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Conservation Objectives Series

Ballyman Glen SAC 000713

An Roinn Cultúir,
Oidhreachta 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***

000713	Ballyman Glen SAC
7220	Petrifying springs with tufa formation (Cratoneurion)*
7230	Alkaline fens

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1976
Title :	Areas of Scientific Interest in Co. Wicklow
Author :	Curtis, T.
Series :	Unpublished report
Year :	2008
Title :	National survey of native woodlands 2003-2008
Author :	Perrin, P.M.; Martin, J.; Barron, S.; O'Neill, F.H.; McNutt, K.E.; Delaney, A.
Series :	Unpublished report to NPWS
Year :	2009
Title :	Ireland Red List No. 2: Non-marine molluscs
Author :	Byrne, A.; Moorkens, E.A.; Anderson, R.; Killeen, I.J.; Regan, E.C.
Series :	Ireland Red List series, NPWS
Year :	2010
Title :	Ireland Red List No. 4: Butterflies
Author :	Regan, E.C.; Nelson, B.; Aldwell, B.; Bertrand, C.; Bond, K.; Harding, J.; Nash, D.; Nixon, D.; Wilson, C.J.
Series :	Ireland Red List series, NPWS
Year :	2012
Title :	Ireland Red List No. 8: Bryophytes
Author :	Lockhart, N.; Hodgetts, N.; Holyoak, D.
Series :	Ireland Red List series, NPWS
Year :	2013
Title :	Conservation status assessment for petrifying springs
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Unpublished report to NPWS
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2014
Title :	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
Author :	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
Series :	Irish Wildlife Manuals, No. 79
Year :	2016
Title :	Monitoring guidelines for the assessment of petrifying springs in Ireland
Author :	Lyons, M.D.; Kelly, D.L.
Series :	Irish Wildlife Manuals, No. 94
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 List Series, NPWS

Year :	2018
Title :	Backing document – National Conservation Status Assessments (NCAs) for three fen habitat types: 7140 – Transition mires and quaking bogs, 7210 – Calcareous fens with *Cladium mariscus* and species of Caricion davallianae, 7230 – Alkaline fens
Author :	Long, M.P.; Crowe, O.; Kimberley, S.; Denyer, J.
Series :	Unpublished report to NPWS
Year :	in prep.
Title :	The Status of EU Protected Habitats and Species in Ireland (2013-2018). Habitat Assessments
Author :	NPWS
Series :	Conservation assessments

Other References

Year :	1950
Title :	The Flora of the County Wicklow. Flowering Plants, Cryptogams and Characeae
Author :	Brunker, J.P.
Series :	Dundalgan Press, Dundalk
Year :	2004
Title :	Common Standards Monitoring guidance for lowland wetland habitats
Author :	JNCC
Series :	Joint Nature Conservation Committee, Peterborough
Year :	2010
Title :	Water Quality in Ireland 2007-2009
Author :	McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series :	Environmental Protection Agency, Wexford
Year :	2011
Title :	Review and revision of empirical critical loads and dose-response relationships. Proceedings of an expert workshop, Noordwijkerhout, 23-25 June 2010
Author :	Bobbink, R.; Hettelingh, J.P.
Series :	RIVM report 680359002, Coordination Centre for Effects, National Institute for Public Health and the Environment (RIVM)
Year :	2015
Title :	The flora and conservation status of petrifying springs in Ireland
Author :	Lyons, M.D.
Series :	Unpublished Ph.D. thesis, Trinity College Dublin
Year :	2017
Title :	Old Connaught Woodbrook WSS. Survey of Annex I Habitats at Ballyman Glen SAC
Author :	Crushell, P.; Foss, P.
Series :	Report prepared by Wetland Surveys Ireland Ltd for Irish Water
Year :	2018
Title :	Irish Vegetation Classification: Technical Progress Report No. 4
Author :	Perrin, P.
Series :	Report submitted to National Biodiversity Data Centre

Spatial data sources

Year :	2016
Title :	Point file associated with Lyons (2015)
GIS Operations :	Dataset created from spatial references; clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	7220 (map 2)
Year :	2017
Title :	Spatial data associated with Crushell and Foss (2017)
GIS Operations :	Dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	7220 (map 2)

7220 Petrifying springs with tufa formation (Cratoneurion)

To restore the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)* in Ballyman Glen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Square metres	Area stable or increasing, subject to natural processes	Crushell and Foss (2017) surveyed an area of Ballyman Glen SAC, mostly to the north of the County Brook River and the southern river bank in the east of the SAC, and mapped a number of discrete Petrifying springs with tufa formation (Cratoneurion)* point locations, where the influence of tufa is more localised and less than 100m², and four seepage zones (areas of tufa extent larger than 100m²) which totalled c.4,110m² (Zone I: c.303m²; Zone II: c.1,492m²; Zone III: c.1,882m²; Zone IV: c.431m²). See map 2 for point locations. The habitat was recorded at two locations by Lyons (2015) within the SAC, at sites PS003b, on the north side of the river valley (located within seepage Zone I), and PS003c (c.1,900m²), in an area of alkaline fen in the south of the SAC (see map 2 for point locations). Crushell and Foss (2017) and Lyons (2015) should be consulted for further details. It is important to note that further unsurveyed areas of the habitat may be present within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 2	See map 2 for the point locations of the springs mapped by Crushell and Foss (2017) and Lyons (2015). It is important to note that further unsurveyed areas of the habitat may be present in the SAC. Lyons and Kelly (2016) describe eight plant communities of Irish petrifying springs based on relevé data. At PS003c in the SAC, the main community recorded by Lyons (2015) was *Carex lepidocarpa* small sedge springs, with the additional communities *Palustriella commutata-Geranium robertianum* springheads and *Palustriella commutata-Agrostis stolonifera* springheads also occurring. Five of the springs mapped by Crushell and Foss (2017) were surveyed and assessed in detail and the *Palustriella commutata-Geranium robertianum* springheads community type was recorded in each. Further information on the vegetation communities associated with this habitat is presented in Lyons and Kelly (2016)
Hydrological regime: height of water table; water flow	Metres; metres per second	Maintain appropriate hydrological regimes	Petrifying springs rely on permanent irrigation, usually from upwelling groundwater sources or seepage sources (Lyons and Kelly, 2013). In karst areas, water tends to flow away rapidly over bare rock surfaces, even on fairly flat ground (Lyons and Kelly, 2013). Water flow should not be altered anthropogenically. See Lyons and Kelly (2016) for further details. See Lyons (2015) and Crushell and Foss (2017) for details on the hydrology of the surveyed springs in Ballyman Glen SAC
Water quality - nitrate level	mg/l	No increase from baseline nitrate level and less than 10mg/l	Target based on data from McGarrigle et al. (2010). See Lyons and Kelly (2016) for further details. A nitrate level of 64.7mg/l was recorded at PS003c by Lyons (2015). A former landfill site is located immediately adjacent to and upstream of the SAC; it is not known to what extent potential leakage of groundwater pollution from the former waste disposal site may be affecting the habitat (Lyons and Kelly, 2013). The habitat may also be vulnerable to nutrient run-off from surrounding agricultural land (NPWS internal files). Further investigation is warranted (Lyons, 2015)

Water quality - phosphate level	µg/l	No increase from baseline phosphate level and less than 15µg/l	Based on data from Lyons (2015). See Lyons and Kelly (2016) for further details
Vegetation composition: positive indicator species	Number per spring	At least three positive/high quality indicator species as listed in Lyons and Kelly (2016) and no loss from baseline number	Based on Lyons and Kelly (2016), where the lists of positive and high quality indicator species are presented. See Lyons (2015) and Crushell and Foss (2017) for baseline numbers and lists of species recorded in the surveyed springs in Ballyman Glen SAC. Positive indicator species recorded include the bryophytes *Aneura pinguis, Bryum pseudotriquetrum, Campylium stellatum, Didymodon tophaceus, Eucladium verticillatum, Fissidens adianthoides, Palustriella commutata, P. falcata, Pellia endiviifolia* and *Philonotis calcarea*, with long-stalked yellow-sedge (*Carex lepidocarpa*), carnation sedge (*C. panicea*), red fescue (*Festuca rubra*), bog pimpernel (*Anagallis tenella*), marsh hawk's-beard (*Crepis paludosa*), grass-of-parnassus (*Parnassia palustris*), common butterwort (*Pinguicula vulgaris*), great horsetail (*Equisetum telmateia*) and the stonewort *Chara vulgaris* (Lyons, 2015; Crushell and Foss, 2017)
Vegetation composition: negative indicator species	Cover (DAFOR scale)	Potentially negative indicator species should not be Dominant or Abundant; potentially negative woody species should be absent in unwooded springs; invasive species should be absent	Based on Lyons and Kelly (2016), where the lists of potentially negative herbaceous, bryophyte, algal and woody species are presented. See Lyons and Kelly (2016) also for details on potentially invasive species. If two or more potentially negative bryophyte/alga species are present, and if at least two are Frequent, or at least one is Abundant, then the habitat fails for this attribute. See Lyons and Kelly (2016) for further details. While the majority of the springs surveyed by Lyons (2015) and Crushell and Foss (2017) were wooded, at PS003c, an unwooded spring associated with alkaline fen, the potentially negative woody species ash (*Fraxinus excelsior*), ivy (*Hedera helix*), bramble (*Rubus fruticosus* agg.) and grey willow (*Salix cinerea*) were recorded by Lyons (2015)
Vegetation structure: sward height	Centimetres	Field layer height between 10cm and 50cm (except for bryophyte-dominated ground <10cm)	Based on Lyons and Kelly (2016). The field layer height recorded by Lyons (2015) at PS003c was above 50cm and a lack of grazing was recorded as a negative impact; this spring is found south of the river in the SAC in alkaline fen
Physical structure: trampling/dung	Cover (DAFOR scale)	Cover should not be Dominant or Abundant	Based on Lyons and Kelly (2016). High levels of deer grazing and associated poaching of the surface of springs was reported at four of the five springs assessed by Crushell and Foss (2017) to the north of the river in the SAC and is likely to occur at other springs north of the river in the SAC, except perhaps those situated along the river bank where trampling by deer is unlikely to occur (Crushell and Foss, 2017). Clay pigeons, some encased in tufa, were found to be present in the ground layer of some of the springs in the SAC; they are launched over the SAC from a clay pigeon shooting range to the south of the SAC (Lyons, 2015; Crushell and Foss, 2017; NPWS internal files). Discarded brushwood on top of tufa formations was also observed at Ballyman Glen by Lyons (2015)

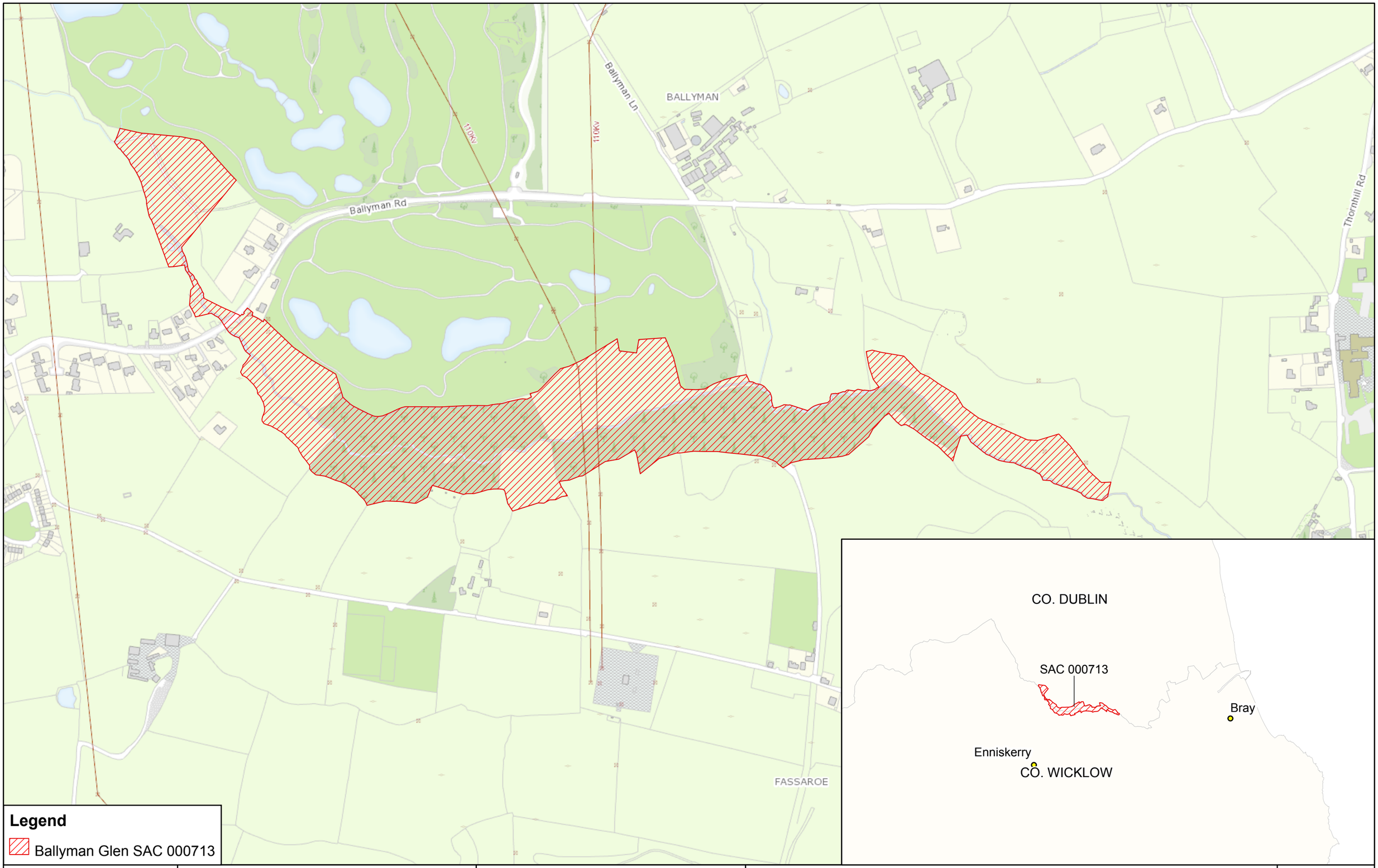
7230 Alkaline fens

To restore the favourable conservation condition of Alkaline fens in Ballyman Glen SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fen has not been mapped in detail for Ballyman Glen SAC and thus the total area of the qualifying habitat in the SAC is unknown. The habitat occurs on an unwooded slope to the south of County Brook River in the south of the SAC. The habitat is associated with seepage areas and the priority Annex I habitat Petrifying springs with tufa formation (Cratoneurion)* (habitat code 7220) that have given rise to thick deposits of marl. The habitat also occurs in association with wet woodland and scrub which occur along the stream in the SAC (NPWS internal files)
Habitat distribution	Occurrence	No decline, subject to natural processes	See the notes for Habitat area above
Ecosystem function: soil nutrients	Soil pH and appropriate nutrient levels at a representative number of monitoring stops	Maintain soil pH and nutrient status within natural ranges	Relevant nutrients and their natural ranges are yet to be defined. However, nitrogen deposition is noted as being relevant to this habitat in NPWS (2013). See also Bobbink and Hettelingh (2011)
Ecosystem function: peat formation	Percentage cover of peat-forming vegetation and water table levels	Maintain active peat formation, where appropriate	In order for peat to form, water levels need to be slightly below or above the soil surface for c.90% of the time
Ecosystem function: hydrology - groundwater levels	Water levels (centimetres); duration of levels; hydraulic gradients	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	Fen habitats require high groundwater levels (i.e. water levels at or above the ground surface) for a large proportion of the calendar year (i.e. duration of mean groundwater level). Fen groundwater levels are controlled by regional groundwater levels in the contributing catchment area (which sustain the hydraulic gradients of the fen groundwater table). Regional abstraction of groundwater may affect fen groundwater levels. In this SAC, the habitat is associated with an extensive seepage area down to the County Brook River (Crushell and Foss, 2017)
Ecosystem function: hydrology - surface water flow	Drain density and form	Maintain, or where necessary restore, as close as possible to natural or semi-natural, drainage conditions	Drainage, either within or surrounding the fen habitat, can result in the drawdown of the alkaline fen groundwater table. The depth, geometry and density of drainage (hydromorphology) will indicate the scale and impact on fen hydrology. Drainage can result in loss of characteristic species and transition to drier habitats
Ecosystem function: water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	Fens receive natural levels of nutrients (e.g. iron, magnesium and calcium) from water sources. However, they are generally poor in nitrogen and phosphorus, with the latter tending to be the limiting nutrient under natural conditions. Water supply should be also relatively calcium-rich. In this SAC, the alkaline fen occurs on moderately sloping lands and is fed by a continuous supply of calcareous groundwater from a series of tufa-forming springs emerging on the upper slopes (Crushell and Foss, 2017). A former landfill site occurs upslope of the alkaline fen in this SAC; it is not known to what extent potential leakage of groundwater pollution from the former waste disposal site may be affecting the habitat. The habitat may also be vulnerable to nutrient run-off from surrounding agricultural land (NPWS internal files)

Community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	The entire diversity of alkaline fen vegetation communities present in the SAC is currently unknown. Information on the vegetation communities associated with alkaline fens in the uplands is presented in Perrin et al. (2014). See also the Irish Vegetation Classification (Perrin, 2018; www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification)
Vegetation composition: brown mosses	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical brown moss species	For lists of typical brown moss species, including high quality indicator species, see the 2013-2018 Article 17 conservation status assessment for alkaline fens (NPWS, in prep.) and the fen habitats supporting document (Long et al., 2018). Typical brown moss species recorded in the habitat in this SAC include *Calliergonella cuspidata, Campylium stellatum, Ctenidium molluscum* and *Palustriella commutata* (Crushell and Foss, 2017)
Vegetation composition: typical vascular plants	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical vascular plant species	For lists of typical vascular plant species, including high quality indicators, see the Article 17 conservation status assessment for alkaline fens (NPWS, in prep.) and the fen habitats supporting document (Long et al., 2018). See also Perrin et al. (2014) and JNCC (2004). The fen is dominated by a field layer of purple moor-grass (*Molinia caerulea*), with abundant blunt-flowered rush (*Juncus subnodulosus*), black bog-rush (*Schoenus nigricans*) and long-stalked yellow-sedge (*Carex lepidocarpa*) (Crushell and Foss, 2017). Other species recorded in the habitat include common sedge (*Carex nigra*), carnation sedge (*C. panicea*), dioecious sedge (*C. dioica*) and broad-leaved cottongrass (*Eriophorum latifolium*) and the high quality indicators marsh helleborine (*Epipactis palustris*), early marsh-orchid (*Dactylorhiza incarnata*) and narrow-leaved marsh-orchid (*D. traunsteinerioides*) (NPWS internal files)
Vegetation composition: native negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of native negative indicator species at insignificant levels	Negative indicators include species not characteristic of the habitat and species indicative of undesirable activities such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include graminoids such as reed canary-grass (*Phalaris arundinacea*) and reed sweet-grass (*Glyceria maxima*), tall herbs such as great willowherb (*Epilobium hirsutum*), bracken (*Pteridium aquilinum*), bramble (*Rubus fruticosus*) and common nettle (*Urtica dioica*), and bryophytes such as *Brachythecium rutabulum* and *Kindbergia praelonga*
Vegetation composition: non-native species	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of non-native species less than 1%	Attribute and target based on Perrin et al. (2014). Non-native species can be invasive and have deleterious effects on native vegetation. A low target is set as non-native species can spread rapidly and are most easily dealt with when still at lower abundances
Vegetation composition: native trees and shrubs	Percentage cover in local vicinity of a representative number of monitoring stops	Cover of scattered native trees and shrubs less than 10%	Attribute and target based on Perrin et al. (2014). Scrub and trees will tend to invade if fen conditions become drier. In this SAC, encroachment around the margins of the fen by gorse (*Ulex europaeus*) and downy birch (*Betula pubescens*) has been reported (Crushell and Foss, 2017; NPWS internal files)
Vegetation composition: soft rush and common reed cover	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	Attribute and target based on Perrin et al. (2014)
Vegetation structure: litter	Percentage cover in local vicinity of a representative number of monitoring stops	Total cover of litter not more than 25%	Attribute and target based on JNCC (2004). More than 25% litter cover may indicate insufficient removal of biomass by grazing and/or undesirable water table levels

Physical structure: disturbed bare ground	Percentage cover at, and in local vicinity of, a representative number of 2m x 2m monitoring stops	Cover of disturbed bare ground not more than 10%	Attribute and target based on Perrin et al. (2014). While grazing may be appropriate in this habitat, excessive areas of disturbed bare ground may develop due to unsuitable grazing regimes. Disturbance can include hoof marks, wallows, human footprints, vehicle and machinery tracks. Excessive disturbance can result in loss of characteristic species and presage erosion for peatlands. The remains of shattered clay pigeons have been reported in the alkaline fen as an area along the southern edge of the SAC is used by a local clay pigeon shooting club (Crushell and Foss, 2017; Perrin et al., 2008; NPWS internal files)
Physical structure: tufa formations	Percentage cover in local vicinity of a representative number of monitoring stops	Disturbed proportion of vegetation cover where tufa is present is less than 1%	Attribute and target based on Perrin et al. (2014). See also the conservation objective for Petrifying springs with tufa formation (Cratoneurion)* (habitat code 7220) in this volume
Indicators of local distinctiveness	Occurrence and population size	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes	This includes species on the Flora (Protection) Order, 2015 and/or Red Lists (Byrne et al., 2009; Regan et al., 2010; Lockhart et al., 2012; Wyse Jackson et al., 2016, etc.). Alkaline fens are rare in Wicklow and Dublin and the fen vegetation in Ballyman Glen SAC is well-developed, with an unusually large number of sedge species recorded; the fen is botanically important in the context of counties Wicklow and Dublin (Brunker, 1950; Curtis, 1976; NPWS internal files)



Legend

Ballyman Glen SAC 000713

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MAP 1:
BALLYMAN GLEN SAC
CONSERVATION OBJECTIVES
SAC DESIGNATION

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

SITE CODE:
SAC 000713; version 3.02. CO. WICKLOW / CO. DUBLIN

0 80 160 240 320 Meters

N

Map Version 1
Date: May 2019

Legend

- 7220 Petrifying springs with tufa formation (Cratoneurion) (Lyons, 2015)
- 7220 Petrifying springs with tufa formation (Cratoneurion) (Crushell and Foss, 2017)
- Ballyman Glen SAC 000713
- OSi Discovery Series County Boundary

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MAP 2:
BALLYMAN GLEN SAC
CONSERVATION OBJECTIVES
PETRIFYING SPRINGS

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

SITE CODE:
SAC 000713; version 3.02. CO. WICKLOW / CO. DUBLIN

0 60 120 180 240 Meters

N

Map Version 1
Date: May 2019