

# National Parks and Wildlife Service

## *Conservation Objectives Series*

Tory Hill SAC 000439



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*

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000439 Tory Hill SAC

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- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (\* important orchid sites)
- 7210 Calcareous fens with *Cladonia* and species of the Caricion davallianae
- 7230 Alkaline fens

## Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: [www.npws.ie/Publications](http://www.npws.ie/Publications)

### NPWS Documents

<b>Year :</b>	2012
<b>Title :</b>	Ireland Red List No. 8: Bryophytes
<b>Author :</b>	Lockhart, N.; Hodgetts, N.; Holyoak, D.
<b>Series :</b>	Ireland Red List series, NPWS
<b>Year :</b>	2013
<b>Title :</b>	Irish semi-natural grasslands survey 2007-2012
<b>Author :</b>	O'Neill, F.H.; Martin, J.R.; Devaney, F.M.; Perrin, P.M.
<b>Series :</b>	Irish Wildlife Manual No. 78
<b>Year :</b>	2013
<b>Title :</b>	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
<b>Author :</b>	NPWS
<b>Series :</b>	Conservation assessments
<b>Year :</b>	2013
<b>Title :</b>	Irish semi-natural grasslands survey annual report No. 4: Western seaboard counties (Clare, Galway, Kerry, Limerick, Mayo) and County Tipperary
<b>Author :</b>	Devaney, F.M.; Martin, J.R.; O'Neill, F.H.; Delaney, A.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2013
<b>Title :</b>	Conservation status assessments for three fen habitat types - 7230, 7210 and 7140
<b>Author :</b>	Kimberley, S.
<b>Series :</b>	Unpublished report to NPWS
<b>Year :</b>	2014
<b>Title :</b>	Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland, Version 2.0
<b>Author :</b>	Perrin, P.M.; Barron, S.J.; Roche, J.R.; O'Hanrahan, B.
<b>Series :</b>	Irish Wildlife Manual No. 79
<b>Year :</b>	2016
<b>Title :</b>	Ireland Red List No. 10: Vascular Plants
<b>Author :</b>	Wyse Jackson, M.; FitzPatrick, Ú.; Cole, E.; Jebb, M.; McFerran, D.; Sheehy Skeffington, M.; Wright, M.
<b>Series :</b>	Ireland Red Lists series, NPWS

### Other References

<b>Year :</b>	2000
<b>Title :</b>	A guide to habitats in Ireland
<b>Author :</b>	Fossitt, J.A.
<b>Series :</b>	The Heritage Council, Kilkenny
<b>Year :</b>	2004
<b>Title :</b>	Common Standards Monitoring guidance for lowland wetland habitats
<b>Author :</b>	JNCC
<b>Series :</b>	Joint Nature Conservation Committee, Peterborough

**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)

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**Year :** 2014  
**Title :** Orchid Ireland Survey 2014  
**Author :** Curtis, T.; Wilson, F.  
**Series :** Report to National Museums Northern Ireland

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**Year :** 2016  
**Title :** Eco-hydrological investigation of Tory Hill fen SAC, Co. Limerick  
**Author :** Regan S.; Conaghan J.  
**Series :** Report to The Office of Public Works

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## Spatial data sources

<b>Year :</b>	2013
<b>Title :</b>	Irish Semi-Natural Grassland Survey
<b>GIS Operations :</b>	Dataset clipped to the SAC boundary. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	6210 (map 2)
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<b>Year :</b>	2016
<b>Title :</b>	Eco-hydrological Investigation of Tory Hill Fen SAC, Co. Limerick
<b>GIS Operations :</b>	Dataset clipped to the SAC boundary. QIs identified. Expert opinion used as necessary to resolve any issues arising
<b>Used For :</b>	7210, 7230 (map 3)
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## Conservation Objectives for : Tory Hill SAC [000439]

### 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (\* important orchid sites)

To restore the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (\* important orchid sites) in Tory Hill 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	As part of the Irish Semi-natural Grassland Survey (ISGS) (Devaney et al., 2013; O'Neill et al., 2013), the habitat Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) was surveyed and mapped within the sub-site Toryhill (ISGS site code 2703) to give a minimum area of 0.95ha in Tory Hill SAC. Map 2 shows the surveyed grassland area classified as 6210 (0.95ha). NB further unsurveyed areas may be present within the SAC
Habitat distribution	Occurrence	No decline, subject to natural processes. See map 2 for the recorded distribution	Distribution based on O'Neill et al. (2013). The habitat occurs on the eastern side of Tory Hill mainly within a disused quarry (Devaney et al., 2013; O'Neill et al., 2013). NB further unsurveyed areas may be present within the SAC
Vegetation composition: positive indicator species	Number at a representative number of 2m x 2m monitoring stops	At least seven positive indicator species present, including two "high quality" species	Attribute and target based on O'Neill et al. (2013), where the list of positive indicator species, including high quality species, identified by the ISGS is also presented. High quality indicators recorded in the habitat in the SAC include quaking-grass ( <i>Briza media</i> ), crested hair-grass ( <i>Koeleria macrantha</i> ), kidney vetch ( <i>Anthyllis vulneraria</i> ) and cowslip ( <i>Primula veris</i> ). Positive indicators include wild thyme ( <i>Thymus polytrichus</i> ), mouse-ear hawkweed ( <i>Pilosella officinarum</i> ), lady's bedstraw ( <i>Galium verum</i> ) and common bird's-foot trefoil ( <i>Lotus corniculatus</i> ) (Devaney et al., 2013; O'Neill et al., 2013). Orchids recorded include bee orchid ( <i>Ophrys apifera</i> ), pyramidal orchid ( <i>Anacamptis pyramidalis</i> ), early-purple orchid ( <i>Orchis mascula</i> ), common spotted-orchid ( <i>Dactylorhiza fuchsii</i> ) and common twayblade ( <i>Neottia ovata</i> ) (Curtis and Wilson, 2014; NPWS internal files)
Vegetation composition: negative indicator species	Percentage cover at a representative number of 2m x 2m monitoring stops	Negative indicator species collectively not more than 20% cover, with cover by an individual species not more than 10%	Attribute and target based on O'Neill et al. (2013), where the list of negative indicator species is also presented
Vegetation composition: non-native species	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of non-native species not more than 1%	Attribute and target based on O'Neill et al. (2013)
Vegetation composition: woody species and bracken	Percentage cover at a representative number of 2m x 2m monitoring stops	Cover of woody species (except certain listed species) and bracken ( <i>Pteridium aquilinum</i> ) not more than 5% cover	Woody species that can occur above 5% cover are juniper ( <i>Juniperus communis</i> ), burnet rose ( <i>Rosa spinosissima</i> ), mountain avens ( <i>Dryas octopetala</i> ) and hoary rock-rose ( <i>Helianthemum oelandicum</i> ). However, cover of these species above 25% may indicate transition to another Annex I habitat such as Alpine and Boreal heaths (4060) or <i>Juniperus communis</i> formations (5130). Attribute and target based on O'Neill et al. (2013). In this SAC, scrub encroachment occurs in parts of the disused quarry and may threaten the orchid-rich grassland habitat in the long-term (Devaney et al., 2013; O'Neill et al., 2013; Curtis and Wilson, 2014)
Vegetation structure: broadleaf herb:grass ratio	Percentage at a representative number of 2m x 2m monitoring stops	Broadleaf herb component of vegetation between 40% and 90%	Attribute and target based on O'Neill et al. (2013)



Vegetation structure: sward height	Percentage at a representative number of 2m x 2m monitoring stops	At least 30% of sward between 5cm and 40cm tall	Attribute and target based on O'Neill et al. (2013)
Vegetation structure: litter	Percentage cover at a representative number of 2m x 2m monitoring stops	Litter cover not more than 25%	Attribute and target based on O'Neill et al. (2013)
Physical structure: bare soil	Percentage cover at a representative number of 2m x 2m monitoring stops	Not more than 10% bare soil	Attribute and target based on O'Neill et al. (2013)
Physical structure: disturbance	Area in local vicinity of a representative number of monitoring stops	Area of the habitat showing signs of serious grazing or other disturbance less than 20m <sup>2</sup>	Attribute and target based on O'Neill et al. (2013)

## Conservation Objectives for : Tory Hill SAC [000439]

### 7210 Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae

To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae\* in Tory Hill 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	Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae* in Tory Hill SAC was surveyed by Regan and Conaghan (2016). The indicative area of the qualifying priority habitat in the SAC is c.0.9ha. The habitat occurs in association with the Annex I habitat Alkaline fens (habitat code 7230) in the SAC. See Regan and Conaghan (2016) for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on Regan and Conaghan (2016). Areas of <i>Cladium</i> fen occur scattered through the wetland area between Tory Hill and Lough Nagirra in the SAC. See map 3 which shows the indicative area of <i>Cladium</i> fen in the SAC
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. See Regan and Conaghan (2016) for details on the hydrology of Tory Hill SAC
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 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. See Regan and Conaghan (2016) for details on the hydrology of Tory Hill SAC
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 also be relatively calcium-rich. In this SAC, the habitat typically occurs in old wet cutaways where there is some influence of upwelling, base-enriched water (Regan and Conaghan, 2016). See Regan and Conaghan (2016) for further details
Vegetation composition: typical species	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain adequate cover of typical species, including brown mosses and vascular plants	For lists of typical plant species, see the Article 17 conservation status assessment for <i>Cladium</i> fens (NPWS, 2013) and the Article 17 fen habitats supporting document (Kimberley, 2013). In Tory Hill SAC, great fen-sedge ( <i>Cladium mariscus</i> ) is well-represented in the habitat. Other typical species occurring include water mint ( <i>Mentha aquatica</i> ), blunt-flowered rush ( <i>Juncus subnodulosus</i> ) and common marsh-bedstraw ( <i>Galium palustre</i> ) (Regan and Conaghan, 2016)
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 impacts such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. See JNCC (2004) and Kimberley (2013)

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: 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
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%. Where tufa is present, disturbed bare ground not more than 1%	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
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 the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)

**7230 Alkaline fens**

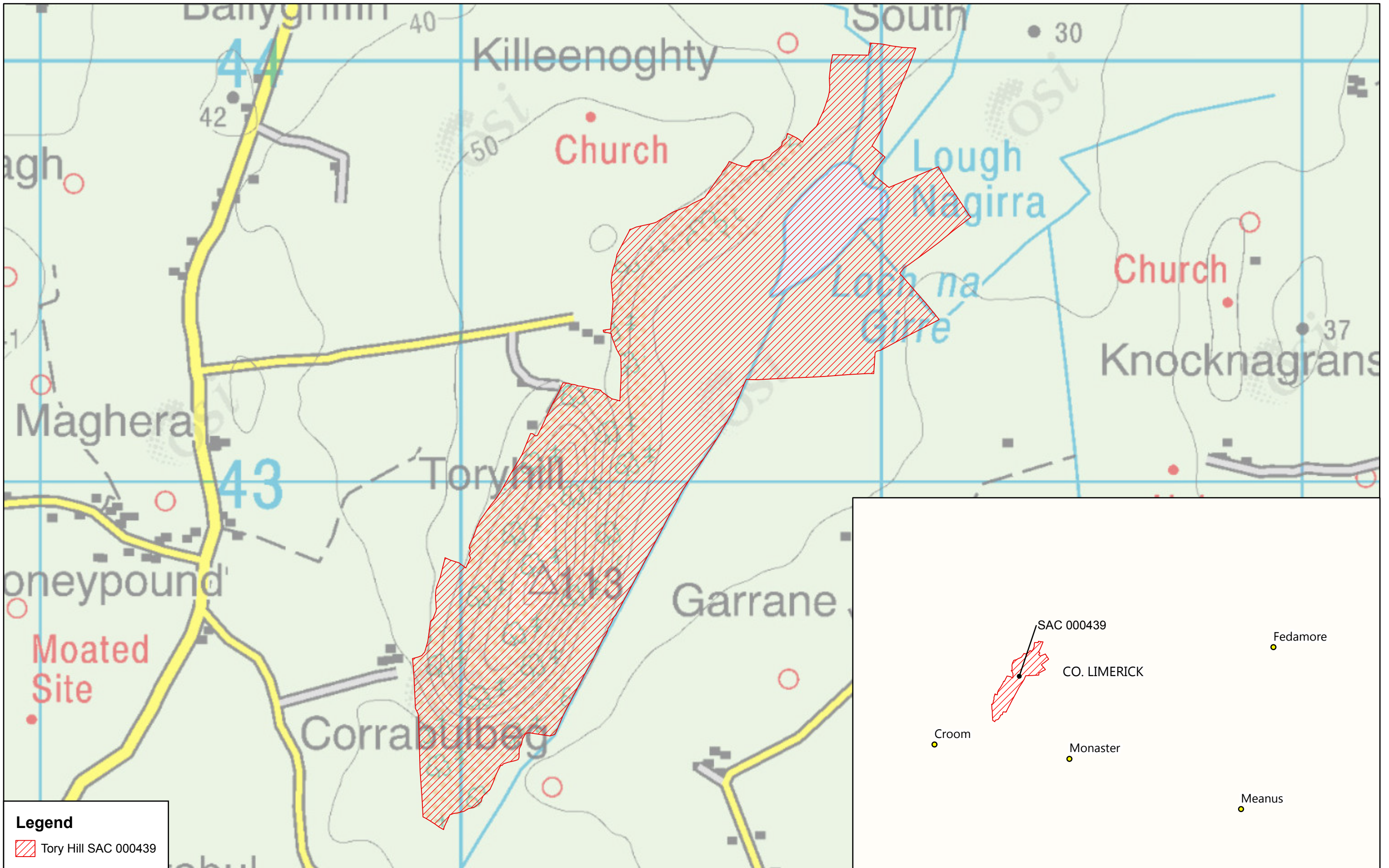
**To restore the favourable conservation condition of Alkaline fens in Tory Hill SAC, which is defined by the following list of attributes and targets:**

<b>Attribute</b>	<b>Measure</b>	<b>Target</b>	<b>Notes</b>
Habitat area	Hectares	Area stable or increasing, subject to natural processes	Alkaline fen in Tory Hill SAC was surveyed by Regan and Conaghan (2016). The indicative area of alkaline fen in the SAC is c.0.6ha, and that of alkaline fen in mosaic with marsh (Fossitt (2000) habitat GM1) is c.7.4ha. The habitat also occurs in association with the priority Annex I habitat Calcareous fens with <i>Cladium mariscus</i> and species of the Caricion davallianae (habitat code 7210) in the SAC. See Regan and Conaghan (2016) for further details
Habitat distribution	Occurrence	No decline, subject to natural processes	Distribution based on Regan and Conaghan (2016). The areas of alkaline fen are concentrated in old wet cutaways close to the bottom of the slope of Tory Hill (Regan and Conaghan, 2016) and occur scattered through the wetland area between Tory Hill and Lough Nagirra in the SAC. See map 3 which shows the indicative area of alkaline fen, including in mosaic with marsh (GM1; Fossitt, 2000), in the SAC
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, Regan and Conaghan (2016) found that the hydraulic gradient is not strong enough to maintain groundwater levels in most areas of the fen in the SAC and there is not enough groundwater getting to the surface for a sufficient period of the year. As such, alkaline fen vegetation is concentrated in old wet cutaways where the upwelling, base-enriched water is at or above the ground surface for the majority of the year. See Regan and Conaghan (2016) for further details
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. The main arterial drain, which borders the eastern boundary of the fen and flows south-west from Lough Nagirra, was found to be drawing down the groundwater levels of the fen in the SAC (Regan and Conaghan, 2016). See Regan and Conaghan (2016) for further details


Ecosystem function: water quality	Water chemistry measures	Maintain, or where necessary restore, 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 also be relatively calcium-rich. In Tory Hill SAC, alkaline fen vegetation is confined to areas where the past removal of surface vegetation, possibly scraw-cutting, has allowed base-rich groundwater to reach the surface (Regan and Conaghan, 2016)
Community diversity	Abundance of variety of vegetation communities	Maintain, or where necessary restore, variety of vegetation communities, subject to natural processes	See Regan and Conaghan (2016) for details on the vegetation communities in Tory Hill SAC. Information on vegetation communities associated with this habitat in the uplands is presented in Perrin et al. (2014)
Vegetation composition: brown mosses	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain, or where necessary restore, adequate cover of typical brown moss species	Typical brown moss species include <i>Bryum pseudotriquetrum</i> , <i>Calliergonella cuspidata</i> , <i>Calliergon giganteum</i> , <i>Campylium stellatum</i> , <i>Cratoneuron filicinum</i> , <i>Ctenidium molluscum</i> , <i>Fissidens adianthoides</i> , <i>Palustriella commutata</i> , <i>Scorpidium cossonii</i> , <i>S. revolvens</i> and <i>S. scorpioides</i> . Regan and Conaghan (2016) recorded <i>Calliergonella cuspidata</i> , <i>C. giganteum</i> and <i>Campylium stellatum</i> , but overall found that brown moss species were either absent or very rare in the habitat in the SAC, possibly due to periods of low water levels. See Regan and Conaghan (2016) for further details
Vegetation composition: typical vascular plants	Percentage cover at a representative number of 2m x 2m monitoring stops	Maintain, or where necessary restore, adequate cover of typical vascular plant species	For lists of typical plant species see the Article 17 conservation status assessment for alkaline fens (NPWS, 2013) and the fen habitats supporting document (Kimberley, 2013). See also Perrin et al. (2014) and JNCC (2004). In this SAC, Regan and Conaghan (2016) recorded an area of the habitat dominated by blunt-flowered rush ( <i>Juncus subnodulosus</i> ), with other typical species including water mint ( <i>Mentha aquatica</i> ) and marsh helleborine ( <i>Epipactis palustris</i> ). In an area dominated by black bog-rush ( <i>Schoneus nigricans</i> ) and purple moor-grass ( <i>Molinia caerulea</i> ), the typical species meadow thistle ( <i>Cirsium dissectum</i> ), carnation sedge ( <i>Carex panicea</i> ) and devil's-bit scabious occur (Regan and Conaghan, 2016). However, the habitat is relatively species-poor and the absence/low cover of the majority of indicator species suggests that the fen habitat in the SAC is relatively poorly-developed (Regan and Conaghan, 2016)
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 impacts such as overgrazing, undergrazing, nutrient enrichment, agricultural improvement or impacts on hydrology. Native negative indicators may include graminoids such as reed canary-grass ( <i>Phalaris arundinacea</i> ) and reed sweet-grass ( <i>Glyceria maxima</i> ), tall herbs such as great willowherb ( <i>Epilobium hirsutum</i> ), bracken ( <i>Pteridium aquilinum</i> ), bramble ( <i>Rubus fruticosus</i> ) and common nettle ( <i>Urtica dioica</i> ), and bryophytes such as <i>Brachythecium rutabulum</i> and <i>Kindbergia praelonga</i>
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


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 ( <i>Juncus effusus</i> ) and common reed ( <i>Phragmites australis</i> ) 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 of peatlands. A small area of alkaline fen to the north-west of Lough Nagirra has been damaged by poaching in recent years, although overall levels of grazing in the habitat in the SAC appear to be low (Regan and Conaghan, 2016)
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)
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 the red data lists (Lockhart et al., 2012; Wyse Jackson et al., 2016)





**Legend**

 Tory Hill SAC 000439



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

**MAP 1:  
TORY HILL SAC  
CONSERVATION OBJECTIVES  
SAC DESIGNATION**

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

**SITE CODE:  
SAC 000439; version 3.01. CO. LIMERICK**

0 0.1 0.2 0.3 0.4 0.5 km

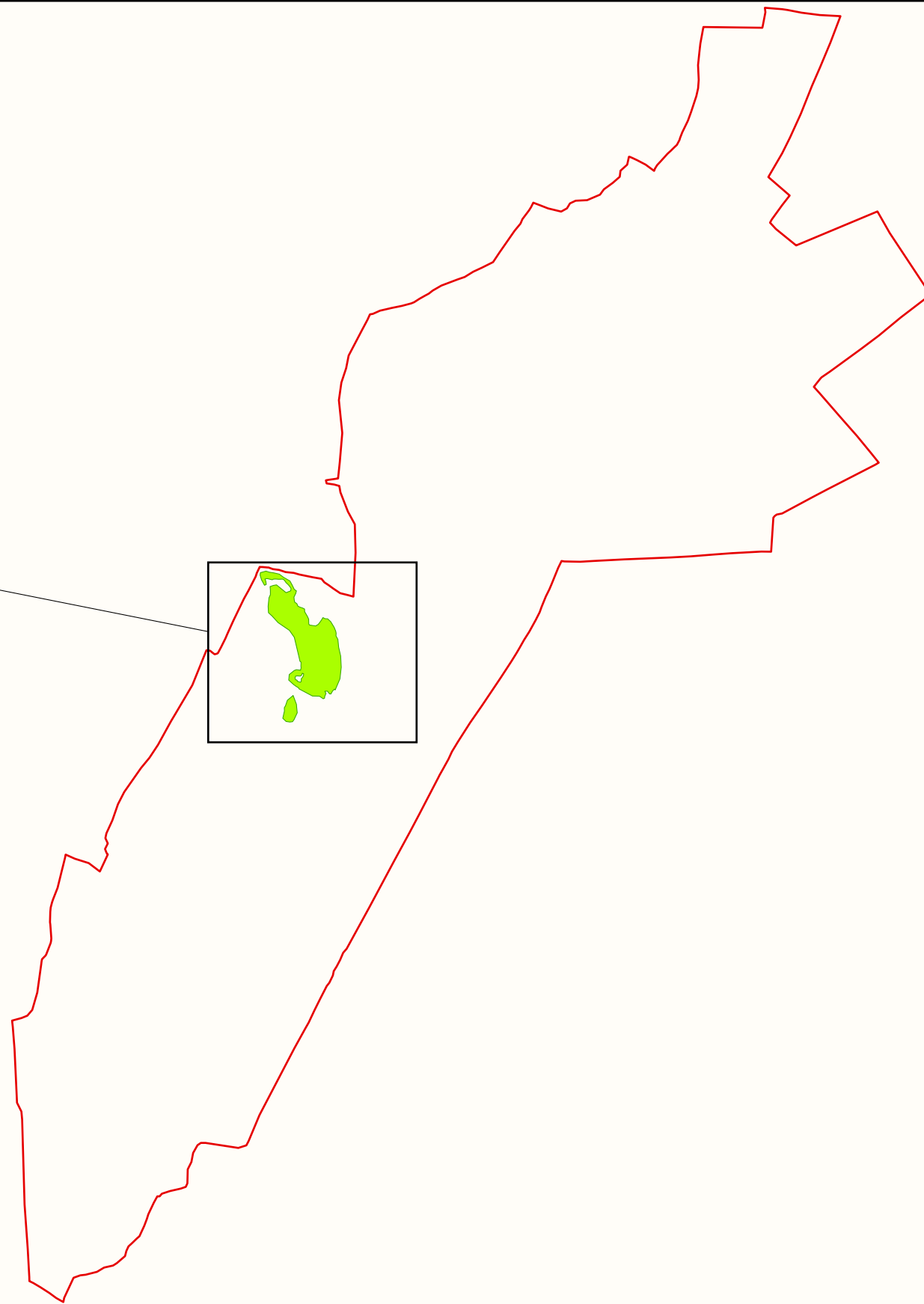
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
Ordnance Survey of Ireland Licence No EN 0059216. © Ordnance Survey of Ireland Government of Ireland

Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann



**Map Version 1  
Date: June 2018**





**Legend**

- Tory Hill SAC 000439
- OSi Discovery Series County Boundary

**Annex I Qualifying Interests**

- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)

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

**MAP 2:  
TORY HILL SAC  
CONSERVATION OBJECTIVES  
GRASSLAND HABITATS**

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

**SITE CODE:  
SAC 000439; version 3.01. CO. LIMERICK**

0    0.1    0.2    0.3    0.4    0.5 km

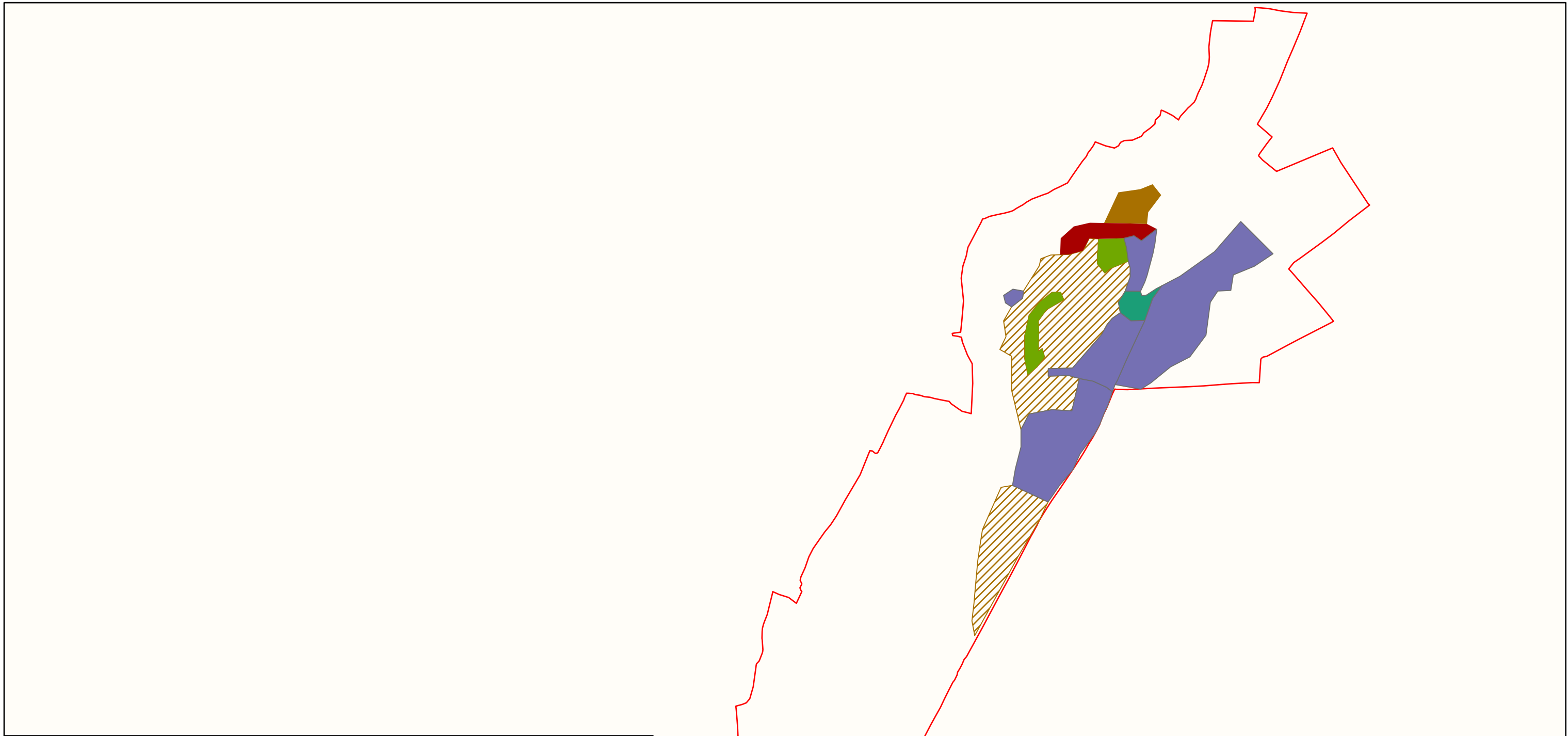
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059216. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann

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**Map Version 1  
Date: June 2018**





**Legend**

OSi Discovery Series County Boundary

Tory Hill SAC 000439

**Annex I Qualifying Interests**

7210 Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

7230 Alkaline fens

7230/GM1 Alkaline fens / Marsh mosaic

**Associated wetland habitats (Fossitt 2000)**

FS1 Reed and large sedge swamps

GM1 Marsh

**Annex I Non - Qualifying Interests**

91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)