

National Parks and Wildlife Service

Conservation Objectives Series

Caherglassaun Turlough SAC 000238



An Roinn Cultúir,
Oidhreacht agus Gaeltachta
Department of Culture,
Heritage and the Gaeltacht

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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*

000238 Caherglassaun Turlough SAC

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

3180 TurloughsE

3270 Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1992
Title :	Turloughs over 10ha - Vegetation survey and evaluation
Author :	Goodwillie, R.N.
Series :	Unpublished report to NPWS
Year :	2006
Title :	A survey of rare and scarce vascular plants in County Galway
Author :	Conaghan, J.; Roden, C.; Fuller, J.
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 1)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2015
Title :	Turlough hydrology, ecology and conservation (Part 2)
Author :	Waldren, S. (ed.)
Series :	Unpublished report to NPWS
Year :	2016
Title :	Ireland Red List No. 10: Vascular Plants
Author :	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
Series :	Ireland Red Lists series, NPWS
Year :	2017
Title :	Conservation objectives supporting document: Turloughs* and Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidenton</i> p.p. vegetation
Author :	O Connor, Á.
Series :	Conservation objectives supporting document
Year :	2018
Title :	Conservation objectives supporting document – lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1932
Title :	The flora of the turloughs: a preliminary note
Author :	Praeger, R.L.
Series :	Proceedings of the Royal Irish Academy, 41B: 37-45
Year :	1979
Title :	A note on the Mollusca of three turloughs
Author :	Donaldson, F.; Donaldson, F.L.; McMillan, N.F.
Series :	Irish Naturalists' Journal, 19(11): 400-401

Year :	1983
Title :	Flora of Connemara and the Burren
Author :	Webb, D.A.; Scannell, M.J.P.
Series :	Royal Dublin Society, Dublin and Cambridge University Press, Cambridge
Year :	1985
Title :	Phytosociological and ecological studies on turloughs in the west of Ireland
Author :	MacGowran, B.
Series :	Unpublished Ph.D. Thesis, National University of Ireland, Galway
Year :	1986
Title :	A study of the geology, hydrology and geomorphology of turloughs
Author :	Coxon, C.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	1997
Title :	An Investigation of the Flooding Problems in the Gort–Ardrahan Area of South Galway. Ecology Baseline Study. Vols I and II.
Author :	Southern Water Global and Jennings O'Donovan and Partners (eds)
Series :	The Office of Public Works, Dublin
Year :	2007
Title :	Protecting and managing underground sites for bats
Author :	Mitchell-Jones, A.J.; Bihari, Z.; Masing, M.; Rodrigues, L.
Series :	EUROBATS Publication Series No. 2
Year :	2008
Title :	The lesser horseshoe bat conservation handbook
Author :	Schofield, H.W.
Series :	The Vincent Wildlife Trust
Year :	2009
Title :	Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat <i>Rhinolophus hipposideros</i>
Author :	Knight, T.; Jones, G.
Series :	Endangered Species Research, 8: 79-86
Year :	2010
Title :	Modelling a network of turloughs
Author :	Gill, L.W.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2011
Title :	The hydrology and hydroecology of turloughs
Author :	Naughton, O.
Series :	Unpublished Ph.D. Thesis, Trinity College Dublin
Year :	2012
Title :	Groundwater flooding in Irish karst: The hydrological characterisation of ephemeral lakes (turloughs)
Author :	Naughton, O.; Johnston, P.M.; Gill, L.W.
Series :	Journal of Hydrology, 470-471: 82-97
Year :	2013
Title :	Modeling a network of turloughs in lowland karst
Author :	Gill, L.W.; Naughton, O.; Johnston, P.M.
Series :	Water Resources Research, 49: 3487-3503

Year : 2017
Title : Groundwater flood hazards and mechanisms in lowland karst terrains
Author : Naughton, O.; McCormack, T.; Gill, L.; Johnston, P.
Series : Geological Society, London, Special Publications, 466

Spatial data sources

Year :	2015
Title :	Turlough hydrology, ecology and conservation
GIS Operations :	Dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	3180 (map 2)
<hr/>	
Year :	2018
Title :	NPWS lesser horseshoe bat database
GIS Operations :	Roost identified, clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	1303 (map 3)
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Year :	2007
Title :	Forest Inventory and Planning System (FIPS)
GIS Operations :	Dataset clipped to 2.5km buffer centred on roost location
Used For :	1303 (map 3)
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Conservation Objectives for : Caherglassaun Turlough SAC [000238]

3180 Turloughs

To restore the favourable conservation condition of Turloughs* in Caherglassaun Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable at c.63.3ha or increasing, subject to natural processes. See map 2	Caherglassaun turlough is one of the better studied of Irish turloughs (Praeger, 1932; MacGowran, 1985; Coxon, 1986; Goodwillie, 1992; Southern Water Global and Jennings O'Donovan and Partners (SWG and JODP), 1997; Gill, 2010; Naughton, 2011; Waldren, 2015). The area target of c.63.3ha for Caherglassaun turlough is based on the approximate area from Waldren (2015). See map 2 for recorded extent. Goodwillie (1992) categorised Caherglassaun turlough as of international ecological importance. Caherglassaun turlough was assessed as in unfavourable-inadequate (poor) condition (Waldren, 2015). See O Connor (2017) for information on all attributes and targets
Habitat distribution	Occurrence	No decline, subject to natural processes	See map 2
Hydrological regime	Various	Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes (groundwater contribution, flood duration, frequency, area and depth, and permanently flooded/wet areas) and targets in O Connor (2017). Caherglassaun turlough is the last in the series of conduit-fed turloughs which includes Blackrock, Lough Coy and Coole/Garryland, and its hydrology is well-studied (Gill, 2010; Naughton, 2011; Naughton et al., 2012; Gill et al., 2013). This system is partly fed by the Owenshree river that drains the acidic bedrock of the Slieve Aughty mountains and, consequently, has a very large zone of groundwater contribution. Its water levels show a small diurnal influence of tides. The turlough basin has a permanent lake with a rocky western shore; a stream enters from the south-west and there are swallow holes in the north-west (Goodwillie, 1992). Record depths of 14.6m were reported for Caherglassaun turlough in 2015/16 by Naughton et al. (2017)
Soil type	Hectares	Maintain variety, area and extent of soil types necessary to support turlough vegetation and other biota	Caherglassaun turlough has extensive areas of poorly-drained mineral soils that are moderately acidic and have low amounts of calcium carbonate and organic matter (Waldren, 2015). Goodwillie (1992) described the soil at Caherglassaun turlough as derived from glacial drift and stony without significant amounts of marl or peat, and noted some finer sediment/silt is associated with the stream and more permanent water
Soil nutrient status: nitrogen and phosphorus	N and P concentration in soil	Maintain/restore nutrient status appropriate to soil types and vegetation communities	Waldren (2015) found relatively low mean total nitrogen (TN) at Caherglassaun turlough of 6,263mg/kg TN and relatively high total phosphorus (TP) of 1,016mg/kg TP
Physical structure: bare ground	Presence	Maintain sufficient wet bare ground, as appropriate	See O Connor (2017) for details on this and all attributes
Chemical processes: calcium carbonate deposition and concentration	Calcium carbonate deposition rate/soil concentration	Maintain appropriate calcium carbonate deposition rate and concentration in soil	Soils had a low calcium carbonate content of 4.37% (Waldren, 2015) at Caherglassaun turlough

Water quality	Various	Restore appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes (nutrients, colour, phytoplankton and epiphyton biomass) and targets in O Connor (2017). Caherglassaun turlough had low alkalinity, high colour and high total phosphorus (mean of 43.2µg/l TP) (Waldren, 2015). Mean chlorophyll <i>a</i> was 3.3µg/l and maximum was 33.5µg/l. Targets of ≤20µg/l TP, annual mean chlorophyll <i>a</i> <8µg/l and annual maximum chlorophyll <i>a</i> <25µg/l may be sufficient to restore Caherglassaun turlough to favourable condition
Active peat formation	Flood duration	Maintain active peat formation, where appropriate	Caherglassaun turlough is dominated by mineral soils with low (13.8%) organic matter content (Waldren, 2015)
Vegetation composition: area of vegetation communities	Hectares	Maintain/restore area of sensitive and high conservation value vegetation communities/units	See MacGowran (1985), Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997) and Waldren (2015) for information on vegetation communities at Caherglassaun turlough. Waldren (2015) stated that woodland and scrub communities seem to have increased since the study by Goodwillie (1992). See also, in this volume, the conservation objective for the habitat Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation (habitat code 3270), which is an integral community of Caherglassaun turlough
Vegetation composition: vegetation zonation	Distribution	Maintain/restore vegetation zonation/mosaic characteristic of the site	See MacGowran (1985), Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997) and Waldren (2015) for information on vegetation at Caherglassaun turlough
Vegetation structure: sward height	Centimetres	Maintain/restore sward heights appropriate to the vegetation unit, and a variety of sward heights across the turlough	See MacGowran (1985), Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997) and Waldren (2015) for information on vegetation at Caherglassaun turlough. Goodwillie (1992) recorded cattle and sheep grazing
Typical species	Presence	Maintain typical species within and across the turlough	Typical species is sub-divided into more detailed attributes (terrestrial, wetland and aquatic plants, invertebrates and birds) and targets in O Connor (2017). At Caherglassaun, the typical species of the habitat Rivers with muddy banks with <i>Chenopodium rubri</i> p.p. and <i>Bidention</i> p.p. vegetation (3270) are of note, as is rigid hornwort (<i>Ceratophyllum demersum</i>) and the Near Threatened fen violet (<i>Viola persicifolia</i>) (Goodwillie, 1992; Goodwillie et al., 1997 in Southern Water Global and Jennings O'Donovan and Partners, 1997; Conaghan et al., 2006; Waldren, 2015; Wyse Jackson et al., 2016). Donaldson et al. (1979) report on the Mollusca of Caherglassaun turlough. Bond (1997 in SWG and JODP, 1997) noted two restricted moth species at Caherglassaun turlough, <i>Acentria ephemerella</i> and <i>Triphosa dubitata</i>
Fringing habitats: area	Hectares	Maintain marginal fringing habitats that support turlough vegetation, invertebrate, mammal and/or bird populations	See O Connor (2017) for details on this and all attributes
Vegetation structure: turlough woodland	Species diversity and woodland structure	Maintain appropriate turlough woodland diversity and structure	Goodwillie (1992) mapped 4ha of <i>Rhamnus</i> wood (vegetation type 3W). Areas of scrub and woodland on limestone pavement with ash (<i>Fraxinus excelsior</i>), hazel (<i>Corylus avellana</i>), yew (<i>Taxus baccata</i>), blackthorn (<i>Prunus spinosa</i>), hawthorn (<i>Crataegus monogyna</i>), buckthorn (<i>Rhamnus cathartica</i>) and spindle (<i>Euonymus europaeus</i>) have also been noted (NPWS internal files)

Conservation Objectives for : Caherglassaun Turlough SAC [000238]

3270 Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation

To maintain the favourable conservation condition of Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation in Caherglassaun Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable, subject to natural fluctuations	The area of habitat 3270 in Caherglassaun Turlough SAC can vary significantly inter-annually with flooding regime. See Goodwillie (1992), Goodwillie et al. (1997 in Southern Water Global and Jennings O'Donovan and Partners (SWG and JODP), 1997), Conaghan et al. (2006) and Waldren (2015) for information on the occurrence of the habitat at Caherglassaun. Goodwillie (1992) estimated the extent of the <i>Eleocharis acicularis</i> community (9B) as 1.9ha and the Wet annuals community (8B) as 0.5ha at Caherglassaun. Waldren (2015) estimated 1.52ha of the <i>Eleocharis acicularis</i> community. See O Connor (2017) for information on all attributes and targets
Habitat distribution	Occurrence	No decline, subject to natural processes	See Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997), Conaghan et al. (2006) and Waldren (2015) for information on the known distribution of the habitat at Caherglassaun in the SAC
Hydrological regime	Various	Maintain appropriate natural hydrological regime necessary to support the natural structure and functioning of the habitat	Hydrological regime is sub-divided into more detailed attributes (groundwater contribution, flood duration, frequency, area and depth, and permanently flooded/wet areas) and targets in O Connor (2017). The habitat occurs on open muddy ground at the edge of the permanent water at Caherglassaun (Goodwillie, 1992; Conaghan et al., 2006). Late drying/long hydroperiod, the supply of fine mud and the gentle slope on the south-west to south-east shore are key to the area, structure and functioning of the habitat at Caherglassaun. Daily fluctuations caused by the tide may also be influential (Goodwillie, 1992)
Soil type	Hectares	Maintain area and extent of soil types necessary to support the habitat	The habitat occurs on fine sediment/mud associated with the permanent water and, particularly, the inflowing stream at the south-west of Caherglassaun (Goodwillie, 1992; Conaghan et al., 2006)
Soil nutrient status: nitrogen and phosphorus	N and P concentration in soil	Maintain nutrient status appropriate to soil types and vegetation communities/units	Waldren (2015) found relatively low mean total nitrogen (TN) at Caherglassaun turlough of 6,263mg/kg TN and relatively high total phosphorus (TP) of 1,016mg/kg TP; however, no soil samples were taken within habitat 3270
Physical structure: bare ground	Presence	Maintain sufficient wet bare ground, as appropriate	Bare ground results from late drying along the lake shore at Caherglassaun and, likely also, the deposition of fine sediment
Chemical processes: calcium carbonate deposition and concentration	Calcium carbonate deposition rate/soil concentration	Maintain appropriate calcium carbonate deposition rate and concentration in soil	Goodwillie (1992) stated that there are no significant amounts of marl at Caherglassaun and Waldren (2015) stated that the soils had a low calcium carbonate content of 4.37%
Water quality	Various	Maintain/restore appropriate water quality to support the natural structure and functioning of the habitat	Water quality is sub-divided into more detailed attributes (nutrients, colour, phytoplankton and epiphyton biomass) and targets in O Connor (2017). Caherglassaun turlough had low alkalinity, high colour, high total phosphorus (mean of 43.2µg/l TP) and high maximum chlorophyll <i>a</i> (33.5µg/l) (Waldren, 2015)

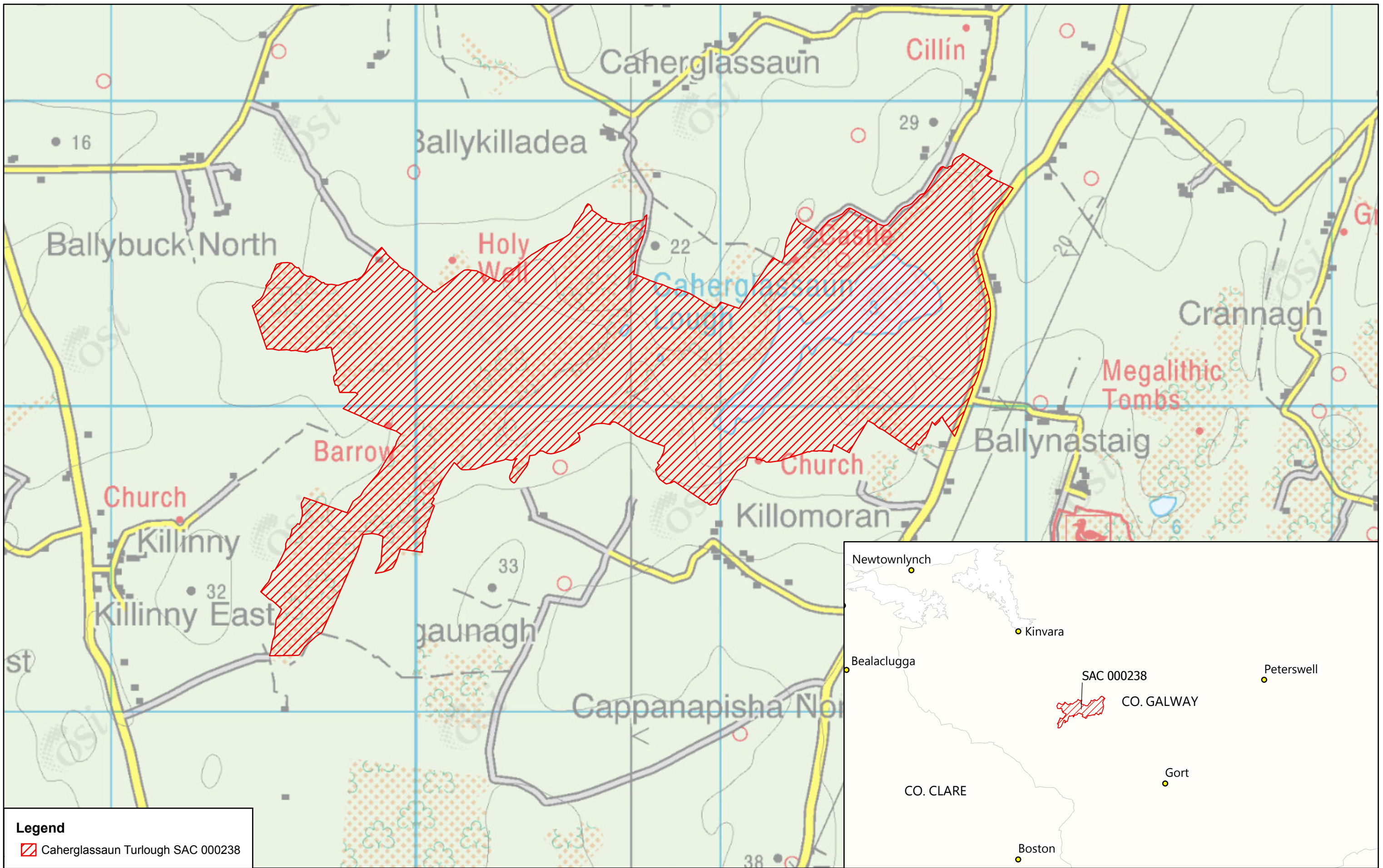
Vegetation composition: area of vegetation communities	Hectares	Maintain area of sensitive and high conservation value vegetation communities/units	See Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997), Conaghan et al. (2006) and Waldren (2015) for information on the vegetation communities. Goodwillie (1992) noted "a particularly fine stand of 9B"
Vegetation composition: vegetation zonation	Distribution	Maintain vegetation zonation/mosaic characteristic of the site	See Goodwillie (1992), Goodwillie et al. (1997 in SWG and JODP, 1997), Conaghan et al. (2006) and Waldren (2015) for information on the vegetation
Typical species: plants	Presence	Maintain typical species	Typical plant species and targets are provided in O Connor (2017). Conaghan et al. (2006) surveyed mudwort (<i>Limosella aquatica</i> ; listed on Flora (Protection) Order, 2015) and northern yellow-cross (<i>Rorippa islandica</i>). Other species recorded in the habitat at Caherglassaun include spear-leaved orache (<i>Atriplex prostrata</i>), needle spike-rush (<i>Eleocharis acicularis</i>), marsh cudweed (<i>Gnaphalium uliginosum</i>), shoreweed (<i>Littorella uniflora</i>), water-purslane (<i>Lythrum portula</i>), water-pepper (<i>Persicaria hydropiper</i>), redshank (<i>P. maculosa</i>), small water-pepper (<i>P. minor</i>) and marsh yellow-cress (<i>Rorippa palustris</i>) (Goodwillie, 1992; Goodwillie et al., 1997 in SWG and JODP, 1997; Conaghan et al., 2006). Conaghan et al. (2006) also reported an unconfirmed record for the Vulnerable vernal water-starwort (<i>Callitriche palustris</i>) (Wyse Jackson et al., 2016). See also Webb and Scannell (1983)
Fringing habitats: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functions and typical species of the habitat	See O Connor (2017) for further details on this and all attributes

Conservation Objectives for : Caherglassaun Turlough SAC [000238]

1303 Lesser Horseshoe Bat *Rhinolophus hipposideros*

To maintain the favourable conservation condition of Lesser Horseshoe Bat in Caherglassaun Turlough SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Population per roost	Number	Minimum number of 20 bats for the winter roost (roost id. 246 in NPWS database). See map 3	A figure of 100 bats for summer roosts and 50 bats for winter roosts was set as a minimum qualifying standard (MQS) when SACs were being selected for lesser horseshoe bat (<i>Rhinolophus hipposideros</i>). Where roosts fall below this figure, the MQS is generally used as the target figure. This site, however, is subject to regular natural flooding which on occasion leads to significant bat mortality. In addition, the site appears to be linked to the nearby Garryland roost. On this basis, a lower target figure (20 bats) is considered justified for the winter roost (roost id. 246 in NPWS database) in Caherglassaun Turlough SAC. See the conservation objectives supporting document for lesser horseshoe bat (NPWS, 2018) for further information on all attributes and targets
Winter roosts	Condition	No decline	Caherglassaun Turlough SAC has been selected for lesser horseshoe bat because of the presence of one internationally important winter roost (roost id. 246 in NPWS database). Damage or disturbance to the roost or to the habitat immediately surrounding it will lead to a decline in its condition (Mitchell-Jones et al., 2007)
Auxiliary roosts	Number and condition	No decline	Lesser horseshoe bat populations will use a variety of roosts during the year besides the main summer maternity and winter hibernation roosts. Such additional roosts within the SAC may be important as night roosts, satellite roosts, etc. Night roosts are also considered an integral part of core foraging areas and require protection (Knight and Jones, 2009). In addition, in response to weather conditions for example, bats may use different seasonal roosts from year to year; this is particularly noticeable in winter. A database of all known lesser horseshoe bat roosts is available on the National Biodiversity Data Centre website. NB further unrecorded roosts may also be present within this SAC
Extent of potential foraging habitat	Hectares	No significant decline within 2.5km of qualifying roost	Lesser horseshoe bats normally forage in woodlands/scrub within 2.5km of their roosts (Schofield, 2008). See map 3 which shows a 2.5km zone around the above roost and identifies potential foraging grounds
Linear features	Kilometres	No significant loss within 2.5km of qualifying roosts. See map 3	This species follows commuting routes from its roost to its foraging grounds. Lesser horseshoe bats will not cross open ground. Consequently, linear features such as hedgerows, treelines and stone walls provide vital connectivity for this species within 2.5km around each roost (Schofield, 2008)
Light pollution	Lux	No significant increase in artificial light intensity adjacent to named roost or along commuting routes within 2.5km of the roost. See map 3	Lesser horseshoe bats are very sensitive to light pollution and will avoid brightly lit areas. Inappropriate lighting around roosts may cause abandonment; lighting along commuting routes may cause preferred foraging areas to be abandoned, thus increasing energetic costs for bats (Schofield, 2008)



Legend
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MAP 1:
CAHERGLASSAUN TURLOUGH SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION
 Map to be read in conjunction with the NPWS Conservation Objectives Document.

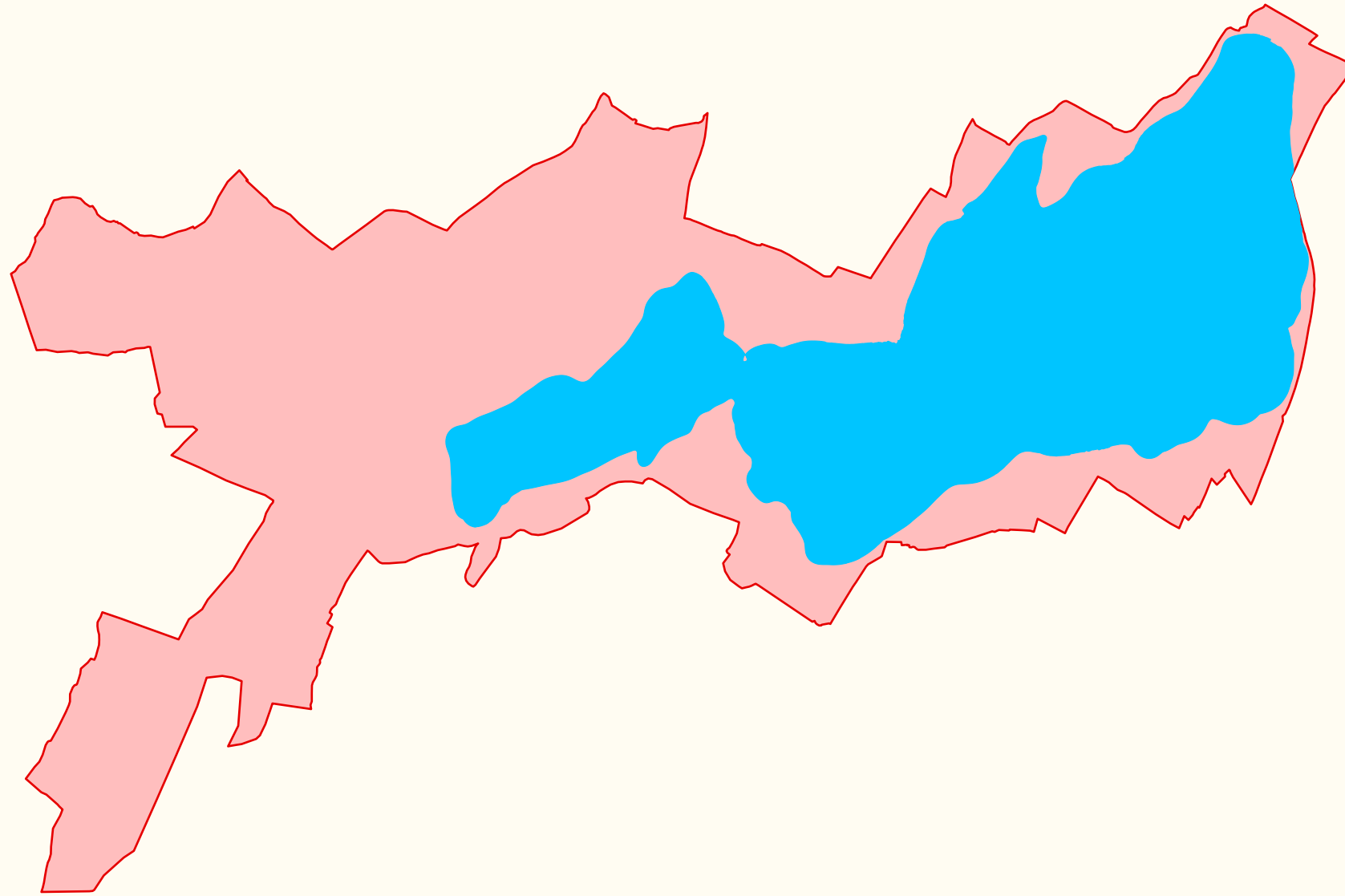
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0 150 300 450 600 Meters

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Map Version 1
Date: Aug 2018



Legend

- 3180 Turloughs*
- Caherglassaun Turlough SAC 000238
- OSi Discovery Series County Boundaries

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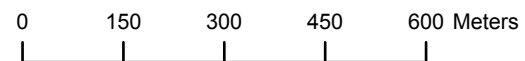


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**MAP 2:
CAHERGLASSAUN TURLOUGH SAC
CONSERVATION OBJECTIVES
TURLOUGHs**

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

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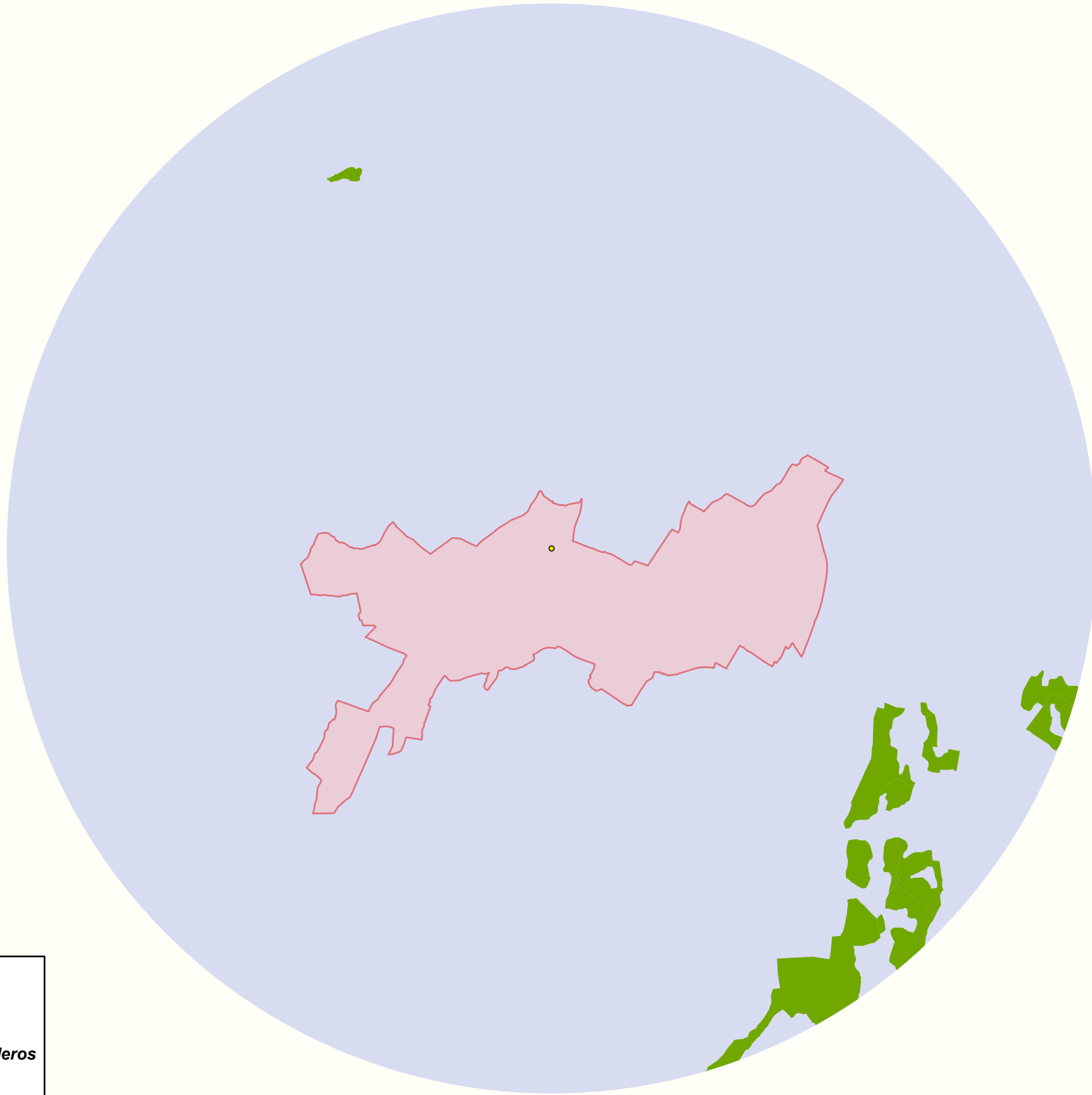


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**Map Version 1
Date: Aug 2018**



Legend

- Caherglassaun Turlough SAC 000238
- OSi Discovery Series County Boundary
- 1303 Lesser Horseshoe Bat *Rhinolophus hipposideros***
- Roost Location
- Roost ID 246 Foraging Range
- Potential Foraging Grounds

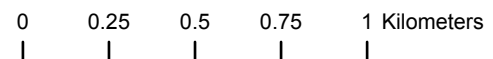


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**MAP 3:
CAHERGLASSAUN TURLOUGH SAC
CONSERVATION OBJECTIVES
LESSER HORSESHOE BAT**

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

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**Map Version 1
Date: Aug 2018**