ISSN 2009-4086

National Parks and Wildlife Service

Conservation Objectives Series

Termoncarragh Lake and Annagh Machair SPA 004093

NPWS
An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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Citation:

NPWS (2025) Conservation Objectives: Termoncarragh Lake and Annagh Machair SPA 004093. 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***

004093	Termoncarragh Lake and Annagh Machair SPA
A038	Whooper Swan *Cygnus cygnus*
A045	Barnacle Goose *Branta leucopsis*
A122	Corncrake *Crex crex*
A142	Lapwing *Vanellus vanellus*
A346	Chough *Pyrrhocorax pyrrhocorax*
A395	Greenland White-fronted Goose *Anser albifrons flavirostris*
A466	Dunlin *Calidris alpina schinzii*
A999	Wetlands

Please note that this SPA overlaps with Mullet Peninsula SPA (004227), Mullet/Blacksod Bay Complex SAC (000470), and Erris Head SAC (001501). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping or adjacent 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 :	2006
Title :	The status and ecology of the chough *Pyrrhocorax pyrrhocorax* in the Republic of Ireland, 2002 -2005
Author :	Trewby, M.; Gray, N.; Cummins, S.; Thomas, G.; Newton, S.
Series :	Final report to NPWS
Year :	2010
Title :	Resurvey of breeding wader populations of machair and associated wet grasslands in north-west Ireland
Author :	Suddaby, D.; Nelson, T.; Veldman, J.
Series :	Irish Wildlife Manual No. 44
Year :	2010
Title :	The seasonal distribution and foraging behaviour of Red-billed Choughs *Pyrrhocorax pyrrhocorax* in Counties Waterford and Cork, February 2008 to January 2009
Author :	Trewby, M.; Carroll; D.; Mugan, N.; O'Keeffe, D.; Newton, S.
Series :	Unpublished BirdWatch Ireland Report to National Parks & Wildlife Service, Kilcoole, Wicklow
Year :	2010
Title :	The seasonal distribution and foraging behaviour of Red-billed Choughs *Pyrrhocorax pyrrhocorax* in north Co. Kerry, September 2008 to September 2009
Author :	Trewby, M.; Carroll; D.; Gaj-McKeever, R.; Newton, S.
Series :	Unpublished BirdWatch Ireland Report to National Parks & Wildlife Service, Kilcoole, Wicklow
Year :	2013
Title :	A review of the SPA network of sites in the Republic of Ireland
Author :	NPWS
Series :	Published Report
Year :	2019
Title :	Irish wetland bird survey: waterbird status and distribution 2009/10-2015/16
Author :	Lewis, L.J.; Burke, B.; Fitzgerald, N.; Tierney, T.D.; Kelly, S.
Series :	Irish Wildlife Manuals No. 106
Year :	2020
Title :	A survey of breeding waders on machair and other coastal grasslands in Counties Mayo and Galway
Author :	Suddaby, D., O'Brien, I., Breen, D. & Kelly, S.
Series :	Irish Wildlife Manuals No. 119
Year :	2024
Title :	Status and Distribution of Chough in Ireland: Results of the National Survey 2021
Author :	Colhoun, K.; Rooney, E.; Collins, J.; Keogh, N.P.; Lauder, A.; Heardman, C.; Cummins, S.
Series :	Irish Wildlife Manuals No. 151

Other References

Year :	1973
Title :	Population Dynamics of Barnacle Geese, *Branta leucopsis*, in Ireland
Author :	Cabot, D.
Series :	Proceedings of the Royal Irish Academy. Section B: Biological, Geological, and Chemical Science, 73, 415–443

Year :	1993
Title :	Seasonal variations in numbers and levels of activity in a communal roost of Choughs *Pyrrhocorax pyrrhocorax* in central Spain
Author :	Blanco, G.; Fargallo, J.A.; Cuevas, J.A.
Series :	Avocetta, 17: 41-44
Year :	1994
Title :	Annual and long-term variation in the survival rates of British lapwings *Vanellus vanellus*
Author :	Peach, W.J.; Thompson, P.S.; Coulson, J.C.
Series :	Journal of Animal Ecology, pp. 60-70
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 :	1996
Title :	The ecology of the Corncrake, with special reference to the effect of mowing on breeding production
Author :	Tyler, G.
Series :	PhD thesis, University College Cork
Year :	1997
Title :	Populations, ecology and threats to the Corncrake *Crex crex* in Europe
Author :	Green, R. E.; Rocamora, G.; Schäffer, N.
Series :	Vogelwelt, 118, 117-134
Year :	1998
Title :	Breeding waders of machair systems in Ireland in 1996
Author :	Madden, B.; Cooney, T.; O'Donoghue, A.; Norriss, D.W.; Merne, O.J.
Series :	Irish Birds 6: 177-191
Year :	1999
Title :	The Corncrake (*Crex Crex*) in Ireland
Author :	Mc Devitt, A. M.; Casey, C.
Series :	Proceedings International Corncrake Workshop 1998, Hilpoltstein/Germany. Eds. Schaffer & Mamme, U. (eds.)
Year :	1999
Title :	Managing grassland for wild geese in Britain: a review
Author :	Vickery, J.; Gill, J.
Series :	Biological Conservation, 89(1), pp.93-106
Year :	2001
Title :	The effects of flooding lowland wet grassland on soil macroinvertebrate prey of breeding wading birds
Author :	Ausden, M.; Sutherland, W.; James R.
Series :	Journal of Applied Ecology 38: 320–338
Year :	2003
Title :	The status and distribution of choughs *Pyrrhocorax pyrrhocorax* in the Republic of Ireland 2002/03
Author :	Gray, N.; Thomas, G.; Trewby, M.; Newton, S.F.
Series :	Irish Birds, 7, 147-156

Year :	2006
Title :	The breeding season foraging behaviour of choughs *Pyrrhocorax pyrrhocorax* in three Irish chough important bird areas
Author :	Trewby, M.; Gray, N.; Cummins, S.; Thomas, G.; Newton, S.
Series :	Unpublished BirdWatch Ireland Report, Kilcoole, Wicklow
Year :	2008
Title :	Research of breeding Dunlin ecology associated with machair and upland NATURA 2000 sites in N.W. Mayo
Author :	Gamero, A.; McNaghten, L.; Suddaby, D.
Series :	Unpublished report to the National Parks and Wildlife Service, Dublin, Ireland
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 :	2019
Title :	Adverse effects of routine bovine health treatments containing triclabendazole and synthetic pyrethroids on the abundance of dipteran larvae in bovine faeces
Author :	Gilbert, G.; MacGillivray, F.S.; Robertson, H.L.; Jonsson, N.N.
Series :	Nature Scientific Reports 9, 4315
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 :	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 :	2019
Title :	Use of microsatellite-based paternity assignment to establish where Corn Crake *Crex crex* chicks are at risk from mechanized mowing
Author :	Green, R. E.; Brekke, P.; Ward, H.; Slaymaker, M.; van der Velde, M.; Komdeur, J.; Dugdale, H. L.
Series :	Ibis, 161 (4), 890-894
Year :	2020
Title :	Diet of corncrakes *Crex crex* and prey availability in relation to meadow management
Author :	Arbeiter, S.; Flinks, H.; Grünwald, J.; Tanneberger, F.
Series :	Ardea, 108 (1), 55-64
Year :	2020
Title :	Northern Lapwing (*Vanellus vanellus*), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors)
Author :	Wiersma, P.; Kirwan, G.M.; Sharpe, C.J.
Series :	Cornell Lab of Ornithology, Ithaca, NY, USA

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 :	2022
Title :	Chough *Pyrrhocorax pyrrhocorax* counts at a Waterford coastal roost
Author :	McGrath, D.
Series :	Irish Birds 44: 103-107
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
Year :	2023
Title :	Home range of a long-distance migrant, the Greenland Barnacle Goose *Branta leucopsis*, throughout the annual cycle
Author :	Doyle, S.; Cabot, D.; Griffin, L.; Kane, A.; Colhoun, K.; Redmond, C.; Walsh, A.; McMahon, B.J.
Series :	Bird Study, 70(1-2), pp.37-46

A038 Whooper Swan *Cygnus cygnus*

To maintain the Favourable conservation condition of Whooper Swan in Termoncarragh Lake and Annagh Machair 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 wintering Whooper Swan in Ireland has increased in the long term, with a 40% population increase from 1991 - 2015 (Lewis et al., 2019). During the period of baseline assessments to inform SPA designation, a minimum of 33 Whooper Swan were estimated to be using this SPA (3 year mean of peak counts from I-WeBS data for the period 1994/95 - 1996/97). A population of 52 Whooper Swan were estimated to be using Termoncarragh Lake and Annagh Machair SPA in recent years (3 year mean of peak counts from I-WeBS data for the period 2019/20 - 2022/23; note, the 2019/20 count was derived from the International Swan Census and there was no count data for 2020/21). This represents an estimated population increase of 58% since the baseline period, in line with the national trend
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 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 feeds on a wide range of aquatic and terrestrial vegetation. Key forage materials include: leaves, with significant consumption of grasses; seeds, including spilled grain; roots; tubers, including potatoes; shoots, including those from winter wheat and other cereals. Key foraging habitats are grasslands (including wet grassland, semi-improved grassland, and intensive grassland), arable stubble, winter cereals, rivers, lakes, turloughs and other wetland habitats. In general, the foraging distance of wintering Whooper Swan from night roosts is estimated to be less than 5km (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	Roosting is a critical ecological requirement for the wintering population. Overnight roosting habitat consists primarily of permanent waterbodies, such as rivers, lakes, turloughs, lagoons and other open waterbodies. 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

A045 Barnacle Goose *Branta leucopsis*

To maintain the Favourable conservation condition of Barnacle Goose in Termoncarragh Lake and Annagh Machair 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 wintering Barnacle Goose in Ireland has increased by 102% from 1993 - 2018 (Lewis et al., 2019) as monitored by the International Census of Greenland Barnacle Goose. During the baseline assessments to inform SPA designation, 2,849 Barnacle Goose were estimated to be using this SPA, Duvillaun Islands SPA, Inishglora and Inishkeeragh SPA and Inishkea Islands SPA (4 year mean of census counts for the period 1993 - 2003; see NPWS, 2013). More recent data showed a population of 2,991 Barnacle Goose used these SPAs during the period 2013 - 2023 (4 year mean of census counts from the International Census of Greenland Barnacle Goose). This suggests the population is broadly stable, with a population increase of 5% since the baseline period, less than the national trend
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 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 grazing herbivore. Historically, in Ireland, foraging habitat included salt marsh, but currently the species is typically associated with open coastal pasture, mostly improved and semi-improved agricultural grasslands. Barnacle Goose grazes on leaves, stems, rhizomes, roots and seeds, with grass and *Plantago/Bellis/Festuca* swards comprising preferred food sources (Cabot, 1973). This species selects a preferred sward height of <10cm but birds can feed on swards >15cm if preferred areas are depleted (based on birds in Islay, see Vickery and Gill, 1999). Birds are highly likely to exhibit foraging site fidelity and may be found foraging on offshore islands as well as commuting to forage on the mainland. Maximum foraging distance is approximately 7km for wintering birds (Doyle et al., 2023)
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	Roosting is a critical ecological requirement for the wintering population. When roosting, this species uses open habitats (primarily pastures) that provide wide sightlines for the birds and which are typically adjacent to water bodies; thus, offshore islands are commonly use. Birds exhibit strong roost site fidelity (Doyle et al., 2023). 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

A122 Corncrake *Crex crex*

To maintain the Favourable conservation condition of Corncrake in Termoncarragh Lake and Annagh Machair SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population size	Number of calling males	Maintain the numbers of calling males to an average of at least 5 per year in any consecutive 5-year period	The breeding season of this migratory bird is mid-April to mid-September. The measure of 'calling males' is as per previous (Green et al., 1997) and recently adapted Corncrake census methods (NPWS internal files). Determination of the SPA population size involves recording calling males within suitable/known areas between 20 May-10 July (BST 11:00-03:00hrs), though calling males outside this period/time are also recorded as potential breeding sites. Where multiple birds occur in close proximity, visits are increased to track movements of individuals and refine records. For the period 2020-24, the SPA held an average of 7 calling males with some interchange with Mullet Peninsula SPA. Agricultural practices incompatible with their breeding ecology is considered the main cause of sub-optimal breeding habitats in this SPA (NPWS internal files). With no baseline site data (NPWS internal files), the target is based on the average of at least 5 calling males in the period 2016-24
Population trend	Percentage change in number of calling males	Long-term population trend is stable or increasing	The national population of breeding Corncrake for the period 2003-07 ranged from 131-162 calling males, with an average of 150, fewer than Republic of Ireland total of 165 in 1993 (McDevitt and Casey, 1999) and lower than all-Ireland figures in Green et al. (1997) of 174. Recent figures for the period 2019-23 indicate that the population has risen to an average of c.182 calling males (151-218). The national population trend seems to be increasing since 2003-07. For the SPA, the average of 7 calling males for the period 2020-24 gives a recent reference point. The population targets for this SPA should be viewed jointly with Mullet Peninsula SPA. SPA totals include any calling males located outside the SPA but ≤250m from the boundary. For the Corncrake SPA network overall, the population trend is considered broadly stable, with an average of 102 calling males for the period (2019-23), on par with an average of 99 for the network for the period (2003-07)
Spatial utilisation by breeding pairs	Percentage	Maintain the spatial utilisation of the SPA by breeding pairs at at least 25-40%	Core areas used by breeding Corncrake can be broadly defined by calculating the portion that lies within 250m of all confirmed calling males, albeit independent flightless chicks will range further (Green et al., 2019). Optimal resilience for the population relies on birds utilising suitable habitat to the maximum extent, with the population well dispersed across the SPA and not confined to isolated locations. The target range is informed by 2016-23 census data for the SPA, and includes estimated usage figures for the SPA where numbers of calling males in any given year were ≥ the SPA baseline figures presented in NPWS (2013). The target area is informed by typical home ranges (Tyler, 1996) and baseline population density. The mean estimated spatial distribution of Corncrake for this SPA was 37.7% for the period 2019-23. Meeting other targets, including that for the 'extent and condition of nesting and foraging habitat', should help achieve the spatial utilisation target

Extent and condition of nesting and foraging habitat	Hectares; condition assessment	At least maintain the extent and quality of this resource to support the targets relating to population size, population trend and spatial utilisation	Given its extended breeding season, the provision of tall-herb species via the creation of early and late cover areas (ELCs) in spring/autumn is beneficial to Corncrake. A ground-nesting rail, it prefers tall, well structured grass vegetation (≥20cm) in hay, arable or silage fields, rough pastures, and in stands of herbaceous species such as Yellow Iris (*Iris pseudacorus*) and Nettle (*Urtica dioica*) (e.g. Green et al., 1997; Tyler, 1996; NPWS internal files). ELCs support adults by providing invertebrate prey species (NPWS internal files) and nesting habitat when meadows are unsuitable, thereby improving breeding success (e.g. via nest concealment allowing better protection from predators) and by allowing breeding to start earlier or end later. Wildlife-friendly mowing provides Corncrake with continuous cover by maintaining low mowing speeds to allow adults/young chicks escape to edges of fields rather than centres i.e. into safety of field margins/neighbouring fields
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available prey biomass to support the population targets	Nesting Corncrake are most at risk to habitat loss due to activities related to grass/crop harvesting and continuous grazing, particularly by sheep. Omnivorous in its diet, it feeds mainly on arthropods, molluscs, worms and seeds (Tyler, 1996; Arbeiter et al., 2020). The availability of earthworms and molluscs in moist habitats may explain why moist unfertilised grassland is good Corncrake habitat, as well as the suitability of the vegetation structure of some marsh vegetation (Green et al., 1997). Insects and molluscs may be vital for Corncrake in floodplain habitats, as areas with long winter floods have a lower abundance of earthworms (Ausden et al., 2001). Suitable and well-connected forage areas, with an open sward structure, ≥20cm in height, offer optimum concealment and cover to adults and young birds, which are flightless for up to 40 days post-hatching. Restoring/maintaining inter-connected mosaics of forage/refuge areas across the SPA and wider hinterland is fundamental
Disturbance to breeding sites	Level of impact	Disturbance occurs at levels that do not significantly impact upon breeding Corncrake	Factors such as intensity, frequency, timing and duration of a potentially disturbing activity (e.g. grass/crop harvesting; recreational activities; summer grazing; development requiring planning permission) must be taken into account to determine the potential impact upon the targets which relate to population demographics (i.e. population size, population trend) and the spatial utilisation of the SPA by breeding Corncrakes. Agricultural activities and associated land-use in/adjacent to the SPA may cause disturbance to breeding sites and may directly impact breeding success, by confining Corncrake to limited locations; thereby increasing mortality risk and resource competition. Late summer harvesting of grass (post 15 Aug) using wildlife-friendly mowing and the retention of refuge areas significantly lowers risk to flightless chicks/moulting adults

A142 Lapwing *Vanellus vanellus*

To maintain the Favourable conservation condition of Lapwing in Termoncarragh Lake and Annagh Machair 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 Lapwing in Ireland is estimated to have declined by 94 - 95% between 1980 and 2019, with an associated 56% reduction in breeding distribution between 1972 and 2011 (see EEA, 2019). Apparently Occupied Territory (AOT) is a standard metric used to represent breeding pairs. In 1996, 22 Lapwing AOTs were recorded in Termoncarragh Lake and Annagh Machair SPA. The population declined to just 6 AOTs in 2009 (Suddaby et al., 2010) but subsequently recovered, with 21 AOTs recorded in 2019 (Suddaby et al., 2020) and 67 AOTs recorded in 2024 (NPWS internal files). The recovery of the population is attributed to the implementation of targeted conservation measures for breeding waders in recent decades within the SPA, primarily in the Annagh Marsh area, including the management of habitat and predation risk (see Suddaby et al., 2020)
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. A study of breeding Lapwing populations in Britain suggests productivity should be at least 0.83 to 0.97 fledglings per pair for population maintenance (Peach et al., 1994). Data from the Annagh Marsh area within the SPA shows productivity from 2014 to 2019 inclusive was above this threshold each year (see Suddaby et al., 2020). The high productivity values can largely be attributed to the implemented conservation measures and are likely the primary demographic factor in the observed population recovery
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	Lapwing breed in open habitats with short vegetation and/or bare ground, including a variety of coastal (including machair) and inland grasslands (improved and semi-natural; pastures and meadows) and a range of wetlands such as flood plains/callows, lakes, turloughs, lagoons, marshes, peatlands (including cutover bog) and fens, as well as arable/tillage fields
Extent and condition of breeding habitat	Hectares of high quality breeding habitat	Sufficient area of high quality habitat to support the population target	Lapwing breed in open habitats with short vegetation and/or bare ground, including a variety of coastal (including machair) and inland grasslands (improved and semi-natural; pastures and meadows) and a range of wetlands such as flood plains/callows, lakes, turloughs, lagoons, marshes, peatlands (including cutover bog) and fens, as well as arable/tillage fields. Lapwing nest on the ground where they create a shallow scrape, lined with vegetation, in areas of short vegetation or bare ground, often adjacent to wet features such as freshwater pools. High quality breeding habitat is considered as habitat in which Lapwing can successfully nest and rear young to fledging

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 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	Lapwing forage exclusively at ground level, only ever wading in very shallow water, and rely primarily on surface and sub-surface dwelling invertebrate prey. Earthworms and insects are central prey, including adults, pupae and/or larvae of beetles, ants, flies (especially cranefly) and moths, but they will also consume snails and spiders. Aquatic invertebrate prey may become increasingly important as the breeding season progresses (see Wiersma et al., 2020). Prey are located both visually and aurally, and Lapwing can feed both diurnally and nocturnally. During the breeding season, foraging habitats include those habitats in which they breed (see Distribution of breeding habitat above)

A346 Chough *Pyrrhocorax pyrrhocorax*

To maintain the Favourable conservation condition of Chough in Termoncarragh Lake and Annagh Machair SPA, which is defined by the following list of attributes and targets::

Attribute	Measure	Target	Notes
Population trend	Percentage change	Long-term population trend stable or increasing	This SPA is selected for non-breeding chough. Despite a decline of 37% in the total number of breeding pairs recorded in Co. Mayo between 2002 and 2021, the population total of 56 non-breeding Chough, is stable/increasing (Colhoun et al., 2024). This SPA contains coastal foraging habitats favoured by Chough and is an important foraging resource for the population post-breeding, centred on the machair and dune habitats. Parts of the nearby Mullet Peninsula SPA also hold suitable feeding areas i.e. coastal grasslands and heath. Such areas can support the local Chough population, particularly during the autumn/winter period. For more site-specific information, please refer to the NPWS site synopsis (site code: 004093); Gray et al. (2003); Trewby et al. (2006); Colhoun et al. (2024)
Winter foraging habitat: quality and quantity	Hectares (ha)	Maintain sufficient quality and quantity of coastal grassland and other relevant habitats	Trewby et al. (2006) highlight the possible convergence of breeding birds from offshore islands on mainland dune systems in Co. Mayo post-breeding. Grazed habitats with short swards of <5cm are usually preferred and areas of bare ground, where soils are easier to probe e.g. paths, earth banks and stone banks. Outside the breeding season, coastal grazed dune and machair habitats in this SPA are usually preferred by Chough (Trewby et al., 2006)
Food availability: prey biomass	Quantity per unit area	Maintain adequate levels of prey biomass (including preferred invertebrate prey items such as leatherjackets, dung beetles, etc.)	Chough feed largely on invertebrates (e.g. ants, spiders, worms, insect larvae such as crane fly larvae, leatherjackets and dung beetles), at or near the soil surface where prey items are more accessible. In warmer weather, Chough can be seen picking off active surface insects, e.g. spiders, including from heather plants (Trewby et al., 2010). The dosing of livestock with veterinary parasiticide treatments (including anthelmintics) has knock-on consequences with respect to invertebrate density in grasslands on which Chough depend (Gilbert et al., 2019)
Distribution of roosting sites	Spatial distribution	The distribution of preferred roosts is maintained	Post-breeding, Chough are highly social, forming mobile flocks that can travel several kilometres to feed (McGrath, 2022). Family groups form 'nursery' flocks in July, returning to nest sites to roost, but by summer's end, these flocks begin to converge pre-dusk, along with non-breeding sub-adults, at communal nocturnal roost sites, leaving post-dawn (Trewby et al., 2010; Blanco et al., 1993). Roosts tend to be close to good foraging habitat (e.g. grazed dune systems); peak attendance is usually in late summer/early autumn, post-breeding. Currently, there are no known roosting (natural or built structures) sites in this SPA

Disturbance at wintering sites	Intensity, timing, frequency and duration	Disturbance occurs at levels that do not significantly impact upon Chough in the SPA	Factors such as intensity, frequency, timing, duration of a (direct or indirect) disturbance source and location (e.g. if access to preferred food sources is restricted), must be taken into account to determine the potential impact upon the targets for winter spatial distribution. Further, site fidelity, weather (e.g. prolonged cold spells) and predation/competition should also be factored in. Impacts are likely to be highest near nest sites and at roost sites but any sustained displacement of family parties (during the post-fledging period) and/or of flocks from preferred foraging sites such as coastal machair or dunes in the non-breeding season is a concern
Winter spatial distribution	Extent of range (ha), time and intensity of use	No significant decline in the range size, timing and intensity of use of areas by Chough, other than that occurring from natural patterns of variation	Winter spatial distribution captures the number of locations and area of potentially suitable habitat available to Chough. The suitability and availability of habitats is likely to vary throughout the year, for example, due to variation in land management practices (e.g. grazing or mowing) or the abundance of resources available (due to natural variation and other factors). As a result, the spatio-temporal patterns of use of habitats during the year will be affected. By the late summer, post-breeding flocks are known to use the SPA and environs, with up to 35 individuals recorded along dunes and machair from Cross Point to Annagh Head (Trewby et al., 2006)
Supporting winter habitat: area and quality	Area (ha) and quality	Sufficient area of utilisable habitat available in ecologically important sites outside the SPA	Outside the breeding season, Chough range widely along the Mayo coast and inland, using suitable habitats for foraging or roosting, with possible convergence of breeding birds from offshore islands on mainland dune systems in Co. Mayo (Trewby et al., 2006). The extent, availability and quality of connected ecologically important areas outside the SPA may be of importance for the resilience of the SPA population. It is hypothesised that, post-breeding, dunes can act as 'assembly points' for juveniles and adults and may serve to also support social interactions (Trewby et al., 2006)

A395 Greenland White-fronted Goose *Anser albifrons flavirostris*

To restore the Favourable conservation condition of Greenland White-fronted Goose in Termoncarragh Lake and Annagh Machair 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 has declined by 13% between 1985 and 2018 (EEA, 2019). It is understood that the Belmullet sub-flock, which forms part of the larger Bog of Erris flock, primarily uses the Termoncarragh Lake and Annagh Machair SPA and wider Mullet Peninsula (Burke et al., 2014). During the baseline assessments to inform SPA designation, 48 Greenland White-fronted Goose were estimated to be using the SPA and wider Mullet Peninsula (4 year mean of peak counts for the period 1994/95 - 1998/99, with no data for 1997/98; NPWS internal files). A population of 11 Greenland White-fronted Goose were reported to be using the SPA and wider Mullet Peninsula in recent years (3 year mean of peak counts for the period seasons 2018/19, 2021/22 and 2022/23; Fox et al., 2019, 2022 and 2023). This represents an estimated population decline of 77% since the baseline period, significantly greater than the national trend
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 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 to 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	Roosting is a critical ecological requirement for the wintering population. 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. 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

A466 Dunlin *Calidris alpina schinzii*

To restore the Favourable conservation condition of Dunlin in Termoncarragh Lake and Annagh Machair 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 1996, 14 Dunlin AOTs were recorded in Termoncarragh Lake and Annagh Machair SPA (Madden et al., 1998). The population subsequently declined, with only 2 AOTS recorded in 2006 and a single AOT recorded in both 2007 and 2008 (see Gamero et al., 2008). Dunlin has not been recorded breeding during subsequent surveys of the SPA (Suddaby et al., 2010 and 2020; NPWS internal files). Dunlin have not recolonised the site despite the implementation of conservation measures for breeding waders in the SPA in recent decades and the associated subsequent recovery in other breeding waders, such as Lapwing
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. A lack of comprehensive data precludes the identification of a minimum productivity rate required to maintain the breeding Dunlin population within the SPA or at national scale. It is likely, based on evidence from other nearby sites that supported breeding Dunlin (see, for example, Gamero et al., 2008), that poor productivity was a central factor in the noted population declines in this SPA (see also Suddaby et al., 2020)
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

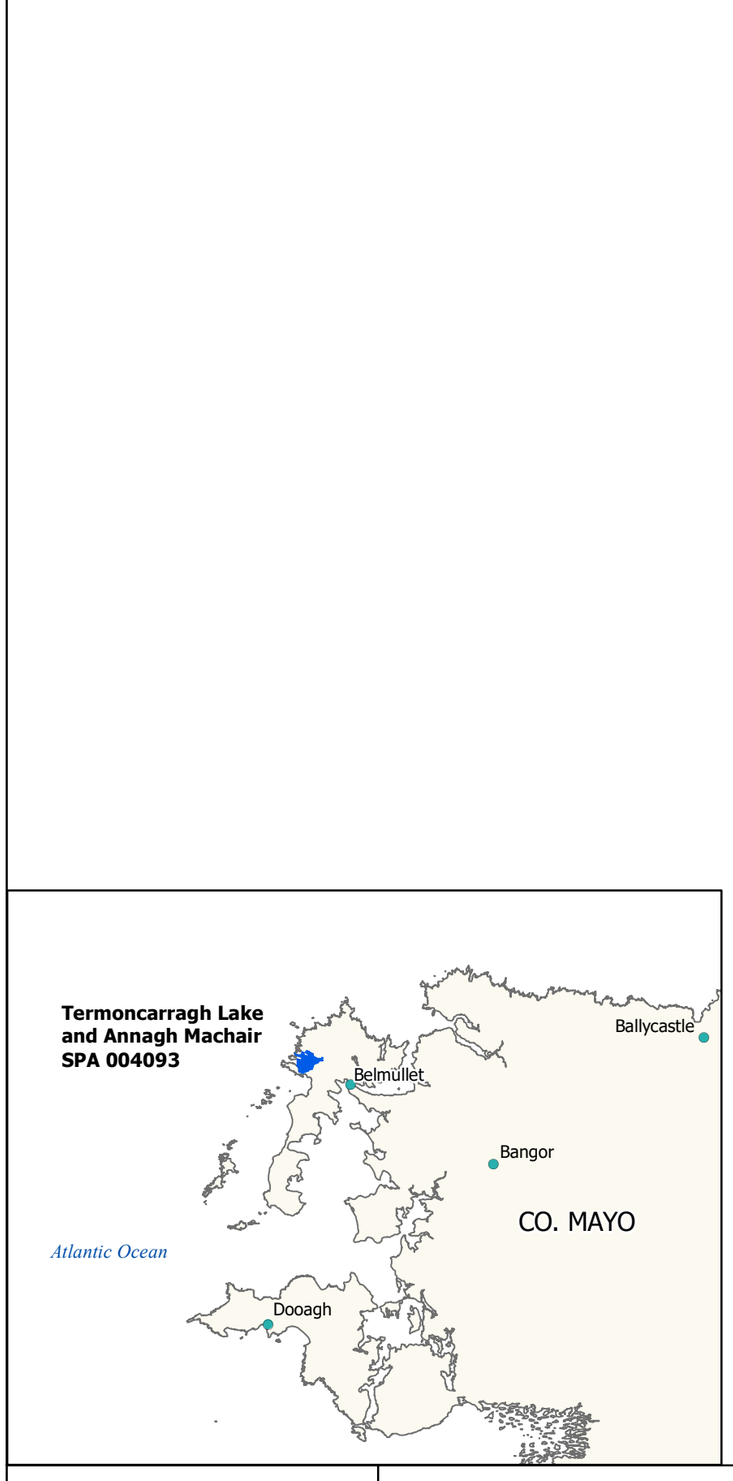
Disturbance at breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and distribution	The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population trend and/or spatial distribution 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	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 above)

Conservation Objectives for : Termoncarragh Lake and Annagh Machair SPA [004093]

A999 Wetlands

To maintain the Favourable conservation condition of Wetland habitats in Termoncarragh Lake and Annagh Machair SPA as a resource for the regularly-occurring migratory waterbirds that utilise these areas. This is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Wetland habitat area	Hectares	No significant loss to wetland habitat within the SPA, other than that occurring from natural patterns of variation	Any significant loss to the wetland habitat within the SPA would likely negatively impact the regularly-occurring migratory waterbirds that utilise this wetland habitat. Such loss of wetland habitat would likely reduce the diversity and abundance of waterbird species that the wetland can support. This, in turn, could negatively impact the Conservation Objectives for waterbird species listed as Special Conservation Interests in the SPA or other regularly-occurring migratory waterbird species
Wetland habitat quality and functioning	Quality and function of the wetland habitat	No significant impact on the quality or functioning of the wetland habitat within the SPA, other than that occurring from natural patterns of variation	Any significant impact on the quality, functioning and accessibility of the wetland habitat within the SPA would likely negatively impact the regularly-occurring migratory waterbirds that utilise this wetland habitat. Impacts on wetland quality, functioning and accessibility would likely reduce the diversity and abundance of waterbird species that the wetland can support. This, in turn, could negatively impact the Conservation Objectives for waterbird species listed as Special Conservation Interests in the SPA or other regularly-occurring migratory waterbird species



Legend

Termoncarragh Lake and Annagh Machair SPA 004093

NPWS An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra National Parks and Wildlife Service

MAP 1:
TERMONCARRAGH LAKE AND ANNAGH MACHAIR SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION

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

SITE CODE:
SPA 004093; version 3
CO. MAYO

0 1.25 2.5 5 Kilometres

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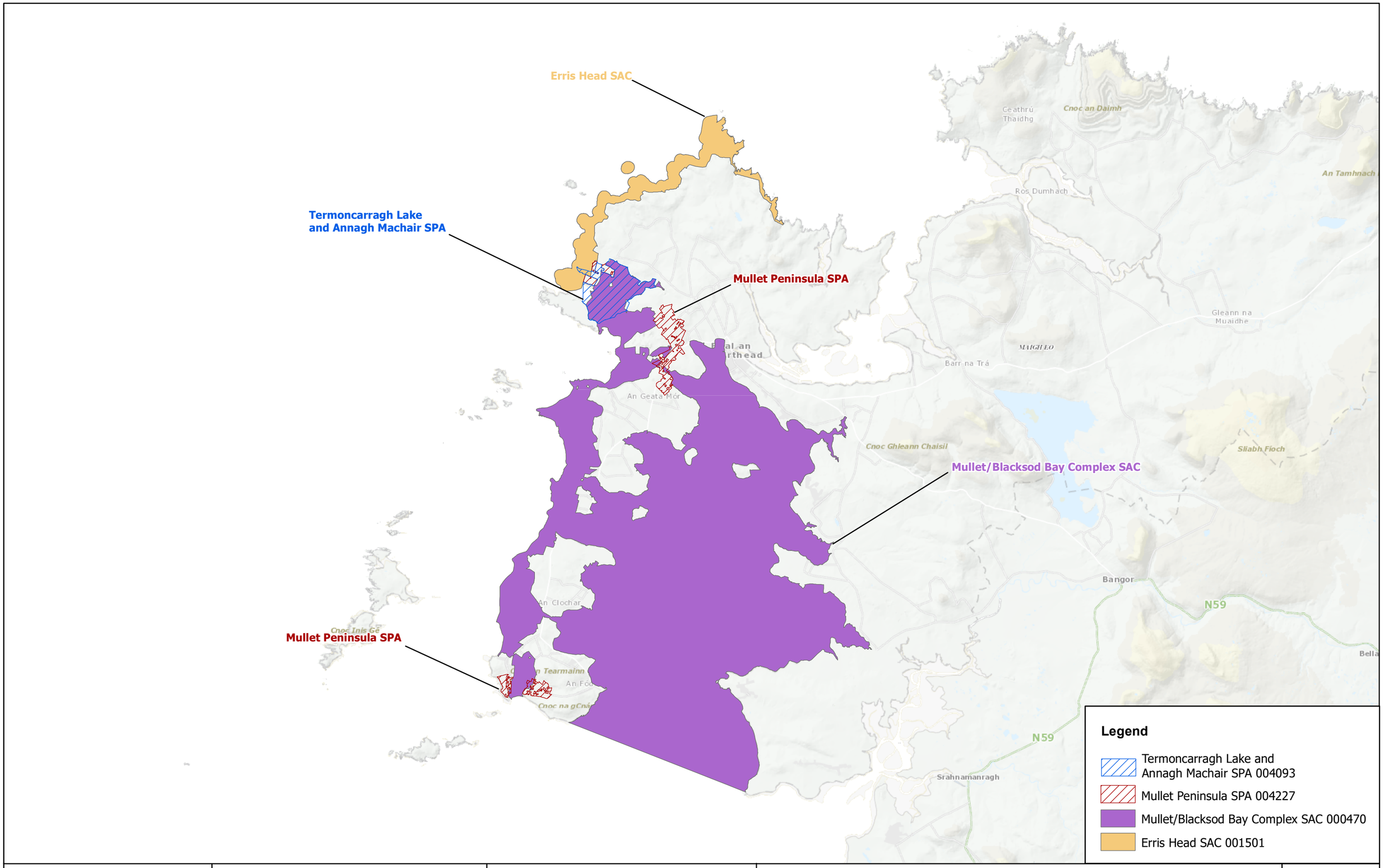
Map version 1
Date: July 2024



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MAP 2:
TERMONCARRAGH LAKE AND ANNAGH MACHAIR SPA
CONSERVATION OBJECTIVES
OVERLAPPING AND ADJACENT SITES

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

SITE CODE:
SPA 004093; version 3
CO. MAYO

0 1.25 2.5 5 Kilometres

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.

Níl sna teorainneacha ar na léarscáileanna ach nod garshuiomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.

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Map version 1
Date: July 2024