National Parks and Wildlife Service

Conservation Objectives Series

Lambay Island SPA 004069



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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.

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Qualifying Interests

* indicates a priority habitat under the Habitats Directive

004069	Lambay Island SPA
A009	Fulmar Fulmarus glacialis
A017	Cormorant Phalacrocorax carbo
A018	Shag Phalacrocorax aristotelis
A043	Greylag Goose Anser anser
A183	Lesser Black-backed Gull Larus fuscus
A184	Herring Gull Larus argentatus
A188	Kittiwake Rissa tridactyla
A199	Guillemot <i>Uria aalge</i>
A200	Razorbill Alca torda
A204	Puffin Fratercula arctica

Please note that this SPA overlaps with North-west Irish Sea SPA (004236), Lambay Island SAC (000204), and Rockabill to Dalkey Island SAC (003000). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping sites as appropriate.

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Supporting documents, relevant reports & publications

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

NPWS Documents

Year: 1973

Title: A Preliminary Report on Areas of Scientific Interest in County Dublin

Author: Goodwillie, R.N.; Fahy, E.

Series: Unpublished Report

Year: 1995

Title: A survey of breeding birds on Lambay Island, May 1995

Author: Madden, B.; Merne, O.J.

Series: 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: Lambay Island SAC (000204) Conservation objectives supporting document- coastal habitats

V1

Author: NPWS

Series: Conservation objectives supporting document

Year: 2013

Title: Lambay Island SAC (site code 204) Conservation objectives supporting document- marine

habitats and species V1

Author: NPWS

Series : Conservation objectives supporting document

Year: 2015

Title : Results of a Breeding Survey of Important Cliff□Nesting Seabird Colonies in Ireland 2015 –

with an interim analysis on population changes

Author: Newton, S.; Lewis, L.; Trewby, M.

Series: Unpublished report by BWI to National Parks and WIldife Service

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: 2024

Title: A survey of breeding seabirds on Lambay Island, Co. Dublin in 2024

Author: Colhoun, K.; Collins, J.; Latimer, J.; Miley, D.; Sarda-Serra, M.; Trapp, S.

Series: Unpublished report to NPWS

Other References

Year: 1911

Title: The fulmar petrel breeding in Ireland

Author: Ussher, R.J.

Series: The Irish Naturalist, 20(9), pp.149-152

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Year: 1991

Title: The status of seabirds in Britain and Ireland

Author: Lloyd, C., Tasker, M.L. and Partridge, K.

Series: Poyser Monographs Volume: 50

Year: 1995

Title: Seabird monitoring handbook for Britain and Ireland: a compilation of methods for survey and

monitoring of breeding seabirds

Author: Walsh, P.; Halley, D.J.; Harris, M.P.; del Nevo, A.; Sim, I.M.W.; Tasker, M.L.

Series: JNCC, Peterborough

Year: 1998

Title: Flexible foraging techniques in breeding cormorants Phalacrocorax carbo and shags

Phalacrocorax aristotelis: benthic or pelagic feeding?

Author: Grémillet, D.; Argentin, G.; Schulte, B.; Culik, B.M.

Series: Ibis, 140(1), pp.113-119

Year: 1999

Title: Diet of the northern fulmar Fulmarus glacialis: reliance on commercial fisheries?

Author: Phillips, R.A.; Petersen, M.K.; Lilliendahl, K.; Solmundsson, J.; Hamer, K.C.; Camphuysen,

C.J.; Zonfrillo, B.

Series : Marine Biology, 135 (1), pp.159-170

Year: 1999

Title: Breeding seabirds of Lambay, County Dublin

Author: Merne, O.J.; Madden, B.

Series: Irish Birds, 6(3), pp.345-358

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: 2005

Title: Breeding performance and timing of breeding of inland and coastal breeding Cormorants

Phalacrocorax carbo in England and Wales

Author: Newson, S.E.; Hughes, B.; Hearn, R.; Bregnballe, T.

Series : Bird Study, 52:1, 10-17, DOI: 10.1080/00063650509461369

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: 2011

Title: A preliminary assessment of the potential impacts of Cormorant (Phalacrocorax carbo)

predation on Salmonids in four selected river systems

Author: Tierney, N.; Lusby, J.; Lauder, A.

Series: Report Commissioned by Inland Fisheries Ireland and funded by the Salmon Conservation

Fund

19 Nov 2024 Version 1 Page 6 of 29

Year: 2012

Title: Integrating Irish Marine Protected Areas: the FAME Seabird Tracking Project

Author: Baer, J.; Newton, S.

Series: Unpublished BirdWatch Ireland report

Year: 2014

Title: The Lesser Black-backed Gull Larus fuscus in England: how to resolve a conservation

conundrum

Author: Ross-Smith, V.H.; Robinson, R.A.; Banks, A.N.; Frayling, T.D.; Gibson, C.C.; Clark, J.A.

Series: Seabird, 27 (October), pp.41-61

Year: 2017

Title: Productivity of the Black-legged Kittiwake Rissa tridactyla required to maintain numbers

Author: Coulson, J.C.

Series: Bird Study 64: 84-89

Year: 2018

Title: Developing and assessing methods to census and monitor burrow-nesting seabirds in Ireland

Author: Arneill, G.E.

Series: PhD thesis, University College Cork

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: 2020

Title: Great Cormorant (Phalacrocorax carbo), version 1.0. In Birds of the World (S. M. Billerman,

Editor)

Author: Hatch, J.J.; Brown, K.M.; Hogan, G.G.; Morris, R.D.; Orta, J.; Garcia, E.F.J.; Jutglar, F.;

Kirwan, G.M.; Boesman, P.F.D.

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

Year: 2020

Title: Lesser Black-backed Gull (Larus fuscus), version 1.0. In Birds of the World (J. del Hoyo, A.

Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors)

Author: Burger, J.; Gochfeld, M.; Kirwan, G. M.; Christie, D. A.; de Juana, E

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

Year: 2020

Title: Black-legged Kittiwake (Rissa tridactyla), version 1.0. In Birds of the World (S. M. Billerman,

Editor)

Author: Hatch, S. A.; Robertson, G. J.; Baird, P. H.

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

Year: 2020

Title: Razorbill (Alca torda), version 1.0. In Birds of the World (S. M. Billerman, Editor)

Author: Lavers, J.; Hipfner, J. M.; G. Chapdelaine, G.

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

Year: 2020

Title: Atlantic Puffin (Fratercula arctica), version 1.0. In Birds of the World (S. M. Billerman, Editor)

Author: Lowther, P. E.; Diamond, A. W.; Kress, S. W.; Robertson, G. J.; Russell, K.; Nettleship, D. N.;

Kirwan, G. M.; Christie, D. A.; Sharpe, C. J.; Garcia, E. F. J.; Boesman, P. F. D.

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

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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: Common Murre (*Uria aalge*), version 2.0. In Birds of the World (S. M. Billerman, P. G.

Rodewald, and B. K. Keeney, Editors)

Author: Ainley, D. G.; Nettleship, D. N.; Storey, A. E.

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: 2021

Title: Definition of Favourable Conservation Status for Great Cormorant, Phalacrocorax carbo

Author: Newson, S.E.; Austin, G.

Series: Natural England, pp.25. ISBN: 978-1-78354-723-4

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: 2024

Title: Great Cormorant (Phalacrocorax carbo)

Author: JNCC

Series: https://jncc.gov.uk/our-work/great-cormorant-phalacrocorax-carbo/

Year: 2024

Title: Atlantic Puffin (Fratercula arctica)

Author: JNCC

Series: https://jncc.gov.uk/our-work/atlantic-puffin-fratercula-arctica/

Year: 2024

Title: European Shag (Phalacrocorax aristotelis)

Author: JNCC

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

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A009 Fulmar Fulmarus glacialis

To restore the Favourable conservation condition of Fulmar in Lambay Island SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population size	Apparently Occupied Sites (AOS)	Long term SPA population trend is stable or increasing	Fulmar were first recorded as a breeding bird in Ireland in 1911 and on Lambay it was first recorded breeding in 1936; by 1987, 560 Apparently Occupie Sites (AOS, hereafter 'pairs') were recorded at this SPA (Ussher, 1911; Merne and Madden, 1999). The population continued to increase to 737 pairs in 1991 and remained largely stable for the period 1995-2007. On foot of a 2015 survey, the Fulmar population, estimated at 375 pairs, was considered to be in decline (Newton et al., 2015). Colhoun et a (2024) recorded 272 pairs breeding on Lambay, which equates to a 51% decline since 1987. This declining trend contrasts with the national population estimate which has increased by 89% over the period 1985-2021 (Burnell et al., 2023)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the average productivity from this SPA was 0.32 (± 0.05 SE) chicks fledged per Apparently Occupied Sites (AOS) in 2007 (246 pairs across three subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. An analysis of the breeding success of Fulmar in the United Kingdom over a 25 year period estimated a mean breeding success of 0.39 and speculated this would result in a population decline (Cook and Robinson, 2010). They estimate that a breeding success of 0.5 would allow populations of Fulmar to stabilise and potentially increase
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 Fulmar. Typically, Fulmar nest near the tops of grassy cliffs on relatively wide ledges (Mitchell et al. 2004). Nesting Fulmar are widely distributed along the cliff dominated coastline of this SPA but principally along the eastern coast, see Colhoun et al. (2024) for further details
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The colonisation of Ireland and Britain by Fulmar over the last two centuries has been largely attributed to their close association with fisheries, but contemporary dietary studies indicate that they also feed on a wide variety of prey including sandeels, crustaceans and squid (Phillips et al., 1999). Based on several studies, Woodward et al. (2019) provides estimates (i.e. overall mean; mean of maximum distances across all studies; and maximum distance recorded) of Fulmar foraging ranges from the nest site during the breeding season, which are 135km, 542km, and 2,736km respectively (see Power et al., 2021)

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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). Work carried out in the UK found that the highest densities of Fulmar performing these behaviours occurred within 2km of the breeding colony (McSorley et al., 2003)
Barriers to connectivity	Number; location; shape; area (hectares)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	require regular and efficient access to marine waters ecologically connected to the colony in order to

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A017 Cormorant *Phalacrocorax carbo*

To restore the Favourable conservation condition of Cormorant in Lambay Island 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	Cormorant were breeding on Lambay since at least the 1800s. On foot of a comprehensive survey carried out in 1987, the population was estimated to be 1,027 Apparently Occupied Nests (AONs hereafter 'pairs') (Merne and Madden, 1999). The 1991 estimate was broadly similar but surveys from 1995-2004 recorded lower estimates of 480-675 pairs. Surveys in 2005-2015 show that the population declined further. A 2024 estimate of 234 pairs (Colhoun et al., 2024) represents an overall decrease of 77% since 1987. The County Dublin colonies have undergone significant change and likely redistribution across the sites of St. Patrick's Island, Lambay, Howth Head and Ireland's Eye (see Trewby et al., 2007). Due to the likely movements between these SPAs, the Cormorant population dynamics of this SPA needs to be viewed in the wider context of the County Dublin breeding population
Productivity rate	Mean number	No significant decline	Measure based on standard survbey methods(see Walsh et al 1995). The Seabird Monitoring Programme (SMP) online database (JNCC, 2011) provides population data for this species
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 Cormorant. Typically, coastal Cormorant colonies ar located on flat or rocky islets or sea stack tops, less often on cliffs (Walsh et al., 1995). Cormorant almost entirely nest on the northern coast of this SPA, see Colhoun et al. (2024) for further details
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Cormorant diet consists predominantly of small benthic and pelagic fish captured by pursuit diving, typically over shallow (<10m) freshwater, estuarine and marine environments (Grémillet et al., 1998; Hatch et al., 2020). Based on analysis of 255 diet samples from five sites across Ireland, Tierney et al (2011) noted Ballan Wrasse Labrus bergylta to be the most important forage species in terms of frequency, followed by Perch Perca fluvialtilis and Roach Rutilus rutilus with less frequent records of salmonids and European Eel Anguilla anguilla. Across all sites, 61% of the identifiable prey items were marine species. Woodward et al. (2019) reviewed the foraging ranges of seabird species and provide estimates (i.e. overall mean; mean of maximum distances across all studies; and maximum distance recorded) of Cormorant foraging ranges from the nest site during the breeding season, which are 7km, 26km, and 35km respectively (see Power et al., 2021)

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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. Cormorant, after long periods in the water, may stand in areas away from the colony and engage in a behaviour known as wing-spreading. The main purpose of this behaviour is to dry plumage (Hatch et al., 2020) and may occur on sandbanks and small rocks and islets
Barriers to connectivity	Number; location; shape; area (hectares)	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) provides estimates (i.e. overall mean; mean of maximum distances across all studies; and maximum distance recorded) of Cormorant foraging ranges from the nest site during the breeding season, which are 7km, 26km, and 35km respectively (see Power et al., 2021)

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A018 Shag *Phalacrocorax aristotelis*

To restore the Favourable conservation condition of Shag in Lambay Island 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	Shag were breeding on Lambay since at least the 1800s. On foot of a comprehensive survey carried out in 1987 the population was estimated to be 1,597 Apparently Occupied Nests (AONs hereafter 'pairs') (Merne and Madden, 1999). Surveys from 1991-1999 recorded lower estimates of 1,124-1,17 pairs. By 2004 numbers recovered to 1,734 pairs (Trewby et al., 2007) and then fell to 469 pairs in 2015 (Newton et al., 2015). A 2024 estimate of 11 pairs (Colhoun et al., 2024) equates to a decrease 93% since 1987. Over time it is possible that north County Dublin's breeding Shag population can redistribute across sites (Lambay, Howth Head, Ireland's Eye and St. Patrick's Island; see Trewby et al., 2007). Due to the potential for movements between these SPAs, the Shag population dynamic of this SPA needs to be viewed in the wider contex of the County Dublin breeding population
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the average productivity from this SPA was 1.69 (± 0.08 SE) chicks fledged per AON in 2007 (135 pairs across five subplots). Further monitoring and research we is required in order to identify a minimum productivity rate for this species at this site and at the national level. Shag productivity in Scotland ha averaged 1.28 chicks fledged per pair between 198 and 2019 (JNCC, 2024). In this time period the Scottish population of Shag has decreased 47% (Burnell et al., 2023). However, the cause of declir may not be related to productivity rate but due to significant losses of that adult population during "wrecks" in some winters during this time period (JNCC, 2024)
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). Nesting Shag are widely distributed along the cliff dominated coastlines of this SPA - see Colhoun et al. (2024) further details
Forage spatial distribution, extent, abundance and availability	Location and 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) provides estimates of foraging ranges from the nesite during the breeding season (i.e. overall mean, mean of maximum distances across all studies, an maximum distance recorded) for Shag, which are 9km, 13km, and 46km respectively (see Power et al., 2021)

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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; area (hectares)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	require regular and efficient access to marine waters ecologically connected to the colony in order to

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A043 Greylag Goose *Anser anser*

To restore the Favourable conservation condition of Greylag Goose in Lambay Island 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 wild (Icelandic) Greylag Goose wintering in Ireland declined by 21% from 1999 - 2018 (Lewis et al., 2019) as monitored via the Irish Wetland Bird Survey (I-WeBS). During baseline assessments to inform SPA designation, a total population of 311 Greylag Goose were estimated to be using both Lambay Island SPA and Rogerstown Estuary SPA (5 year mean of peak counts for period 1995/96 - 1999/2000; see NPWS, 2013). The population of Greylag Goose recorded clambay Island had declined to just 60 in 2007/08, and the species has not been recorded during I-WeBS surveys of the island since then (with survey during 2008/09 -10/11, 2013/14, 2015/16 and 2021/22). This is in line with a 89% decline in the Greylag Goose population at Rogerstown Estuary SPA from 160 (baseline) to 18 (2017/18 - 2019/20) and a noted long-term decline of the wider Greylag Goose population in north Co. Dublin (see Burke et al., 2022)
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 is likely to vary throughout the season, for example, due to variation in land management practices or the abundance of resources available (due to natural variation and other factors). This will affect the spatio-temporal patterns of use of the habitats by the wintering population
Disturbance at wintering site	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact the achievement of targets for population trend and spatial distribution	The impact of any significant disturbance (direct or indirect) to the wintering population will ultimately affect the achievement of targets for population trend and/or spatial distribution. Disturbance contributes to increased energetic expenditure whic can result in increased likelihood of winter mortality or reduced fitness (if energy expenditure is greater than energy gain), which can 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 SPA or sites for certain activities, such as foraging wher preferred foraging areas are unavailable due to disturbance, extensive flooding, or other factors

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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 primarily a grazer. Key foraging habitats include marshes, grasslands (particularly wet grasslands) and other wetland habitats, cereal stubble, estuaries, and lakes. Key forage resources are herbaceous plant materials accessible at ground level in terrestrial areas or from the surface of water bodies, including roots (of rushes and sedges, for example), grasses and other leaves, stems, tubers (such as potatoes), and (spilled) grain
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 overnight, this species typically utilises lakes, estuaries 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

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A183 Lesser Black-backed Gull *Larus fuscus*

To maintain the Favourable conservation condition of Lesser Black-backed Gull in Lambay Island 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	Lesser Black-backed Gull have been breeding in relatively low and at times sporadic numbers in this SPA since at least the middle part of the 19th century. Counts in the 1990s recorded a sustained increase of 63 to 258 to 309 Apparently Occupied Nests (AONs hereafter 'pairs') in 1991, 1995 and 1999 respectively (Merne and Madden, 1999). In the early 2000s, numbers ranged from 133 pairs (2004) to 321 pairs (2007) and by 2015 345 pairs were recorded (Trewby et al., 2007; Newton et al., 2015; A 2024 survey reports an estimate of 579 Lesser Black-backed Gull pairs breeding on Lambay (Colhoun et al., 2024). This equates to an increase of 819% from 1991
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the mean productivity of Lesser Black-backed Gull from this SPA was $1.66 (\pm 0.14 \text{ SE})$ chicks fledged per pair in 2007 (18 pairs across three subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. Ross-Smith et al. (2014) summarises Lesser Black-backed Gull productivity in some UK colonies and colonies with productivity rates above 1.0 had increasing population trends
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. Lesser Black-backed Gull nests colonially, often with other gull species o offshore islands and coastal cliffs (Mitchell et al., 2004). Lesser Black-backed Gull did not nest on the coastal fringe of the island in the last three surveys (1987, 1999, and 2015) and bred only in the inland section of the island
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The diet of Lesser Black-backed Gull is diverse and opportunistic. This species can forage over both terrestrial and aquatic habitats. Frequent prey items include small fish, aquatic invertebrates, bird's eggs and chicks, trawler discards, rodents and berries (Burger et al., 2020). Based on several studies, Woodward et al. (2019) provides 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 Lesser Black-backed Gull, which are 43km, 127km, and 533km respectively (see Power et al., 2021)

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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. On Lambay, Lesser Black-backed Gull nest sites occur across the island but largely inland, away from the cliff faces (Colhoun et al., 2024)
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; area (hectares)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	require regular and efficient access to marine waters ecologically connected to the colony in order to

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A184 Herring Gull *Larus argentatus*

To restore the Favourable conservation condition of Herring Gull in Lambay Island 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 breeding Herring Gull colony on Lambay was established by the middle part of the 19th century; on foot of a comprehensive survey carried out in 1987 the population was estimated to be 5,000-6,000 Apparently Occupied Nests (AONs; hereafter 'pairs') (Merne and Madden, 1999). This population decreased by 64-70% to 1,804 by 1999 (Lloyd et al., 1991; Mitchell et al., 2004; Trewby et al., 2007). Subsequent surveys in 2002, 2004, 2005 and 2007 ranged between 311 and 492 (Trewby et al., 2007), highlighting a further decrease in the Herring Gull population in this SPA. The population increased to 766 pairs in 2010 and to 906 pairs in 2015 (Trewby et al., 2007; Burnell et al., 2023). A 2024 survey reports an estimate of 2,080 pairs marking a significant increase since the turn of the century but a long-term decline of 58-62% from 1987 (Colhoun et al., 2024)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the mean productivity of Herring Gull from this SPA was 1.82 (± 0.09 SE) chicks fledged per pair in 2007 (70 pairs across four subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. 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 chicks per nest. 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
Winter population trend	Percentage change in number of individuals	Long term winter population trend is stable or increasing	During the baseline assessments to inform SPA designation, 2,400 Herring Gull were estimated to be using Lambay Island SPA over winter (5 year mean peak count for baseline period 1995/96-1999/2000; see NPWS, 2013). There is insufficient data available to provide an updated population estimate or population trend for this species within the SPA
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 Herring Gull. Typically, coastal Herring Gull breeding colonies are located along rocky coastline with cliffs, islets and offshore islands (Mitchell et al., 2004). Nesting Herring Gull are widely distributed along the coastline of this SPA but the majority of Herring Gull nest in the inland section of the island. In 2024 94% of Herring Gull nests recorded were sited inland from the cliffs of this SPA, see Colhoun et al. (2024) for further details

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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	Winter spatial 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 is 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
Forage spatial distribution, extent, abundance and availability (winter and breeding)	Location and 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 terrestrial, freshwater and marine habitats, both natural and human-altered. 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. Resulting estimates of 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 are 15km, 59km, and 92km respectively (Power et al., 2021). During the non-breeding season, the species typically forages within 100km of roost sites (Clarke et al., 2016)
Disturbance at breeding or wintering sites	Intensity, frequency, timing and duration	Disturbance occurs at levels that do not significantly impact on birds at the breeding or wintering sites	The impact of any significant disturbance (direct or indirect) to the breeding or wintering population will ultimately affect the achievement of targets for population trend and/or spatial distribution. 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. On Lambay, Herring Gull nest sites occur across the island but largely inland, away from the cliff faces (Colhoun et al., 2024). 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), which can 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 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

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Location and hectares of Sufficient number of Roosting is a critical ecological requirement for the Winter roost wintering population. Similar to foraging habitat spatial distribution roosting habitat locations, area and and extent availability of suitable preferences, Herring Gull can use a variety of roosting habitat to support roosting habitats across marine, terrestrial and the population target freshwater environments, including a mixture of anthropogenically modified and natural habitats, e.g. coastal waters, lakes, islands, wetlands, parks, pitches and farmland. 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 winter Area (hectares) and Sufficient area of utilisable The wintering population can make extensive use of habitat: area and quality habitat available in suitable habitats in important areas outside the SPA, quality ecologically important sites for foraging and roosting. The extent, availability outside the SPA 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 Barriers to Number; location; Barriers do not significantly Barriers limiting the population's access to this SPA connectivity shape; area (hectares) or ecologically important sites outside the SPA will impact the population's (winter and access to the SPA or other ultimately affect the achievement of targets for breeding) ecologically important sites population trend and/or spatial distribution. Access outside the SPA 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. 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) provides 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)

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A188 Kittiwake *Rissa tridactyla*

To restore the Favourable conservation condition Kittiwake in Lambay Island 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	Kittiwake were breeding on Lambay Island by the middle part of the 19th century; on foot of a comprehensive survey carried out in 1987 the population was estimated to be 3,005 Apparently Occupied Nests (AONs hereafter 'pairs') (Merne and Madden, 1999). The next survey in 1991 was broadly similar but subsequent surveys in 1995, 1999 and 2004 recorded higher estimates of 3,947-5,102. In 2015 the population decreased to 3,320 pairs (Burnell et al., 2023). The most contemporary population estimate of 2,223 pairs in 2024 (Colhou et al., 2024) represents a 33% decrease since 2011 and an overall decrease of 26% since 1987. This is similar to the national trend which has seen a decrease of 36% between 1999-2002 and 2015-2021 (Burnell et al., 2023)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the average productivity rate from this SPA was 0.65 ± 0.07 S chicks fledged per AON in 2007 (316 pairs across three subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. Coulson (2017) established, bas on data from UK Kittiwake colonies during the peri 1985-2015, that 0.8 fledglings per pair were neede to maintain the size of these colonies. He also note that this level of productivity is not a fixed value ar changes if the adult mortality rate changes
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 Kittiwake. Typically this species is a cliff-nester on ledges of offshore islands, sea stacks, or inaccessil areas of coastal mainland (Hatch et al., 2020). Nesting Kittiwake are widely distributed along the cliff dominated coastlines of this SPA but principall along the northern and eastern coast, see Colhour et al. (2024) for further details
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	Kittiwake is a surface feeding seabird and primarily piscivorous (e.g. sandeels, herring, gadoids) with some invertebrates (e.g. euphausids, amphipods) the diet also recorded (Hatch et al., 2020). Woodward et al. (2019) provides estimates (i.e. overall mean, mean of maximum distances across studies, and maximum distance recorded) of Kittiwake foraging ranges from the nest site during the breeding season, which are 55km, 156km, and 770km respectively (see Power et al., 2021)

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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)
Barriers to connectivity	Number; location; shape; area (hectares)	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) provides estimates (i.e. overall mean, mean of maximum distances across all studies, and maximum distance recorded) of Kittiwake foraging ranges from the nest site during the breeding season, which are 55km, 156km, and 770km respectively (see Power et al., 2021)

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A199 Guillemot *Uria aalge*

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

Attribute	Measure	Target	Notes
Breeding population size	Individuals (IND)	Long term SPA population trend is stable or increasing	The Guillemot colony on Lambay was established by the middle part of the 19th century. On foot of a comprehensive survey carried out in 1987 the population was estimated to be 42,990 individuals (Merne and Madden, 1999). Subsequent surveys (1991, 1995, 1999, 2004 and 2015) show that the population increased through the 1990s and stabilised this century (Madden and Merne, 1995; Merne and Madden, 1999; and Newton et al., 2015). At 59,610 individuals, the 2024 population estimate for this SPA equates to an increase of 38.4% since 1987 and stable (-0.4%) since 1999 (Colhoun et al., 2024). The latter contrasts with a national increasing trend of 28% (Burnell et al., 2023). The Guillemot population in this SPA was the largest recorded in the country in the three most recent national surveys in 1985-1988, 1998-2002 and 2015-2021 accounting for 43%, 44% and 34% of the national population estimates respectively (Lloyd et al., 1991; Mitchell et al., 2004; Burnell et al., 2023)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported the mean Guillemot productivity from this SPA was 0.74 (± 0.06 SE) chicks fledged per Apparently Occupied Sites (AOS) in 2007 (355 pairs across five subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. An analysis of the breeding success of Guillemot in the United Kingdom over a 25 year period determined that a breeding success of 0.66 would result in an increasing population (Cook and Robinson, 2010)
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 Guillemot. Ledges on sea cliffs and sloping island surfaces are the preferred habitat for this species (Ainley et al., 2021). Nesting Guillemot are widely distributed along the cliff dominated coastlines of this SPA but principally along the northern and eastern coasts, see Colhoun et al. (2024) for further details
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The diet of Guillemot consists of micronektonic prey, 2-25cm in length (mainly 6-10cm), including fish, euphausiids, large copepods, and squid. In summer, when adults are provisioning chicks, prey is predominantly fish. This contrasts with a more diverse diet during the non-breeding period, with euphausiids in particular being more important (Ainley et al., 2021). Based on several studies, Woodward et al. (2019) provides 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 Guillemot, which are 33km, 72km, and 338km respectively (see Power et al., 2021). A limited amount of tracking data for Guillemot breeding at this SPA showed birds travelling up to 45km from Lambay Island with the majority of foraging taking place within 29km of the colony (Baer and Newton, 2012)

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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). Studies in the UK found the highest densities of Guillemot performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003)
Barriers to connectivity	Number; location; shape; area (hectares)	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. Studies in the UK found the highest densities of Guillemot performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003). Based on several studies, Woodward et al. (2019) provides 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 Guillemot, which are 33km, 73km, and 338km respectively (see Power et al., 2021)

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A200 Razorbill *Alca torda*

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

Attribute	Measure	Target	Notes
Breeding population size	Individuals (IND)	Long term SPA population trend is stable or increasing	Razorbill were breeding on Lambay Island by the middle part of the 19th century. On foot of a comprehensive survey carried out in 1987 the population was estimated to be 3,496 individuals (Merne and Madden, 1999). Subsequent surveys in 1991 and 1995 were broadly similar until a 1999 survey produced an estimate of 4,337 individuals and by 2004 it increased further with an estimate o 5,685 individuals (Trewby et al., 2007). The population continued to increase to 7,353 individual in 2015, the highest recorded at this colony, accounting for 22% of the national population (Burnell et al., 2023). The most contemporary population estimate of 6,366 individuals in 2024 (Colhoun et al., 2024) representing a 13% decrease since 2015 but an 82% increase since 1987
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Trewby et al. (2007) reported that the average productivity from this SPA was $0.65 (\pm 0.03 \text{ SE})$ chicks fledged per Apparently Occupied Sites (AOS) in 2007 (270 pairs across six subplots). Further monitoring and research work is required in order to identify a minimum productivity rate for this species at this site and at the national level. An analysis of the breeding success of Razorbill in the United Kingdom over a 25 year period determined that a breeding success of 0.55 would result in a slowly decreasing population (Cook and Robinson, 2010)
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. Razorbill breed in rocky coastal regions on steep mainland cliffs and rocky offshore islands (Lavers et al., 2020). Nesting Razorbill are widely distributed along the cliff dominated coastlines of this SPA but principally along the northern coast, see Colhoun et al. (2024) for further details
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The diet of Razorbill comprises of schooling fish including Herring and sandeels. Crustaceans and polychaetes may also be important in adult diets (Lavers et al., 2020). Based on several studies, Woodward et al. (2019) provides estimates of foraging ranges from the nest site during the breeding season (i.e. overall mean, mean of maximum distances across all studies, and maximud distance recorded) for Razorbill which are 61km, 89km, and 313km respectively

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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). Studies in the UK found the highest densities of Razorbill performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003)
Barriers to connectivity	Number; location; shape; area (hectares)	Barriers do not significantly impact the population's access to the SPA or other ecologically important sites outside the SPA	require regular and efficient access to marine waters ecologically connected to the colony in order to

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A204 Puffin Fratercula arctica

To restore the Favourable conservation condition of Puffin in Lambay Island SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Breeding population size	Individuals (IND)	Long term SPA population trend is stable or increasing	As Puffin burrows are often sited on steeply sloping ground largely inaccessible to surveyors, counts of the number of individual birds associated with the area is a survey method often used, though it is less accurate than counting the number of occupied burrows during the breeding season. These counts of birds on land, sea and air are ideally undertaken during the evening, early in the season (see Arneill 2018; Walsh et al., 1995). Merne and Madden (1999) reports on land based counts in 1987, 1991 and 1999 which amounted to island estimates of 235, 233 and 260-265 individuals respectively. A smaller total of 144 individuals was recorded in 201 (Burnell et al., 2023). In 2024 a notably larger number of 695 individuals was reported (Colhoun et al., 2024). Looking at reports from the early to mid 1900s, Merne and Madden (1999) noted that it appears Puffin numbers were considerably greater then (e.g. 1,000 pairs in June 1939 was reported)
Productivity rate	Number of fledged young per breeding pair	Sufficient to maintain a stable or increasing population	Further monitoring and research work is required in order to identify a minimum productivity rate for the species at this site and at the national level. In Wales, an average of 0.71 chicks were fledged per apparently occupied burrow between 1986 and 20: (JNCC, 2024). In this time period the Welsh population of Puffin increased (Burnell et al., 2023). The presence of rats (<i>Rattus norvegicus</i> and possibly <i>R. rattus</i>) may well be depressing productivity rates (and hence breeding numbers) of Lambay
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 the species. Puffin are a highly colonial species wit pairs typically nesting underground in burrows dug in the soil of offshore islands. If such habitat is in short supply Puffin can nest among boulder screes or at low densities in cracks in sheer cliffs (Mitchell et al., 2004). Nesting Puffin are widely distributed along the cliff dominated coastlines of this SPA but principally along the eastern coast, see Colhoun et al. (2024) for further details. The presence of rats (<i>Rattus norvegicus</i> and possibly <i>R. rattus</i>) on flat and gently sloping areas are likely limiting the exte of suitable breeding habitat on Lambay
Forage spatial distribution, extent, abundance and availability	Location and hectares, and forage biomass	Sufficient number of locations, area of suitable habitat and available forage biomass to support the population target	The diet of Puffin predominantly consists of small t mid-sized (5-15cm) schooling midwater fish including Sprat (<i>Sprattus sprattus</i>), sandeel (<i>Ammodytes</i> spp.) and Herring (<i>Clupea harengus</i>) (Lowther et al., 2020). Based on several studies, Woodward et al. (2019) provides estimates of foraging ranges from the nest site during the breeding season (i.e. overall mean, mean of maximum distances across all studies, and maximudistance recorded) for Puffin, which are 62km, 137km, and 383km respectively (see Power et al., 2021)

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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	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). Studies in the UK found that the highest densities of Puffin performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003)
Barriers to connectivity	Number; location; shape; area (hectares)	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. Studies in the UK found that the highest densities of Puffin performing these behaviours occurred within 1km of the breeding colony (McSorley et al., 2003). Woodward et al. (2019) provides 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 Puffin, which are 62km, 137km, and 383km respectively (see Power et al., 2021)

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