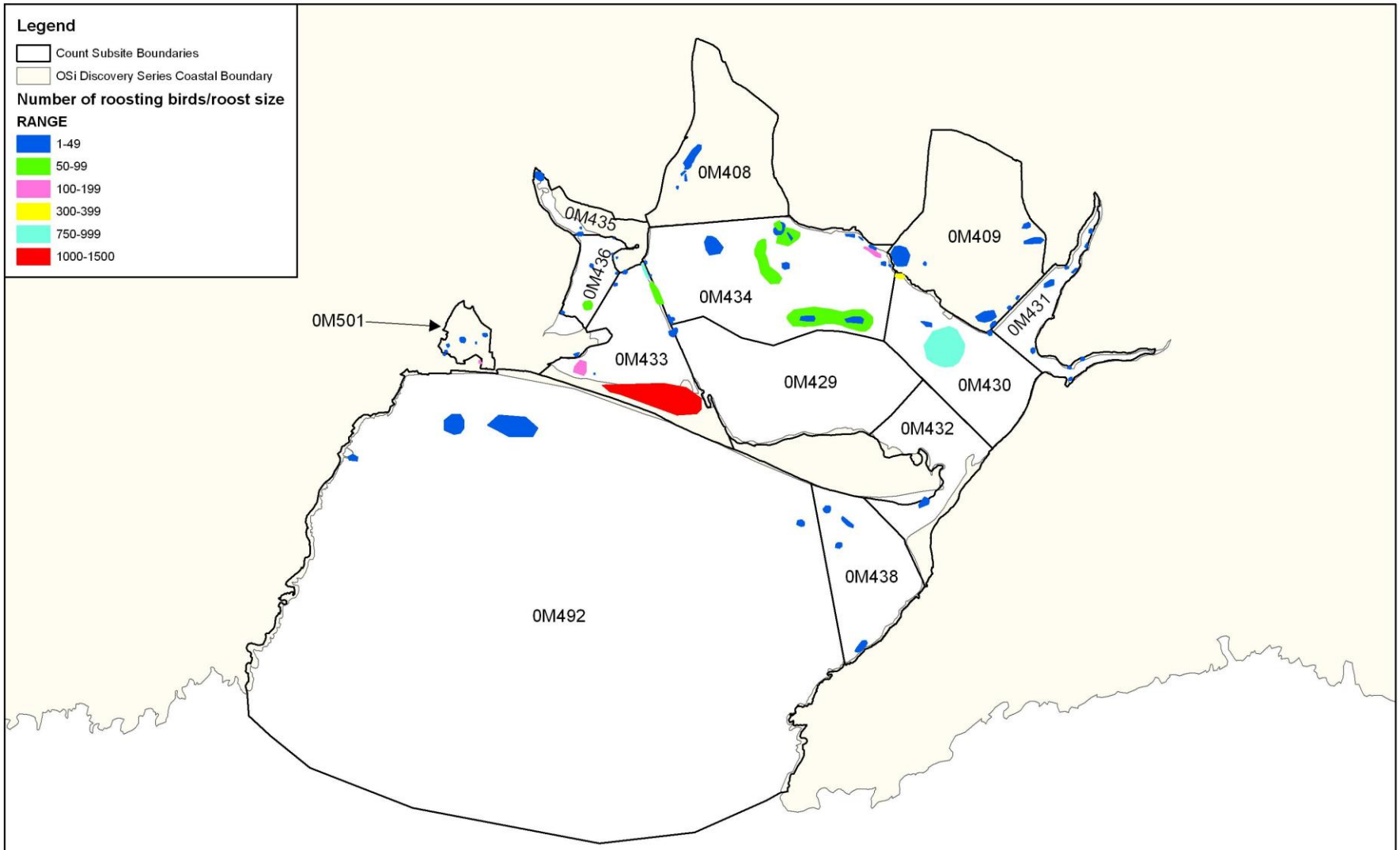
(2a) Summary data and roost location maps from the roost survey 18th January 2012

(Please see Sections 5.3.1 and 5.3.2 for further details on methods/limitations)

Subsite Code	Subsite Name	No. roost locations	No. species	Species
0M408	Tramore Back Strand: Lisselan Fields	5	6	BH, CU, ET, MS, RK, WN
0M409	Tramore Back Strand: Kilmacleague Fields	8	6	CU, ET, GK, L., SN, T.
0M429	Back Strand South	1	1	H.
0M430	Summerville	4	12	BA, BH, CA, CM, CU, GB, HG, KN, LB, OC, RK, SN
0M431	Kilmacleague & Clohernagh	9	8	BH, CU, GK, PB, RK, SU, T., WN
0M432	Bass Pt to Corbally Crossroads	1	1	CM
0M433	Back Strand west of sea wall	9	18	BA, BW, CA, CU, DN, ET, GP, GK, GV, HG, KN, L., PB, OC, RK, SU, SN, T
0M434	Back Strand north	21	16	BH, CM, CA, CU, DN, ET, GB, GK, GV, L., MA, OC, RK, SU, T., TT
0M435	Crobally to Ballinattin	3	7	CU, ET, GK, OC, RK, SU, WN
0M436	Corbally south to old Landfill	7	6	CU, ET, GK, SU, T., TT
0M438	Rinnashark Harbour	4	3	GB, GG, OC
0M492	Outer Tramore Bay	3	4	CM, GB, GG, HG
0M501	Tramore boating lake	7	6	BH, CM, GA, L., MA, WN

(2b) Tramore Back Strand SPA (4027) SCI species and recorded roosts 18/01/12 – shows number of roost locations within subsite, and in brackets, the peak number recorded at a single roost location

Subsite Code	PB	GP	GV	L.	DN	BW	BA	CU
0M408								3 (43)
0M409				1 (28)				1 (1)
0M429								
0M430							1 (60)	1 (3)
0M431	1 (2)							1 (1)
0M432								
0M433	1 (15)	1 (200)	2 (105)	3 (565)	2 (300)	2 (98)	2 (65)	1 (48)
0M434			1 (4)	4 (168)	1 (10)			2 (2)
0M435								1 (1)
0M436								1 (1)
0M438								
0M492								
0M501				2 (56)				



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Tramore Back Strand
Roost Location Map
Data collected during the roost survey on 18/01/2012

Map to be read in conjunction with the NPWS Conservation Objectives SPA Supporting Document.

County Waterford

0 0.5 1 1.5 2km

N

Map Version 1
Date: Aug 2013

APPENDIX 9

Tramore Back Strand - Activities & Events

Please note that this list is based on the current review process and is not exhaustive.

Legend:	
O	observed or known to occur in or around Tramore Back Strand.
U	known to occur but unknown area (subsites)/spatial extent; hence all potential subsites are included (e.g. fisheries activities).
H	historic, known to have occurred in the past.
P	potential to occur in the future.
	Grey highlighting refers to activities that have the potential to cause disturbance to waterbirds.

Activity/Event	0M408	0M409	0M429	0M430	0M431	0M432	0M433	0M434	0M435	0M436	0M438	0M492	0M501
1. Coastal protection, sea defences & stabilisation													
1.1 Linear defences	**O**	**O**	**O**		**O**		**O**	**O**				**O**	
1.2 Training walls							**O**						
1.3 Groynes							**O**						
1.4 *Spartina* planting/growing			**O**	**O**			**O**	**O**	**O**	**O**			
1.5 Marram grass planting												**O**	
1.6 Other modifications			**O**				**O**	**O**					
2. Barrage schemes/drainage													
2.2 Altered drainage/river channel	**O**							**O**					
2.3 Other channel modifications							**O**						
2.5 Other							**O**	**O**					
4. Industrial, port & related development													
4.3 Slipway				**O**									
4.4 Pier												**O**	
4.5 Manufacturing industries										**O**			
6. Pollution													
6.1 Domestic & urban waste water												**O**	
6.3 Landfill							**H**						
7. Sediment extraction (marine & terrestial)													
7.3 Sand and gravel extraction						**H**							
7.4 Removal of beach materials												**H**	
8. Transport & communications													
8.2 Flight path		**O**	**O**	**O**	**O**	**O**	**O**	**O**					**O**
8.5 Road schemes										**O**			
8.6 Car parks				**O**	**O**	**O**							**O**

9. Urbanisation													
9.1 Urbanised areas, housing									**O**	**O**			**O**
12. Tourism & recreation													
12.5 Leisure centres, sports ground													**O**
12.8 Sailing												**O**	
12.9 Sailboarding & wind-surfing												**O**	
12.11 Canoeing												**O**	
12.12 Surfing												**O**	
12.15 Angling							**O**				**O**	**O**	
12.17 Bathing & general beach recreation												**O**	
12.18 Walking, incl. dog walking		**O**	**O**	**O**		**O**	**O**	**O**				**O**	**O**
12.19 Birdwatching				**O**	**O**	**O**	**O**						
12.22 Motorised vehicles		**O**				**O**		**O**				**O**	
12.23 Horse-riding	**O**												
12.27 Others												**O**	
13. Wildfowl & hunting													
13.1 Wildfowling	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**
13.2 Other hunting-related activities	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**	**U**
14. Bait-collecting													
14.1 Digging for lugworms/ragworms			**O**	**O**			**O**	**O**					
15. Fisheries & Aquaculture													
15.6 Molluscs - hand-gathering			**O**	**O**	**O**		**O**	**O**		**O**			
16. Agriculture & forestry													
16.1 Saltmarsh grazing/harvesting								**O**					
16.12 Polderisation	**O**	**O**											
16.13 Agricultural and other land-claim							**H**						
16.14 In-filling of ditches, ponds, pools and marshes							**H**						

18. Wildlife habitat management													
18.3 Habitat creation & restoration - terrestrial												**O**	
18.4 Habitat management												**O**	
19. Natural events													
19.1 Storms, floods and storm surges	**O**	**O**										**O**	
19.2 Severe cold weather	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**
19.3 Eutrophication													**O**

APPENDIX 10

Disturbance Assessment

Scoring system - definitions & rationale

Frequency/Duration	Score	Rationale
Continuous	3	Continuous motion or noise; not necessarily 24-hours per day but zones of fairly continuous activity such as a port or marina.
Frequent	2	Frequently observed during the survey programme, can be up to several times per 6 hour tidal cycle; and/or known to occur on a frequent basis.
Infrequent	1	Observed only once or twice during the survey programme and known/considered likely to be infrequent.
Rare	0	Known to occur but not observed during the survey programme and considered likely to be rare in occurrence.
Intensity	**Score**	**Rationale**
Active, high-level	3	Would indicate an active event that is likely to displace waterbirds during its presence e.g. active shipping channel, speed boats, quad bikes, loose dogs.
Medium-level	2	Lower intensity events such as non-powered watercraft, vehicles, people walking along a shoreline (without dogs) – that are likely to result in waterbirds moving but birds will be less 'alarmed' than (1) and response will be species-specific.
Low-level	1	Although activity may be of a nature to displace waterbirds, birds move only slightly, resume normal behaviour quickly or show no determinable response at all; e.g. solitary walkers close to site but not impacting on waterbirds' immediate location; cars passing on an adjacent road…
Very low-level	0	Any activities considered to impart little effect upon waterbirds.
Response	**Score**	**Rationale**
Most birds disturbed all of the time	3	Birds do not return - therefore equivalent to habitat loss.
Most birds displaced for short periods	2	Birds return once disturbance has ceased.
Most species tolerate disturbance	1	Weak response, birds may move slightly away from disturbance source.
Most birds successfully habituate to the disturbance	0	Little determinable effects.

The scores assigned to the three attributes were then added together to give an overall 'disturbance score' which is used to define the extent of the impact as follows:-

Scores 0 – 3 = Low
Scores 4 – 6 = Moderate
Scores 7 – 9 = High

Scoring system – worked example

Disturbance event – humans walking along a beach; the beach is a popular recreational area and this activity was recorded frequently during surveys.		
Attribute	**Score**	**Rationale**
Frequency/Duration	2	Recorded frequently during the survey period; known area of beach recreation.
Intensity	2	Medium level - considered likely to result in waterbirds moving away from the source of disturbance although response will be species-specific and some species may even habituate to the activity.
Response	2	Most birds are displaced for short periods and therefore will resume their previous behaviour in the area when the activity ceases.
TOTAL SCORE	**6**	**MODERATE**

Results - based on records from the 2011/12 Waterbird Survey Programme

Activity/Event	0M408	0M409	0M429	0M430	0M431	0M432	0M433	0M434	0M435	0M436	0M438	0M492	0M501
8.2 Flight path					6			5					
12.12 Water-based recreation (e.g. surfing)												3	
12.18 Walking, incl. dog walking		6	7	6		6	6	6				4	
12.22 Motorised vehicles		6											
14.1 Digging for lugworms/ragworms								3					
15.6 Molluscs - hand-gathering			3		3			3		3			