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Conservation Objectives Series

Inishmurray SPA 004068

An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
National Parks and Wildlife Service

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

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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***

004068 Inishmurray SPA

A018	Shag *Phalacrocorax aristotelis*
A045	Barnacle Goose *Branta leucopsis*
A184	Herring Gull *Larus argentatus*
A194	Arctic Tern *Sterna paradisaea*

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 :	Seabird Productivity on the West Coast of Ireland in 2006
Author :	Hall, M.E.; Newton, S.; Suddaby, D.; Trewby, M.
Series :	Seabird Monitoring Project Report 2006. Unpublished report to National Parks and Wildlife Service
Year :	2007
Title :	Seabird Productivity at East and South coast colonies in Ireland in 2007: Site accounts
Author :	Trewby, M.; Burt E.; Newton, S.
Series :	Unpublished report to NPWS
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 :	2021
Title :	Estimated foraging ranges of the breeding seabirds of Ireland's marine special protected area network
Author :	Power, A.; McDonnell, P.; Tierney, T.D.
Series :	Published NPWS report
Year :	2022
Title :	Rockabill Tern Report, 2022
Author :	Allbrook, D.; Dunne, S.; Fink, A.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS
Year :	2022
Title :	Lady's Island Lake Tern Report 2022
Author :	Stubbings, E.; Büche, B.; Murray, T.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS
Year :	2023
Title :	Lady's Island Lake Tern Report 2023
Author :	Stubbings, E.; Büche, B.; Murray, T.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS
Year :	2023
Title :	Rockabill Tern Report 2023
Author :	Fihey, A.; Crowley, C.; Fitzgerald, M.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS
Year :	2024
Title :	Lady's Island Lake Tern Report 2024
Author :	Stubbings, E.; Büche, B.; Doyle, H.; Burke, B.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS

Year :	2024
Title :	Rockabill Tern Report 2024
Author :	Coughlan, K.; Roberts, E.; Streker, R.; Newton, S.
Series :	BirdWatch Ireland Seabird Conservation Report to NPWS
Year :	2024
Title :	Foraging activity of breeding Arctic Terns and European Shags in W Ireland: results of a telemetry study in 2023
Author :	Colhoun, K.; Latimer, J.; Sardà-Serra, M.; Collins, J.; Inger, R.
Series :	Unpublished report to NPWS

Other References

Year :	1900
Title :	The Birds of Ireland: An Account of the Distribution, Migrations and Habits of Birds as Observed in Ireland, with All Additions to the Irish List
Author :	Ussher, R.J.; Warren, R.
Series :	Gurney and Jackson
Year :	1966
Title :	Ireland's Birds: their distribution and migrations
Author :	Ruttledge, R.F.
Series :	Published by HF & G Witherby, London
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 :	1985
Title :	The 1984 all Ireland tern survey
Author :	Whilde, A.
Series :	Irish Birds 3: 1-32
Year :	1991
Title :	The status of seabirds in Britain and Ireland
Author :	Lloyd, C.; Tasker, M.L.; Partridge, K.
Series :	Poyser Monographs Volume: 50
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 :	1997
Title :	The status and distribution of breeding sandwich, roseate, common, arctic and little terns in Ireland in 1995
Author :	Hannon, C.; Berrow, S.D.; Newton, S.F.
Series :	Irish Birds, 6: 1-22
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 : 2003

Title : Implications for seaward extensions to existing breeding seabird colony Special Protection Areas

Author : McSorley, C.A.; Dean, B.J.; Webb, A.; Reid J.B.

Series : JNCC Report No. 329

Year : 2004

Title : Seabird populations of Britain and Ireland

Author : Mitchell, P.I.; Newton, S.F.; Ratcliffe, N.; Dunn, T.E.

Series : Poyser, London

Year : 2010

Title : How Representative is the Current Monitoring of Breeding Seabirds in the UK?

Author : Cook, A.S.C.P.; Robinson, R.A.

Series : BTO Research Report No. 573

Year : 2019

Title : Desk-based revision of seabird foraging ranges used for HRA screening

Author : Woodward, I.; Thaxter, C.B.; Owen, E.; Cook, A.S.C.P.

Series : BTO Research Report No. 724

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

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Year : 2020

Title : Arctic tern (*Sterna paradisaea*), version 1.0. In Birds of the World (S. M. Billerman, Editor)

Author : Hatch, J. J.; Gochfeld, M.; Burger, J.; Garcia, E. F. J.

Series : Cornell Lab of Ornithology, Ithaca, NY, USA

Year : 2020

Title : Herring Gull (*Larus argentatus*), version 1.0. In Birds of the World (S. M. Billerman, Editor)

Author : Weseloh, D. V.; Hebert, C. E.; Mallory, M. L.; Poole, A. F.; Ellis, J. C.; Pyle, P.; Patten, M. A.

Series : Cornell Lab of Ornithology, Ithaca, NY, USA

Year : 2021

Title : European Shag (*Gulosus aristotelis*), version 1.2. In Birds of the World (B. K. Keeney, Editor)

Author : Orta, J., Garcia, E. F. J.; Jutglar, F.; Kirwan, G. M.; Boesman, P. F. D.

Series : Cornell Lab of Ornithology, Ithaca, NY, USA

Year : 2023

Title : Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015-2021)

Author : Burnell, D.; Perkins, A.J.; Newton, S.F.; Bolton, M.; Tierney, T.D.; Dunn, T.E.

Series : Lynx Nature Books, Barcelona

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

Year : 2024

Title : European Shag (*Phalacrocorax aristotelis*)

Author : JNCC

Series : https://jncc.gov.uk/our-work/european-shag-phalacrocorax-aristotelis/

Conservation Objectives for : Inishmurray SPA [004068]

A018 **Shag *Phalacrocorax aristotelis***

To maintain the Favourable conservation condition of Shag in Inishmurray SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing	The estimated breeding population of Shag on Inishmurray in 1986 was 237 pairs (Lloyd et al., 1991). The population declined significantly to 104 pairs in 2000 (Mitchell et al., 2004). The population recovered to 279 pairs in 2006 (Hall et al., 2006). A survey conducted in 2016 saw the population increase further with an estimated 389 pairs which is the highest count on record for this SPA (Burnell et al., 2023). This represents an increase of 64% between 1986 and 2016 (Burnell et al., 2023). At the national level the population estimate for the periods 1985 - 1988 and 2015 - 2021 are broadly similar indicating stability over that period (Burnell et al., 2023)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Hall et al. (2006) reported average productivity from Inishmurray SPA was 0.64 (± 0.10 SE) chicks fledged per AON in 2006 (124 pairs across four subplots). Trewby et al. (2007) reported that the average productivity from Lambay Island SPA was 1.69 (± 0.08 SE) chicks fledged per AON in 2007 (135 pairs across five subplots). Further monitoring and research work is required to identify a minimum productivity rate for this species at this site and at the national level. Shag productivity in Scotland has averaged 1.28 chicks fledged per pair between 1986 and 2019 (JNCC, 2024). In this time period the Scottish population of Shag decreased 47% (Burnell et al., 2023). However, the decline may not be related to productivity rate but rather due to significant losses of that adult population during "wrecks" in some winters during this time period (JNCC, 2024). Poor productivity recorded in this SPA in 2006 may have been a result of human disturbance and predation from gulls (Hall et al., 2006)
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population	Distribution encapsulates the number of locations and area of potentially suitable nesting habitat for the breeding population and its availability for use. The suitability and availability of habitat across the SPA may vary through time. This will affect the spatio-temporal patterns of use of the habitats by Shag. Typically this species breeds on sea cliffs, rocks and stacks (Orta et al., 2021). Hall et al. (2006) provides detailed information on the distribution and characteristics of this species' nest sites on Inishmurray
Forage spatial distribution, extent, abundance and availability	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The diet of Shag is almost exclusively fish, taken chiefly near the sea bed or at intermediate depths, and principally of the families Ammodytidae (sandeels), Gadidae, Clupeidae, Cottidae, and Labridae, but a wide range of other species can be taken, perhaps opportunistically (Orta et al., 2021). Based on several studies, Woodward et al. (2019) provide estimates of foraging ranges from the nest site during the breeding season (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) for Shag, which are 9km, 13km, and 46km respectively (see Power et al., 2021). A GPS-tracking study of Inishmurray's Shag population over two breeding seasons (2022 and 2023) showed that the majority of the tracked individuals travelled to forage along the mainland coast (Colhoun et al., 2024)

Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding site	Disturbance events at the nest site/breeding colony level can result in a reduction of overall productivity and even lead to the abandonment of the breeding colony. The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population size and/or spatial distribution. Disturbance contributes to increased energetic expenditure, which can result in increased likelihood of mortality or reduced fitness (if energy expenditure is greater than energy gain) and, in turn, negatively impact population trends. 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 size and spatial distribution
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	Seabird species can make extensive use of the marine waters adjacent to their breeding colonies for non site-specific maintenance behaviours (e.g. courtship, bathing, preening), as defined in McSorley et al. (2003). Additionally, some species may engage in maintenance behaviours outside of the breeding colony but not in the water
Barriers to connectivity	Number, location, shape, and area (ha)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	Seabirds, particularly during the breeding season, require regular and efficient access to marine waters ecologically connected to the colony in order to forage as well as to engage in other maintenance behaviours. Woodward et al. (2019) provide estimates of foraging ranges from the nest site during the breeding season (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) for Shag, which are 9km, 13km, and 46km respectively (see Power et al., 2021). Colhoun et al. (2024) presents corresponding values specifically from Inishmurray of 6.4km and 18km for mean of maximum and maximum distances respectively

A045 Barnacle Goose *Branta leucopsis*

To maintain the Favourable conservation condition of Barnacle Goose in Inishmurray 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, 2,048 Barnacle Goose were estimated to be using this SPA, Ardbolin Island and Horse Island SPA and Ballintemple and Ballygilgan SPA (4 year mean of census counts for baseline period 1993 - 2003; see NPWS, 2013). More recent data showed a population of 4,538 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 represents a population increase of 122% since the baseline period, 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 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 used. 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

A184 Herring Gull *Larus argentatus*

To maintain the Favourable conservation condition of Herring Gull in Inishmurray SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing	Approximately 200 pairs of Herring Gull were recorded on Inishmurray in 1986 (Lloyd et al., 1991). The population declined to 111 pairs in 2000 (Mitchell et al., 2004) and 96 pairs in 2006 (Hall et al., 2006). However, the population increased to at least 182 pairs in 2014 (NPWS internal files). A survey conducted in 2016 recorded 243 pairs of Herring Gull which is the highest recorded for this SPA and represents an increase of 22% since 1986. The natural-nesting (i.e. non-urban) Herring Gull population in Ireland is reported to have increased by 94% between 1998 - 2002 and 2015 - 2021 (Burnell et al., 2023)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	There was no productivity data available for this species in this SPA. Cook and Robinson (2010) undertook Population Viability Analyses (PVA) of a selection of breeding populations in the UK. Over their study period, Herring Gull productivity at monitored nests was 0.75. Were this level to be maintained, Herring Gull populations would decline by 60% over 25 years. For the population to stabilise, breeding success would have to increase to 1.3 - 1.5 chicks per nest per year. A lack of comprehensive Irish data precludes the identification of a minimum productivity rate for this species at the site and at the national level
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population	Distribution encapsulates the number of locations and area of potentially suitable nesting habitat for the breeding population and its availability for use. The suitability and availability of habitat areas may vary through time. This will affect the spatio-temporal patterns of use of the habitats by Herring Gull. Typically, coastal Herring Gull colonies are located along rocky coastlines with cliffs, islets and offshore islands (Mitchell et al., 2004)
Forage spatial distribution, extent, abundance and availability	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Herring Gull is a generalist and opportunistic feeder and can forage over both terrestrial and aquatic habitats. Its diet includes fish, fish offal, bivalves, gastropods, crustaceans, squid, insects, other seabirds, small land birds, small mammals, terrestrial insects, earthworms, berries, carrion, and a wide variety of human refuse (Weseloh et al., 2020). Woodward et al. (2019) reviewed the foraging ranges of seabird species from over 300 studies including: direct tracking of birds; estimates based on flight speeds and time activity; survey observations; and speculative estimates. Woodward et al. (2019) provide estimates (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) of Herring Gull foraging ranges from the nest site during the breeding season, which are 15km, 59km, and 92km respectively (see Power et al., 2021)

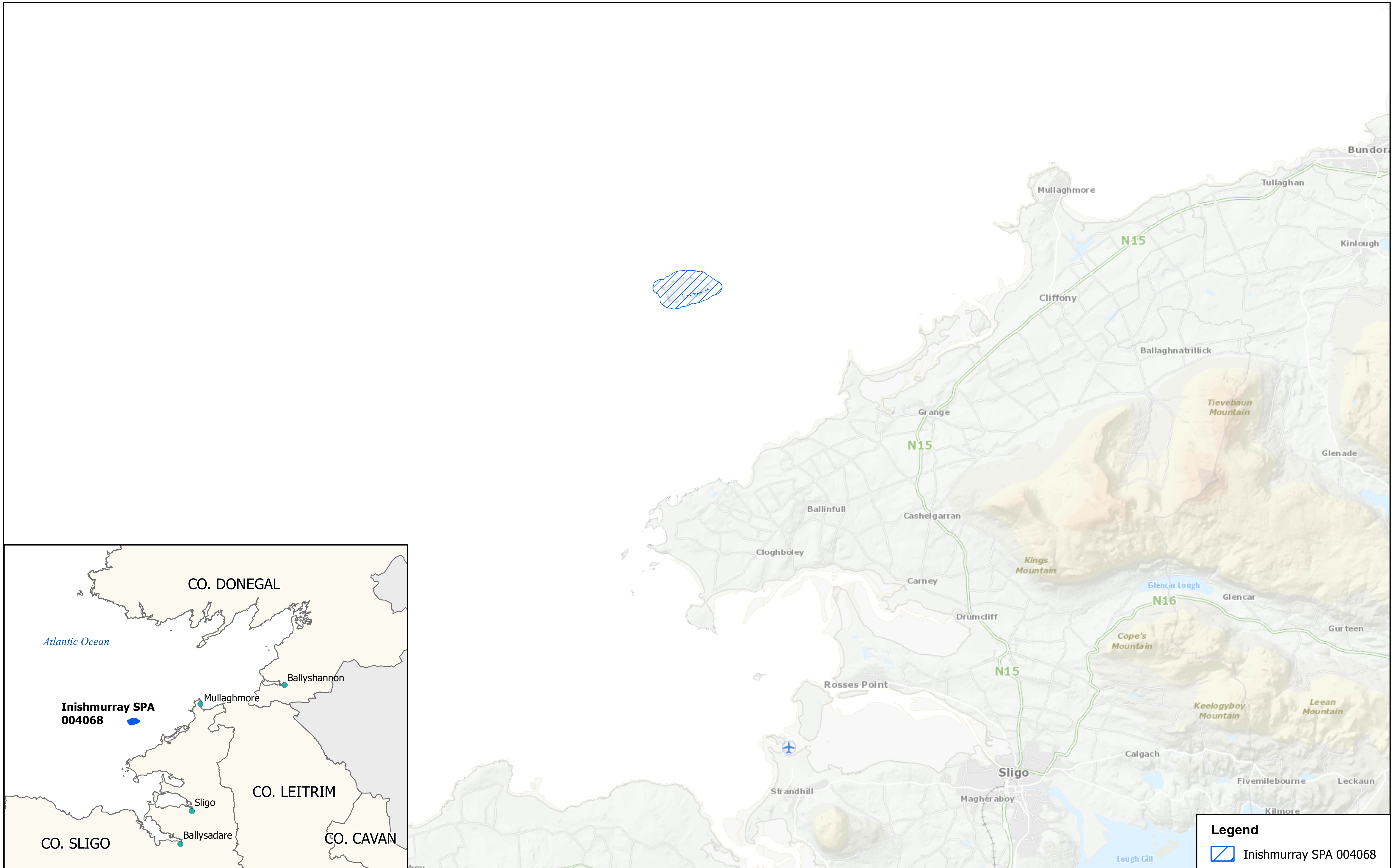
Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	Disturbance events at the nest site/breeding colony level can result in a reduction of overall productivity and even lead to the abandonment of the breeding colony. The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population size and/or spatial distribution. Disturbance contributes to increased energetic expenditure, which can result in increased likelihood of mortality or reduced fitness (if energy expenditure is greater than energy gain) and, in turn, negatively impact population trends. 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 size and spatial distribution
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	Seabird species can make extensive use of the marine waters adjacent to their breeding colonies for non site-specific maintenance behaviours (e.g. courtship, bathing, preening), as defined in McSorley et al. (2003)
Barriers to connectivity	Number, location, shape, and area (ha)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	Seabirds, particularly during the breeding season, require regular and efficient access to marine waters ecologically connected to the colony in order to forage as well as to engage in other maintenance behaviours. Based on several studies, Woodward et al. (2019) provide estimates (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) of Herring Gull foraging ranges from the nest site during the breeding season, which are 15km, 59km, and 92km respectively (see Power et al., 2021)

A194 **Arctic Tern *Sterna paradisaea***

To restore the Favourable conservation condition of Arctic Tern in Inishmurray SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population size	Number of Apparently Occupied Nests (AON)	Long term SPA population trend is stable or increasing	Ussher and Warren (1900) noted the presence of very large Arctic Tern colonies on the coast of Co. Sligo and Ruttledge (1966) described Inishmurray as Ireland's largest Arctic Tern colony with approximately 400 - 450 breeding pairs. Only 5 pairs were recorded on Inishmurray during the 1984 all-Ireland tern survey (Whilde et al., 1985) but this increased to 80 pairs in 1986 (NPWS internal files). A population of 113 pairs was recorded during the 1995 all-Ireland tern survey (Hannon et al., 1997). Subsequent surveys in the 2000s and the 2010s have not recorded Arctic Tern breeding at this SPA (Hall et al., 2006; Burnell et al., 2023) indicating that this species no longer breeds here
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	There was no productivity data available for this species in this SPA. Annual productivity estimates are available from the wardened tern colonies of Rockabill and Lady's Island Lake. Over a three-year period (2022 - 2024) the average productivity estimates were 0.24 and 0.93 chicks per nest respectively (Stubbings et al., 2022, 2023 and 2024; Coughlan et al., 2024, Fihey et al., 2023; and Allbrook et al., 2022). As this species is long-lived there is a possibility that a population could be returning to a nest site annually but not fledging any chicks. Caution should be taken when interpreting the results of tern breeding numbers, especially on offshore islands, without having productivity data
Distribution: extent of available nesting options within the SPA	Numbers and spatial distribution	Sufficient availability of suitable nesting sites throughout the SPA to maintain a stable or increasing population	Distribution encapsulates the number of locations and area of potentially suitable nesting habitat for the breeding population and its availability for use. The suitability and availability of habitat across the SPA may vary through time. This will affect the spatio-temporal patterns of use of the habitats by Arctic Tern. Terns are ground nesting birds. Typically colonies are found in open areas close to the shore, frequently in areas with loose substrate or low vegetation (Hatch et al., 2020). In Ireland all known large colonies are situated on marine or inland islands of varying distances from the mainland/shore
Forage spatial distribution, extent, abundance and availability	Location, hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Arctic Tern are largely piscivorous. The most frequent fish prey are small, schooling species commonly caught in open water, at tide rips, and over predators (e.g. jellyfish and marine mammals). These are usually 1- or 2-year-old fish from the Clupeidae (herring), Gadidae (cod, pollock) and Ammodytidae (sandeel) families (Hatch et al., 2020). Based on several studies, Woodward et al. (2019) provide estimates (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) of Arctic Tern foraging ranges from the nest site during the breeding season, which are 6km, 26km, and 46km respectively (see Power et al., 2021)

Disturbance at the breeding site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding site	Disturbance events at the nest site/breeding colony level can result in a reduction of overall productivity and even lead to the abandonment of the breeding colony. The impact of any significant disturbance (direct or indirect) to the breeding population will ultimately affect the achievement of targets for population size and/or spatial distribution. Disturbance contributes to increased energetic expenditure, which can result in increased likelihood of mortality or reduced fitness (if energy expenditure is greater than energy gain) and, in turn, negatively impact population trends. 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 size and spatial distribution
Disturbance at areas ecologically connected to the colony	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on breeding population	Seabird species can make extensive use of the waters adjacent to their breeding colonies for non site-specific maintenance behaviours (e.g. courtship, bathing, preening) as defined in McSorley et al. (2003). Additionally, some species may engage in maintenance behaviours outside of the breeding colony but not in the water. For example, terns may roost on rocky islets or beaches away from the breeding colony
Barriers to connectivity	Number, location, shape, and area (ha)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	Seabirds, particularly during the breeding season, require regular access to waters ecologically connected to the colony in order to forage, as well as to engage in other maintenance behaviours. Based on several studies, Woodward et al. (2019) provide estimates (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) of Arctic Tern foraging ranges from the nest site during the breeding season, which are 6km, 26km, and 46km respectively (see Power et al., 2021)



MAP 1:
INISHMURRAY SPA
CONSERVATION OBJECTIVES
SPA DESIGNATION

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

SITE CODE:
SPA 004068; version 3
CO. SLIGO

0 0.75 1.5 3 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 garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaithe.

N

Map version 1
Date: May 2024