ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Lough Nillan Bog SPA 004110



National Parks and Wildlife Service, Department of Housing, Local Government and Heritage,

90 King Street North, Dublin 7, D07 N7CV, Ireland.

Web: www.npws.ie E-mail: natureconservation@npws.gov.ie

Citation:

NPWS (2025) Conservation Objectives: Lough Nillan Bog SPA 004110. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

> Series Editors: Maria Long and Colin Heaslip ISSN 2009-4086

Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area 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 favourable conservation status of a species is achieved when:

• 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 on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.

2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.

3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.

4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.

5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

*	indicates a	priority	habitat	under	the	Habitats	Directive
---	-------------	----------	---------	-------	-----	----------	-----------

004110	Lough Nillan Bog SPA
A098	Merlin Falco columbarius
A140	Golden Plover Pluvialis apricaria
A395	Greenland White-fronted Goose Anser albifrons flavirostris
A466	Dunlin Calidris alpina schinzii

Please note that this SPA overlaps with Lough Nillan Bog (Carrickatlieve) SAC (000165) and West of Ardara / Maas Road SAC (000197) and adjoins Meenaguse Scragh SAC (001880). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping and adjoining site(s) as appropriate.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	(In prep)	
Title :	The Status and Distribution of breeding Golden Plover and Dunlin in Connacht and North-west Ireland in 2022 and 2023.	
Author : Colhoun, K.; Robb, D.; Dowling, R.; Ní Cheallaigh, S.; Latimer, J.; Konstantinidis, Rooney, E.; Sardà-Serra, M.; Collins, J.		
Series :	Irish Wildlife Manuals	
Year :	2013	
Title : A review of the SPA network of sites in the Republic of Ireland		
Author : NPWS		
Series :	Published Report	
Year :	2022	
Title :	Survey of breeding merlin in the special protection area network 2018	
Author : Lusby, J.; O'Brien, I.; Lauder, A.; Wilson-Parr, R.; Breen, D.; Cummins, S.; Tierney.		
Series : Irish Wildlife Manual No. 139		

Other References

Year :	1995
Title :	Impacts of hunting disturbance on waterbirds - a review
Author :	Madsen, J.; Fox, A.D.
Series :	Wildlife Biology 1(4):193-207
Year :	2000
Title :	Time budgets and foraging of breeding golden plover Pluvialis apricaria
Author :	Whittingham M.J.; Percival S.M.; Brown A.F.
Series :	Journal of Applied Ecology 37, 632-646
Year :	2002
Title :	Upland Bird Survey Report 2002: Donegal
Author :	Cox, R.B.; Eddleston, C.R.; Newton, S.F.
Series :	BirdWatch Ireland Conservation Report No. 02/04
Year :	2005
Title :	Merlins of the Wicklow mountains
Author :	McElheron, A.
Series :	Currach Press, Dublin
Year :	2010
Title :	Breeding biology of merlins Falco columbarius in Ireland, 1986-1992
Author :	Norriss, D.W.; Hara, B.; Hennigan, J.; McElheron, A.; McLaughlin, D.J.; Swan, V; Walsh, A.
Series :	Irish Birds, 9:23-30
Year :	2011
Title :	Assessing the effectiveness of monitoring methods for merlin <i>Falco columbarius</i> in Ireland: the pilot merlin survey 2010
Author :	Lusby, J.; Férnandez-Bellon, D.; Norriss, D.; Lauder, A.
Series ·	Irish Birds 9, 143 – 154

Year :	2011		
Title :	The feeding ecology of merlin <i>Falco columbarius</i> during the breeding season in Ireland, and an assessment of current diet analysis methods		
Author :	Fernández-Bellon, D.; Lusby, J.		
Series :	Irish Birds 9, 159-164		
Year :	2014		
Title :	A review of Greenland white-fronted geese in Ireland 1982/83 – 2011/12		
Author :	Burke, B.; Egan, F.; Norriss, D.; Wilson, H.J.; Walsh, A.J.		
Series :	Unpublished report		
Year :	2016		
Title :	Assessing connectivity with Special Protection Areas (SPAs)		
Author :	Scottish Natural Heritage		
Series :	Guidance Series Version 3 - June 2016		
Year :	2017		
Title :	Breeding ecology and habitat selection of merlin Falco columbarius in forested landscapes		
Author :	Lusby, J.; Corkery, I.; McGuiness, S.; Fernández-Bellon, D.; Toal, L.; Norriss, D.; Breen, D.; O'Donaill, A.; Clarke, D.; Irwin, S.; Quinn, J.L.; O'Halloran, J.		
Series :	Bird Study 64, 445-454		
Year :	2019		
Title :	Report of the 2018/19 international census of Greenland white-fronted geese		
Author : Fox, T.; Francis, I.; Walsh, A.; Norriss, D.			
Series : Unpublished report			
Year :	2019		
Title :	le: Report under Article 12 of the Birds Directive Period 2013-2018		
Author :	EEA		
Series :	European Environment Agency. European Topic Centre on Biological Diversity. Pp 1-9. https://cdr.eionet.europa.eu/Converters/run_conversion? file=ie/eu/art12/envxztxxq/IE_birds_reports_20191031-130157.xml&conv=612&source=remote		
Year :	2020		
Title :	Report of the 2019/20 international census of Greenland white-fronted geese		
Author :	Fox, T.; Francis, I.; Walsh, A.; Norriss, D.		
Series :	Unpublished report		
Year :	2021		
Title :	Report of the 2020/21 international census of Greenland white-fronted geese		
Author : Fox, T.; Francis, I.; Walsh, A.; Norriss, D.; Kelly. S.			
Series :	Unpublished report		
Year :	2022		
Title :	Report of the 2021/22 international census of Greenland white-fronted geese		
Author :	Fox, T.; Francis, I.; Walsh, A; Norriss, D.; Kelly, S.		
Series :	Unpublished report		
Year :	2023		
Title :	Report of the 2022/23 international census of Greenland white-fronted geese		
Author :	Fox, T.; Francis, I.; Walsh, A; Norriss, D.; Kelly, S.		
Series :	Unpublished report		

Conservation Objectives for : Lough Nillan Bog SPA [004110]

A098 Merlin *Falco columbarius*

To maintain the Favourable conservation condition of Merlin in Lough Nillan Bog SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population size	Number of occupied territories	Breeding population is stable/increasing	Early season visits improve detection of Merlin, a challenging species to survey (Norriss et al., 2010; Lusby et al., 2011, 2017). Lusby et al. (2017) defined occupied territories according to highest levels of breeding evidence, i.e. all confirmed breeding pairs and any occupied territories during the survey breeding season (1 April - 15 July) and sites with recent signs of occupation e.g. plucking posts with fresh kills on repeat visits. In 2010, 1 male was recorded in the SPA (NPWS internal files). An estimate of 5 territories for the SPA was based on the availability of suitable breeding habitat for sites with known breeding birds (NPWS, 2013). Norriss et al. (2010) reported 5.89 pairs/100 km2 for 1986 and 1988 - 1992, in an area 'Ardara', that included most of the SPA. Based on this, for this SPA 41.16km2 in area, 2 - 3 territories is probable. A 2018 survey (Lusby et al., 2022) covering 20.23% of the SPA, had no sightings but other site records confirmed the presence of a pair
Productivity rate	Number of fledged young per breeding attempt with known outcome	Sufficient to maintain the population size target	Various Irish studies have provided estimates of productivity and/or breeding success for Merlin (Norriss et al., 2010; Lusby et al., 2017; Lusby et al., 2022). Monitoring of five traditional nesting areas in Ireland from 1986 - 1992 calculated a mean productivity of 2.23 young per pair based on 141 confirmed pairs (Norriss et al., 2010). A review of available breeding data for Ireland 1982 - 2014, estimated productivity at 2.1 young per breeding attempt (Lusby et al., 2017). However, general information on life history such as natal dispersal, first year and adult survival are lacking in the Irish context. Furthermore, reproductive performance of pairs at this SPA is not known. In the absence of such data, it is not possible to identify a minimum breeding productivity rate for this SPA
Distribution: extent of available nesting options within the SPA	Number and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain the population	Formerly ground-nesting in heather, Merlin are now largely tree-nesting in Ireland, often utilising old crows' nests (McElheron, 2005; Norriss et al., 2010; Lusby et al., 2017). This SPA comprises an extensive complex of blanket bog, wet heath and is bordered by areas of commercial forestry which have hosted successful Merlin nests on at least three occasions (NPWS internal files). One nest was found in a conifer copse surrounding an abandoned farmhouse on the edge of the SPA (Lusby et al., 2022). Thus, a sufficiency of available nest sites (e.g. mature trees holding suitable stick nests, that are proximate to open foraging habitats and dense heather stands on sloping ground), distributed across the SPA, is needed to support the breeding population

Extent and condition of suitable open habitats for foraging	Hectares; condition assessment; prey biomass	Sufficient availability of suitable foraging habitat across the SPA to support targets relating to population size, productivity rate and distribution	The sporadic occupancy of territories by Merlin, and failures of some pairs to lay clutches, is seen also in other raptor species where females in poorer territories have difficulty attaining condition to breed (Norriss et al., 2010). Lusby et al. (2017) showed that the proportion of open suitable habitat i.e. moors and heathland, peat bogs and semi-natural grasslands (using CORINE Land Cover) within 5km of nest sites was positively related to breeding success. Preferred prey include open country small passerines and moths; woodland birds feature in April (Fernández-Bellon and Lusby, 2011). Open foraging habitats include wet and dry heaths; <i>Molinia</i> -dominated meadows; blanket bog; semi-open habitats i.e. woodland copses. The total extent of suitable foraging habitat in this SPA has not been estimated. Key aspects to consider regarding any assessment of the condition of these habitats for Merlin include prey biomass, structure, soil integrity, overall connectivity and coherence
Disturbance to breeding sites	Intensity, timing, frequency, and duration	Disturbance occurs at levels that do not significantly impact upon the breeding population	Factors such as intensity, frequency, timing, location and duration of a (direct or indirect) disturbance source must be taken into account to determine the potential impact upon the targets for population size, population trend, productivity rate and distribution of nesting options. Merlin frequently select the tallest trees in which to nest, thereby potentially increasing nest vulnerability to felling operations for pairs nesting in commercial forests (Norriss et al., 2010). This is particularly relevant in this area, as Merlin have been known to nest in forestry plantations adjacent to the SPA. Lusby et al. (2022) described the pressures within the SPA network, which include turf-cutting, burning, agricultural intensification and afforestation

Page 8 of 14

A140 Golden Plover *Pluvialis apricaria*

To restore the Favourable conservation condition of Golden Plover in Lough Nillan Bog SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population trend	Percentage change in number of potential breeding pairs	Long term trend is stable or increasing	The national breeding population of Golden Plover in Ireland is estimated to have declined by 82 - 84% between 1972 and 2019 (see EEA, 2019). Apparently Occupied Territory (AOT) is a standard metric used to represent breeding pairs. In 2002, baseline surveys to inform SPA designation recorded 16 Golden Plover AOTs across 11 1km-squares in this SPA (see Cox et al. (2002) for survey results and NPWS (2013) for SPA figures). In 2023, surveys of 15 1km-squares (including the 11 squares surveyed in 2002) recorded no evidence of breeding Golden Plover (Colhoun et al., in prep). The 2023 survey estimated that 21 1km-squares within the SPA (41km2 in total) were suitable breeding habitat for Golden Plover; thus the 2023 survey covered 71% of the identified suitable breeding habitat in the SPA. The 2023 survey results therefore suggest the breeding population of Golden Plover within the SPA has declined significantly and that Golden Plover may no longer breed within the SPA
Productivity rate	Number of young fledged per potential breeding pair	Sufficient productivity to maintain the population trend as stable or increasing	Productivity is a measure of breeding output and a key determinant in whether a population can maintain itself. It is defined here as the total number of chicks that are successfully reared to fledge (i.e. become independent of their parents) divided by the total number of breeding pairs (or AOTs), including failed pairs/females, in a given breeding season. There is currently no information on the productivity rate of Golden Plover within this SPA. A lack of comprehensive data precludes the identification of a minimum productivity rate for the Golden Plover population of this SPA or indeed for the national breeding population
Distribution of breeding habitat	Spatial distribution	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation	Golden Plover breed in open habitats, primarily blanket bog and other peatland habitats in Ireland, where they nest on the ground, in short or tussocky vegetation
Extent and condition of breeding habitat	Hectares of high quality breeding habitat	Sufficient area of high quality habitat to support the population target	Golden Plover breed in open habitats, primarily blanket bog and other peatland habitats in Ireland, where they nest on the ground, in short or tussocky vegetation. High quality breeding habitat is considered as habitat in which Golden Plover can successfully nest and rear young
Disturbance at breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population trend and/or spatial distribution of nesting and foraging habitat. Factors such as intensity, frequency, timing and duration of a (direct or indirect) disturbance source must be taken into account to determine the potential impact upon the targets for population trend and spatial distribution. Disturbance contributes to increased energetic expenditure which can result in increased likelihood of mortality (in adults and chicks) or reduced breeding fitness of adults (if energy expenditure is greater than energy intake), and can thus negatively impact population trends. Disturbance is likely to have greatest impact at nesting sites and feeding areas for young, for example, increasing the mortality risk to eggs and young from predation, inclement weather and starvation

Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the breeding population's access to the SPA or other ecologically important sites outside the SPA	Barriers limiting the breeding population's access to this SPA or movement within the SPA will ultimately affect the achievement of targets for population trend and/or spatial distribution. Factors such as the number, location, shape and area of potential barriers must be taken into account to determine their potential impact
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target	Golden Plover forage exclusively at ground level and rely primarily on a wide variety of surface and sub- surface dwelling invertebrate prey. Coleoptera, Oligochaeta, and Diptera (Bibionidae and Tipulidae) are known important prey for the species. The species is reliant on open habitats, primarily breeding in blanket bogs and other peatland habitats in Ireland. During the breeding season, Golden Plover also utilise a range of surrounding habitats for foraging, including grasslands, lake shores and other wetlands. While Golden Plover primarily forage diurnally, the species is also known to feed nocturnally on clear and moonlit nights. Quantitative information on foraging ranges of breeding Golden Plover in Ireland is unavailable but studies elsewhere have shown breeding adults to forage up to 4km from the nest (Whittingham et al., 2000). Whittingham et al. (2000) reported moorland breeding Golden Plover foraged 1.1km - 3.7km from their nests during the incubation period

Conservation Objectives for : Lough Nillan Bog SPA [004110]

A395 Greenland White-fronted Goose Anser albifrons flavirostris

To restore the Favourable conservation condition of Greenland White-fronted Goose in Lough Nillan Bog SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	The national population of Greenland White-fronted Goose declined by 13% between 1985 - 2018 (EEA, 2019). It is understood that a single flock of Greenland White-fronted Goose uses both Lough Nillan Bog SPA and Sheskinmore Lough SPA. During the baseline assessments to inform SPA designation, 103 geese were estimated to be using these SPAs (5 year mean of peak counts for baseline period 1994/95 - 1998/99; NPWS, 2013). This flock declined to 23 Greeland White-fronted Goose in recent years (5 year mean of peak counts 2018/19 - 2022/23, see Fox et al. 2019, 2020, 2021, 2022 and 2023). This represents a population decline of 78% since the baseline period. This corresponds to a report by Burke et al. (2014) that reported a long term decline in the Sheskinmore Lough and Lough Nillan Bog population from the early 1980s to winter 2011/12. The most recent record of this species occurring within the SPA is from winter 2013/14 (NPWS internal files)
Winter spatial distribution	Hectares, time and intensity of use	Sufficient number of locations, area, and availability (in terms of timing and intensity of use) of suitable habitat to support the population target	Distribution encapsulates the number of locations and area of potentially suitable habitat for the wintering population and its availability for use. The suitability and availability of habitat areas are likely to vary throughout the season, for example, due to variation in land management practices or the abundance of resources available (due to natural variation and other factors). This will affect the spatio-temporal patterns of use of the habitats by the wintering population
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	The impact of any significant disturbance (direct or indirect) to the wintering population will ultimately affect the achievement of targets for population trend and/or spatial distribution. Disturbance contributes to increased energetic expenditure which can result in increased likelihood of winter mortality or reduced fitness (if energy expenditure is greater than energy gain) and, in turn, negatively impact population trends (see, for example, Madsen and Fox, 1995). Factors such as intensity, frequency, timing and duration of a (direct or indirect) disturbance source must be taken into account to determine the potential impact upon the targets for population trend and spatial distribution
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the wintering population's access to the SPA or other ecologically important sites outside the SPA	Barriers limiting the population's access to this SPA or ecologically important sites outside the SPA will ultimately affect the achievement of targets for population trend and/or spatial distribution. Factors such as the number, location, shape and area of potential barriers must be taken into account to determine their potential impact. Access to ecologically important sites outside the SPA must also be considered as a single SPA may not satisfy all the ecological requirements of the wintering population, and it may require access to other SPAs or sites for certain activities, such as foraging when preferred foraging areas are unavailable due to disturbance, extensive flooding, or other factors

Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	This species is a grazer, feeding on a wide range of vegetation. Key forage materials include roots, tubers (such as potatoes), shoots (such as winter wheat), stolons, rhizomes, leaves (such as grasses), and seed such as (spilled) grain. Key habitats include peat bogs (including raised bogs and blanket bogs), grasslands (such as wet grassland, callows, semi-improved grassland, and intensive grassland), arable stubble, winter cereal fields, coastal grasslands, and occasionally salt marsh. In general, the foraging distance of wintering Greenland White-fronted Goose from night roosts is estimated at 5km - 8km (Scottish Natural Heritage, 2016), although this will vary depending on site and landscape
Roost spatial distribution and extent	Location and hectares of roosting habitat	Sufficient number of locations, area and availability of suitable roosting habitat to support the population target	Overnight roosting habitat mainly consists of permanent waterbodies, such as lakes, estuaries, bays, and other open waterbodies. When roosting in waterbodies, this species can roost on above-water features such as sandbanks. Roosting is a critical ecological requirement for the wintering population. Daytime roosting is also a common behaviour, where birds minimise activity levels to conserve energy, while benefitting from the vigilance of other flock members. A lack of sufficient and suitable roosting habitats can result in increased mortality risk, whether indirectly (e.g. via increased energy expenditure travelling to/from roost sites) or directly (e.g. via increased predation risk), or reduction in site use; this would ultimately affect the achievement of targets for population trend and/or spatial distribution
Supporting habitat: area and quality	Hectares and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	The wintering population can make extensive use of suitable habitats in important areas outside the SPA for foraging and roosting. The extent, availability and quality of these supporting habitats may be of importance for the resilience of the SPA population. Suitable supporting habitats include those highlighted in the attributes for foraging and roosting habitat

Page 12 of 14

A466 Dunlin *Calidris alpina schinzii*

To restore the Favourable conservation condition of Dunlin in Lough Nillan Bog SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population trend	Percentage change in number of potential breeding pairs	Long term trend is stable or increasing	The national breeding population of Dunlin in Ireland is estimated to have declined by 93 - 94% between 1972 and 2019 (see EEA, 2019). Apparently Occupied Territory (AOT) is a standard metric used to represent breeding pairs. In 2002, baseline surveys to inform SPA designation recorded 6 Dunlin AOTs across 11 1km-squares in this SPA (see Cox et al. (2002) for survey results and NPWS (2013) for SPA figures). In 2023, surveys of 15 1km-squares (including the 11 squares surveyed in 2002) recorded no evidence of breeding Dunlin (Colhoun et al., in prep). The 2023 survey estimated that 21 1km-squares within the SPA (41km2 in total) were suitable breeding habitat for Golden Plover, and this likely reflected suitable available breeding habitat for Dunlin. Thus the 2023 survey likely covered 71% of the suitable Dunlin breeding habitat in the SPA. The 2023 survey results therefore suggest the breeding population of Dunlin has declined significantly and that Dunlin may no longer breed in the SPA
Productivity rate	Number of young fledged per potential breeding pair	Sufficient productivity to maintain the population trend as stable or increasing	Productivity is a measure of breeding output and a key determinant in whether a population can maintain itself. It is defined here as the total number of young that are successfully reared to fledge (i.e. become independent of their parents) divided by the total number of potential breeding pairs (or AOTs), including failed pairs/females, in a given breeding season. There is currently no information on the productivity rate of Dunlin within this SPA. A lack of comprehensive data precludes the identification of a minimum productivity rate for the Dunlin population of this SPA or indeed for the national breeding population
Distribution of breeding habitat	Spatial distribution	No significant loss of distribution in the long term, other than that occurring due to natural patterns of variation	Dunlin breed in open, moist habitats, showing a preference for areas of vegetation interspersed with shallow pools or other standing or flowing water. They breed in upland and lowland blanket bog, other peatland habitats, coastal grasslands (such as machair), edges of lagoons and lakes, and other suitably open wetlands
Extent and condition of breeding habitat	Hectares of high quality breeding habitat	Sufficient area of high quality habitat to support the population target	Dunlin breed in open, moist habitats, showing a preference for areas of vegetation interspersed with shallow pools or other standing or flowing water. They breed in upland and lowland blanket bog, other peatland habitats, coastal grasslands (such as machair), edges of lagoons and lakes, and other suitably open wetlands. Dunlin nest on the ground in long or tussocky vegetation in which the nest is concealed. High quality breeding habitat is considered as habitat in which Dunlin can successfully nest and rear young

Disturbance at breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and distribution	The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population trend and/or spatial distribution. Factors such as intensity, frequency, timing and duration of a (direct or indirect) disturbance source must be taken into account to determine the potential impact upon the targets for population trend and spatial distribution. Disturbance contributes to increased energetic expenditure which can result in increased likelihood of mortality (in adults and chicks) or reduced breeding fitness of adults (if energy expenditure is greater than energy intake), and can thus negatively impact population trends. Disturbance is likely to have greatest impact at nesting sites and feeding areas for young, for example, increasing the mortality risk to eggs and young from predation, inclement weather and starvation
Barriers to connectivity and site use	Number, location, shape and hectares	Barriers do not significantly impact the breeding population's access to the SPA or other ecologically important sites outside the SPA	Barriers limiting the breeding population's access to this SPA or movement within the SPA will ultimately affect the achievement of targets for population trend and/or spatial distribution. Factors such as the number, location, shape and area of potential barriers must be taken into account to determine their potential impact
Forage spatial distribution, extent and abundance	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat, and available forage biomass to support the population target	Dunlin forage exclusively at ground level and rely primarily on a wide variety of surface and sub- surface dwelling invertebrate prey. When breeding, diet is primarily adults and larvae of insects, including Diptera, craneflies, beetles, caddisflies, wasps, sawflies and mayflies. Dunlin will also feed upon spiders, mites, and earthworms. Foraging habitats include those habitats in which they breed (see Distribution of breeding habitat attribute above)

Page 14 of 14



