

National Parks and Wildlife Service

Conservation Objectives Series

Tullaher Lough and Bog SAC 002343



An Roinn Ealaíon, Oidhreachta,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs



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Citation:

**NPWS (2016) Conservation Objectives: Tullagher Lough and Bog SAC 002343.
Version 1. National Parks and Wildlife Service, Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs.**

**Series Editor: Rebecca Jeffrey
ISSN 2009-4086**

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*

002343	Tullaheer Lough and Bog SAC
7110	Active raised bogsE
7120	Degraded raised bogs still capable of natural regeneration
7140	Transition mires and quaking bogs
7150	Depressions on peat substrates of the Rhynchosporion

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	2000
Title :	Raised bog restoration project. A continuation of the investigation into the conservation and restoration of selected raised bog sites in Ireland
Author :	Derwin, J.; Mac Gowan, F.
Series :	Unpublished report to Duchas, the Heritage Service
Year :	2014
Title :	National raised bog SAC management plan
Author :	Department of Arts, Heritage and the Gaeltacht
Series :	Draft for consultation. 15 January 2014
Year :	2016
Title :	Tullaheer Lough and Bog SAC (site code: 2343) Conservation objectives supporting document-raised bog habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document

Other References

Year :	1991
Title :	Tullaheer Lough & Bog wetland heritage zone. Feasibility study
Author :	Foss, P.; O'Connell, C.
Series :	Report on behalf the Irish Peatland Conservation Council
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 :	2014
Title :	Nitrogen deposition and exceedance of critical loads for nutrient nitrogen in Irish grasslands
Author :	Henry, J.; Aherne, J.
Series :	Science of the Total Environment 470–471: 216–223

Spatial data sources

Year :	2014
Title :	Scientific Basis for Raised Bog Conservation in Ireland
GIS Operations :	RBSB13_SACs_ARB_DRB dataset, RBSB13_SACs_2012_HB dataset, RBSB13_SACs_DrainagePatterns_5k dataset and RBSB13_SAC_LIDAR_DTMs dataset clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For :	Potential 7110; digital elevation model; drainage patterns (maps 2 and 4)
<hr/>	
Year :	Digitised 2006
Title :	Raised Bog Restoration Project 1999
GIS Operations :	Ecotope dataset clipped to SAC boundary. Appropriate ecotopes selected and exported to new dataset. Expert opinion used as necessary to resolve any issues arising
Used For :	7110 ecotopes (map 3)
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Year :	2016
Title :	Internal NPWS data
GIS Operations :	Potential habitat distribution created from spatial references supplied by NPWS expert. Expert opinion used as necessary to resolve any issues arising
Used For :	7140 (map 5)
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Conservation Objectives for : Tullagher Lough and Bog SAC [002343]

7110 Active raised bogs

To restore the favourable conservation condition of Active raised bogs in Tullagher Lough and Bog SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Restore area of active raised bog to 13.2ha, subject to natural processes	Active Raised Bog (ARB) habitat is estimated to have been 6.8ha in extent in 1999 when the site was last surveyed (Derwin and MacGowan, 2000). Area of Degraded Raised Bog (DRB) on the High Bog (HB) has been modelled as 8.0ha. See map 2. It is estimated that 4.0ha of this area is potentially restorable to ARB by drain blocking. The total potential ARB on the HB is therefore estimated to be 10.8ha. Eco-hydrological assessments of the cutover estimates that an additional 2.4ha of bog forming habitats could be restored. The long term target for ARB is therefore 13.2ha. See raised bog supporting document for further details on this and following attributes
Habitat distribution	Occurrence	Restore the distribution and variability of active raised bog across the SAC. See map 3 for distribution in 1999	ARB habitat at Tullagher Lough and Bog is sub-central ecotope only, and occurs to the north and south of the central bog. DRB occurs adjacent to the central areas, which will require restoration measures. There is also potential for ARB restoration on cutover areas of the bog (see area target above)
High bog area	Hectares	No decline in extent of high bog necessary to support the development and maintenance of active raised bog. See map 2	The area of high bog within Tullagher Bog in 2012 (latest figure available) was 19.6ha (DAHG 2014)
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	For ARB, mean water level needs to be near or above the surface of the bog lawns for most of the year. Seasonal fluctuations should not exceed 20cm, and should only be 10cm below the surface, except for very short periods of time
Hydrological regime: flow patterns	Flow direction; slope	Restore, where possible, appropriate high bog topography, flow directions and slopes. See map 4 for current situation	ARB depends on mean water levels being near or above the surface of bog lawns for most of the year. Long and gentle slopes are the most favourable to achieve these conditions. Changes to flow directions due to subsidence of bogs can radically change water regimes and cause drying out of high quality ARB
Transitional areas between high bog and adjacent mineral soils (including cutover areas)	Hectares; distribution	Restore adequate transitional areas to support/protect active raised bog and the services it provides	No semi-natural margins exist along the edges of Tullagher Bog. Eco-hydrological assessments have evaluated the potential for ARB restoration on cutover areas (see note for habitat area attribute above)
Vegetation quality: central ecotope, active flush, soaks, bog woodland	Hectares	Restore 6.6ha of central ecotope/active flush/soaks/bog woodland as appropriate	At least 50% of ARB habitat should be high quality (i.e. central ecotope, active flush, soaks, bog woodland). Target area of active raised bog for the site has been set at 13.2ha (see area target above)
Vegetation quality: microtopographical features	Hectares	Restore adequate cover of high quality microtopographical features	Hummock and hollow microtopography is moderately well developed on Tullagher Lough and Bog
Vegetation quality: bog moss (<i>Sphagnum</i>) species	Percentage cover	Restore adequate cover of bog moss (<i>Sphagnum</i>) species to ensure peat-forming capacity	<i>Sphagnum</i> cover varies naturally across Ireland with relatively high cover in the east to lower cover in the west. Hummock forming species such as <i>Sphagnum austinii</i> are particularly good peat formers. <i>Sphagnum</i> cover and distribution also varies naturally across a site

Typical ARB species: flora	Occurrence	Restore, where appropriate, typical active raised bog flora	Typical flora species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Typical ARB species: fauna	Occurrence	Restore, where appropriate, typical active raised bog fauna	Typical fauna species include widespread species, as well as those with more restricted distributions but typical of the habitat's subtypes or geographical range
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	Tullagher Bog is at the south-western limit of raised bog distribution in Ireland. The SAC, including the bog, supports a small flock of wintering Greenland white-fronted geese (<i>Anser albifrons flavirostris</i>)
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: bare peat, algae dominated pools and hollows, marginal cracks, tear patterns, subsidence features such as dry mineral mounds/ridges emerging or expanding and evidence of burning
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Native negative indicator species that suggest drying out include abundant bog asphodel (<i>Narthecium ossifragum</i>), deergrass (<i>Trichophorum germanicum</i>) and harestail cotton-grass (<i>Eriophorum vaginatum</i>) forming tussocks; abundant magellanic bog-moss (<i>Sphagnum magellanicum</i>) in pools previously dominated by <i>Sphagnum</i> species typical of very wet conditions (e.g. feathery bog-moss (<i>S. denticulatum</i>)). Indicators of frequent burning events include abundant <i>Cladonia floerkeana</i> and high cover of carnation sedge (<i>Carex panicea</i>) (particularly in true midlands raised bogs)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	Most common non-native invasive species on raised bogs include lodgepole pine (<i>Pinus contorta</i>), rhododendron (<i>Rhododendron ponticum</i>) and pitcherplant (<i>Sarracenia purpurea</i>)
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding bog close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Tullagher Lough and Bog suggests that the current level is approximately 9.5kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measure	Water quality on the high bog and transitional areas close to natural reference conditions	Water chemistry within raised bogs is influenced by atmospheric inputs (rainwater). However, within soak systems, water chemistry is influenced by other inputs such as focused flow or interaction with underlying substrates. Water chemistry in marginal areas and lagg zone surrounding the high bog varies due to influences of different water types (bog water, regional groundwater, and run-off from surrounding mineral lands)

Conservation Objectives for : Tullaher Lough and Bog SAC [002343]

7120 Degraded raised bogs still capable of natural regeneration

The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs (7110) and a separate conservation objective has not been set in Tullaher Lough and Bog SAC

Attribute	Measure	Target	Notes
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Conservation Objectives for : Tullaher Lough and Bog SAC [002343]

7140 Transition mires and quaking bogs

To maintain the favourable conservation condition of Transition mires and quaking bogs in Tullaher Lough and Bog 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	Transition mires and quaking bogs has not been mapped in detail for this SAC and thus the total area of the qualifying habitat is unknown. However, previous surveys (Foss and O'Connell, 1991; NPWS internal files) indicate that the habitat is mostly confined to an area in the south of the SAC, which is part of a mosaic of habitats (including some open water) within a shallow basin that lies c.500m west of Tullaher Lough (and locally known as Letts Lough)
Habitat distribution	Occurrence	Maintain the habitat within the shallow topographic basin in the south of the SAC	See above note and map 5 for indicative distribution. NB other areas of this habitat may occur in the SAC
Hydrological regime: water levels	Centimetres	Restore appropriate water levels throughout the site	The transition mire and quaking bog habitat in this SAC requires shallow water levels to be maintained in the basin where it occurs
Hydrological regime: flow patterns	Flow direction; slope	Maintain appropriate topography and water movement regime	The surface topography and water levels of areas of cutover bog to the north of the transition mire are similar to those of the basin in which it occurs. It is important that this situation is maintained in order to ensure the hydrological integrity of the Annex I habitat
Vegetation quality: plant community diversity	Abundance of variety of vegetation communities	Maintain variety of vegetation communities, subject to natural processes	There is a variety of vegetation communities associated with the habitat, from open water to higher, hummocky vegetation (Foss and O'Connell, 1991); however, it has not been surveyed in detail
Vegetation quality: microtopographical features	Hectares	Maintain high quality microtopographical features	Hummocky microtopographical features are part of the transition mire habitat complex, which also includes pool features closer to the main body of open water
Vegetation quality: bog moss and other moss species	Percentage cover	Maintain adequate cover of bog moss (<i>Sphagnum</i>) and other moss species	High moss cover is expected in this habitat. Foss and O'Connell (1991) list moss species, but cover has not been mapped in detail
Vegetation composition: typical species	Occurrence	Maintain typical flora	Typical species are listed in Foss and O'Connell (1991) and NPWS internal files
Elements of local distinctiveness	Occurrence	Maintain features of local distinctiveness, subject to natural processes	The transitions from open water to extensive transition mire communities are the main features of local distinctiveness. Both Foss and O'Connell (1991) and NPWS internal files note the exceptional abundance of cranberry (<i>Vaccinium oxycoccus</i>), which covers the <i>Sphagnum</i> -dominated hummocks. This feature was also noted on a site visit in October 2016 (Maurice Eakin, pers. comm.)
Negative physical indicators	Percentage cover	Negative physical features absent or insignificant	Negative physical indicators include: algae-dominated pools, evidence of burning, signs of desiccation and moribund <i>Sphagnum</i>
Vegetation composition: native negative indicator species	Percentage cover	Native negative indicator species at insignificant levels	Native negative indicator species that could suggest drying out include ling (<i>Calluna vulgaris</i>) and birch (<i>Betula pubescens</i>)
Vegetation composition: non-native invasive species	Percentage cover	Non-native invasive species at insignificant levels and not more than 1% cover	The most likely non-native invasive species that could encroach are conifers (colonising from plantation to the south of the SAC) and rhododendron (<i>Rhododendron ponticum</i>)

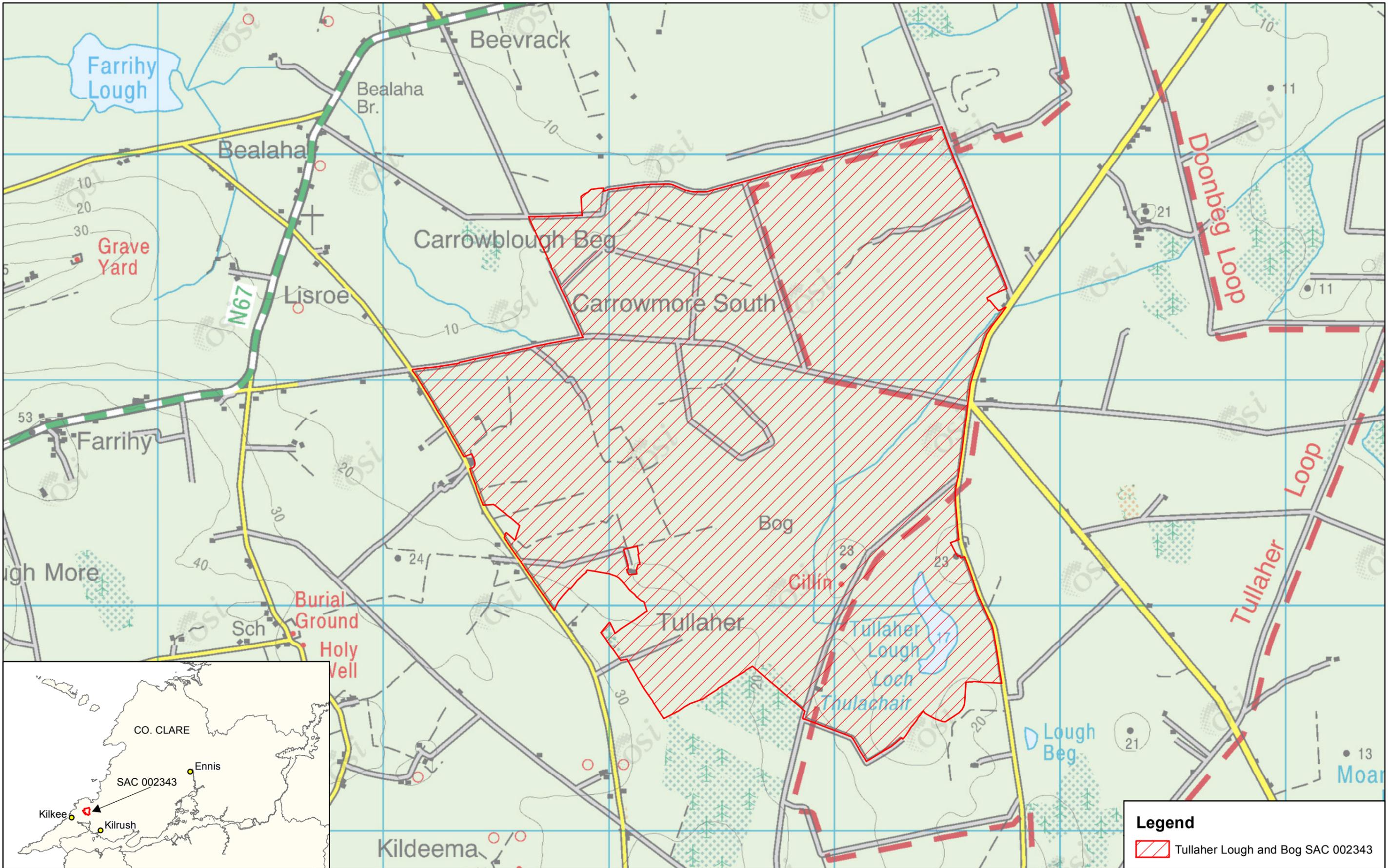
Air quality: nitrogen deposition	kg N/ha/year	Air quality surrounding transition mire habitat close to natural reference conditions. The total N deposition should not exceed 5kg N/ha/yr	Change in air quality can result from fertiliser drift; adjacent quarry activities; or other atmospheric inputs. The critical load range for ombrotrophic bogs has been set as between 5 and 10kg N/ha/yr (Bobbink and Hettelingh, 2011). The latest N deposition figures for the area around Tullagher Lough and Bog suggests that the current level is approximately 9.5kg N/ha/yr (Henry and Aherne, 2014)
Water quality	Hydrochemical measure	Water quality in the basin close to natural reference conditions	The surface conditions necessary to maintain transition mire range from acidic to slightly base-rich. The vegetation normally has intimate mixtures of species considered to be acidophile and others thought of as calciphile or basophile. In other cases these intermediate properties may reflect the actual process of succession, as peat accumulates in groundwater-fed fen or open water to produce rainwater-fed bog isolated from groundwater influence. The most obvious source of enrichment is off the higher mineral ridges that surround the basin, including the afforested area to the south

Conservation Objectives for : Tullaher Lough and Bog SAC [002343]

7150 Depressions on peat substrates of the Rhynchosporion

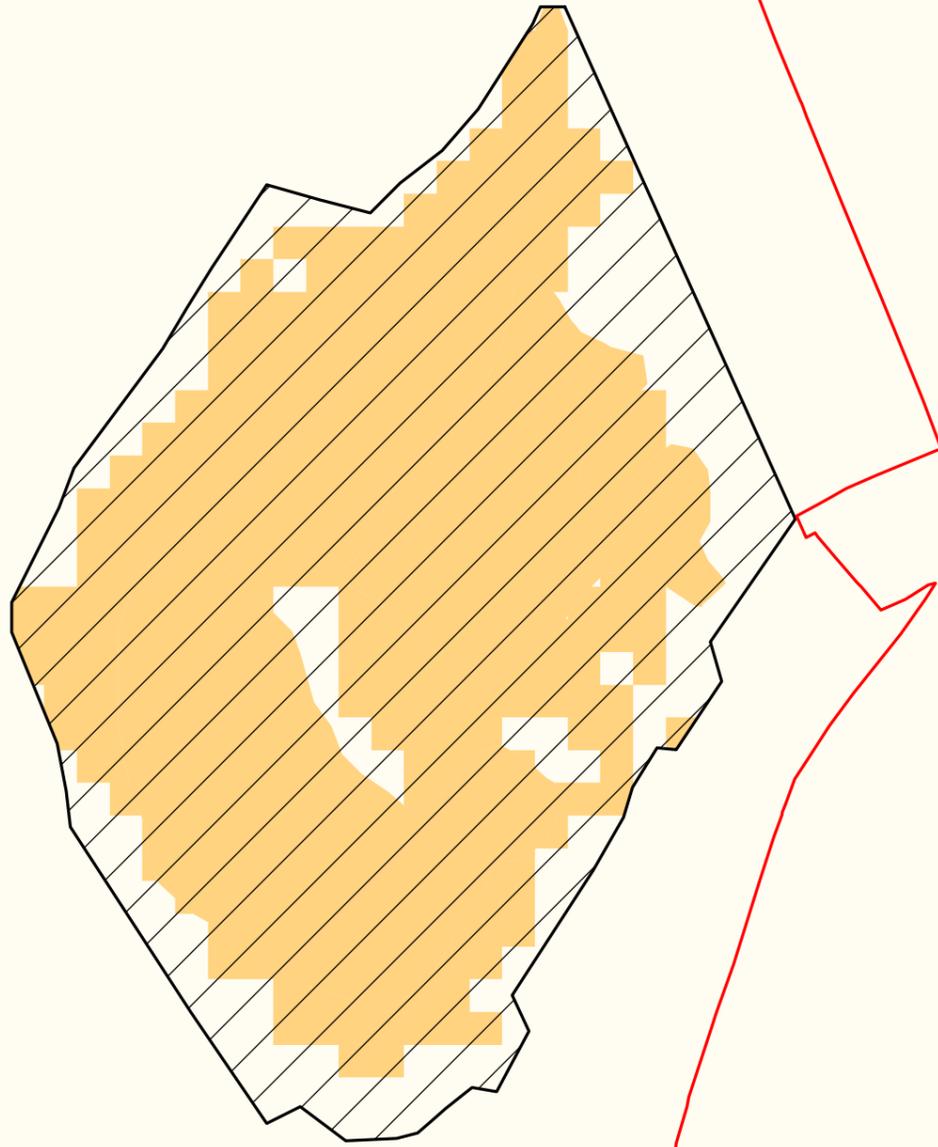
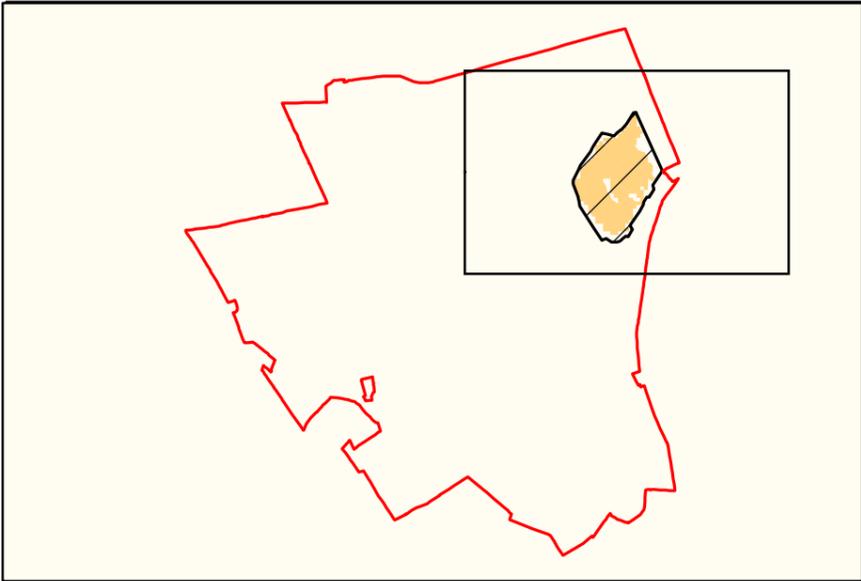
Depressions on peat substrates of the Rhynchosporion is an integral part of good quality Active raised bogs (7110) and thus a separate conservation objective has not been set for the habitat in Tullaher Lough and Bog SAC

Attribute	Measure	Target	Notes
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Legend

 Tullaheer Lough and Bog SAC 002343



Legend

- Tulla Lough and Bog SAC 002343
- High Bog Boundary
- Potential 7110 *Active Raised Bogs

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**MAP 2:
TULLAHER LOUGH AND BOG SAC
CONSERVATION OBJECTIVES
EXTENT OF POTENTIAL
ACTIVE RAISED BOGS**

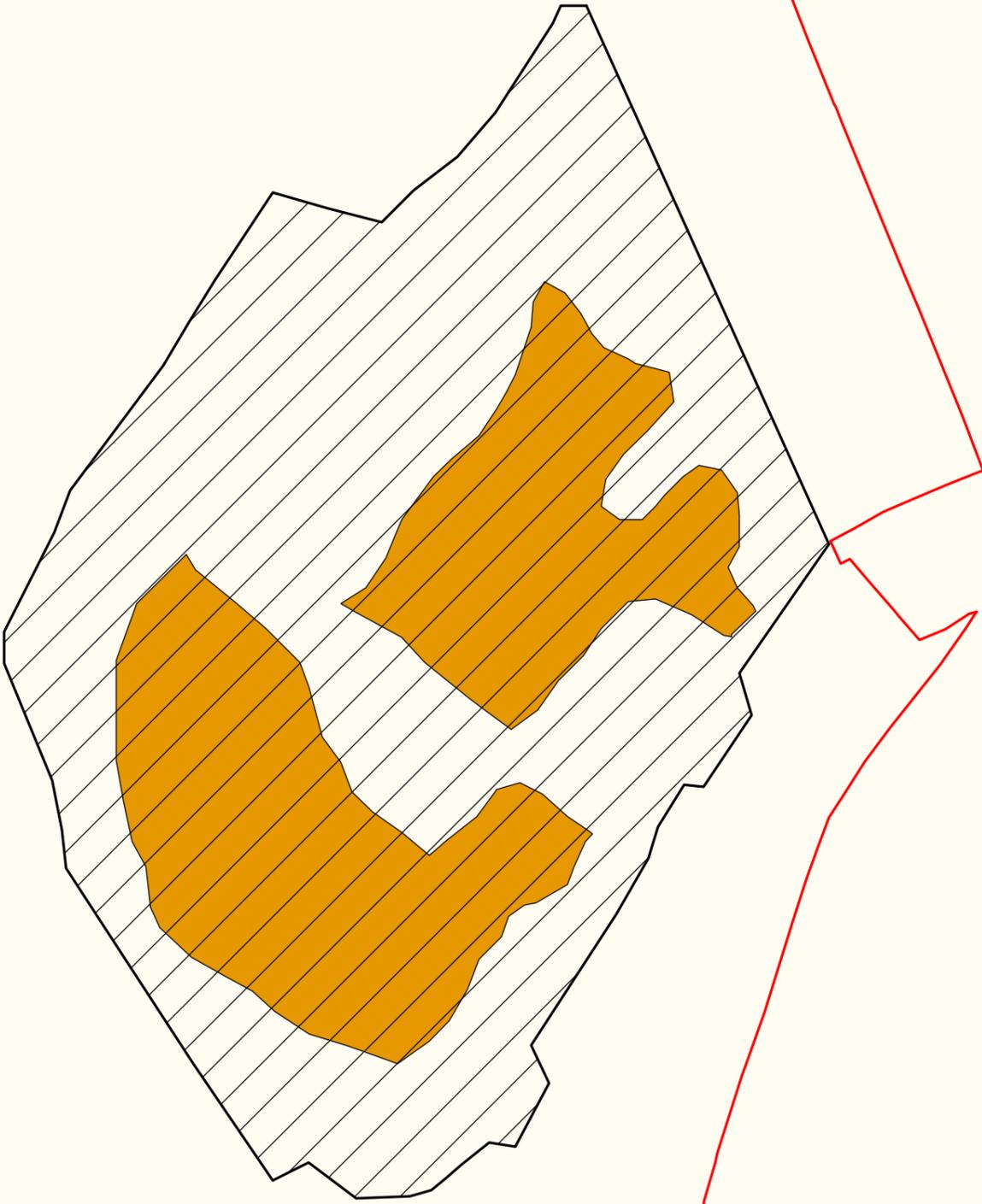
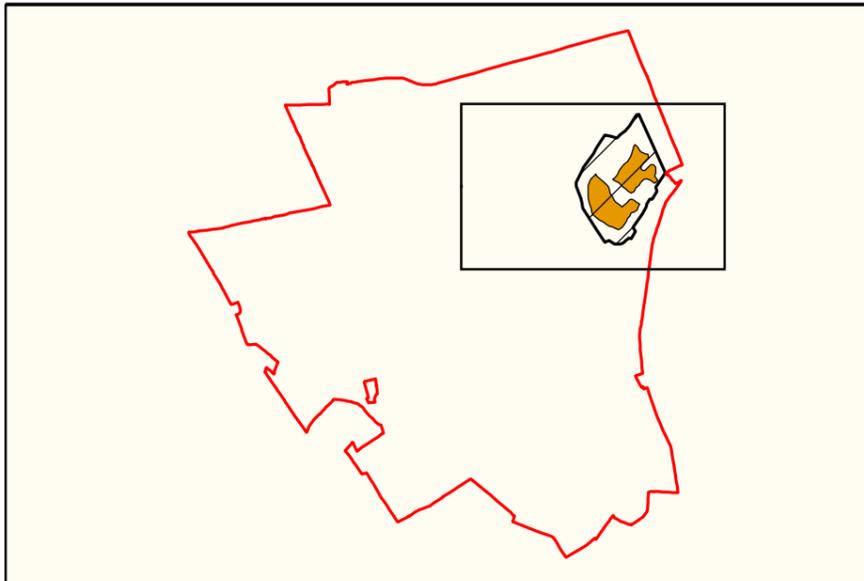
Map to be read in conjunction with the NPWS Conservation Objectives Document.

**SITE CODE:
SAC 002343; version 3.01. Co. Clare**

The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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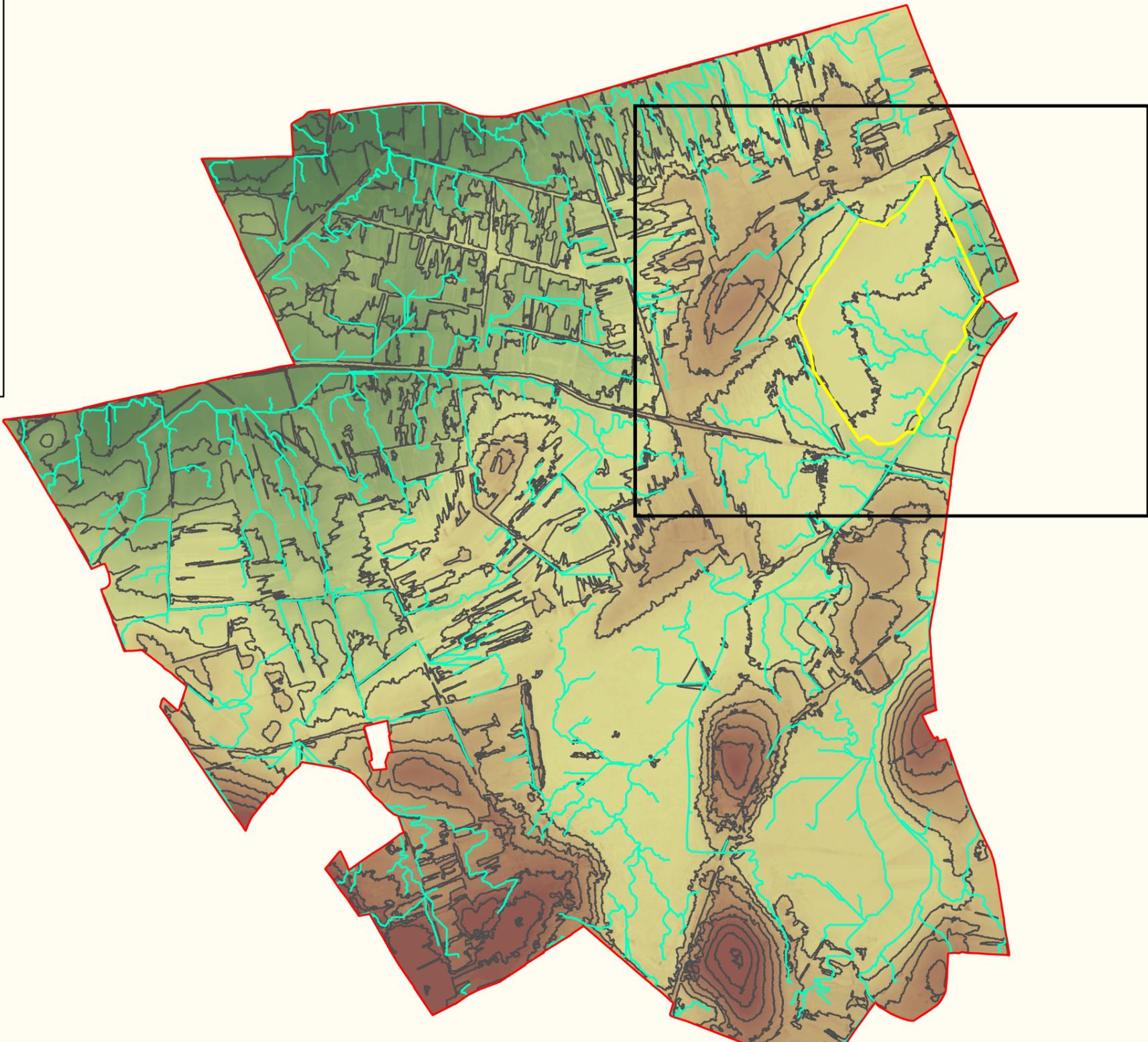
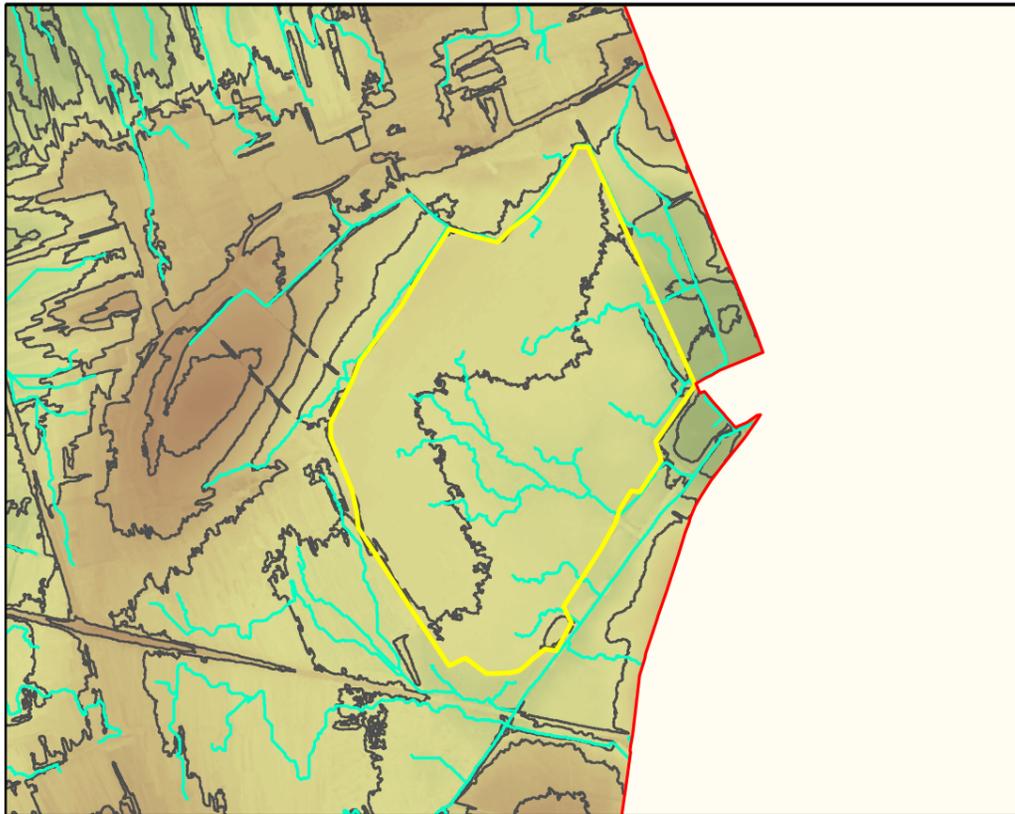
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar comharthaithe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh EN 0059214. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann.

**Map Version 1
Date: Nov 2016**



Legend

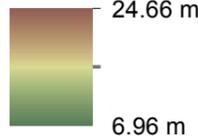
- Tulla Lough and Bog SAC 002343
- High Bog Boundary
- Active Raised Bogs Ecotopes**
- Sub-central ecotope



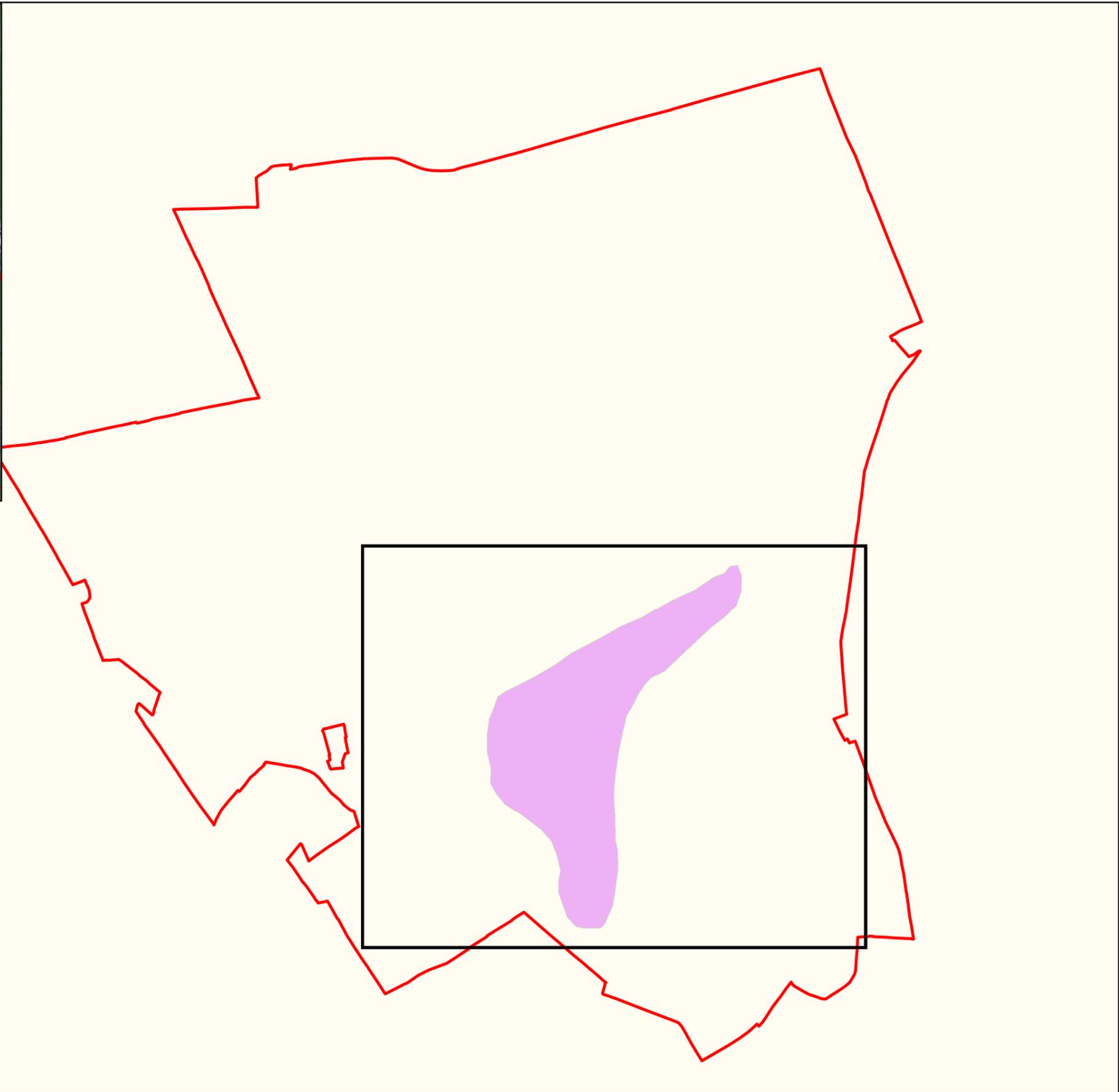
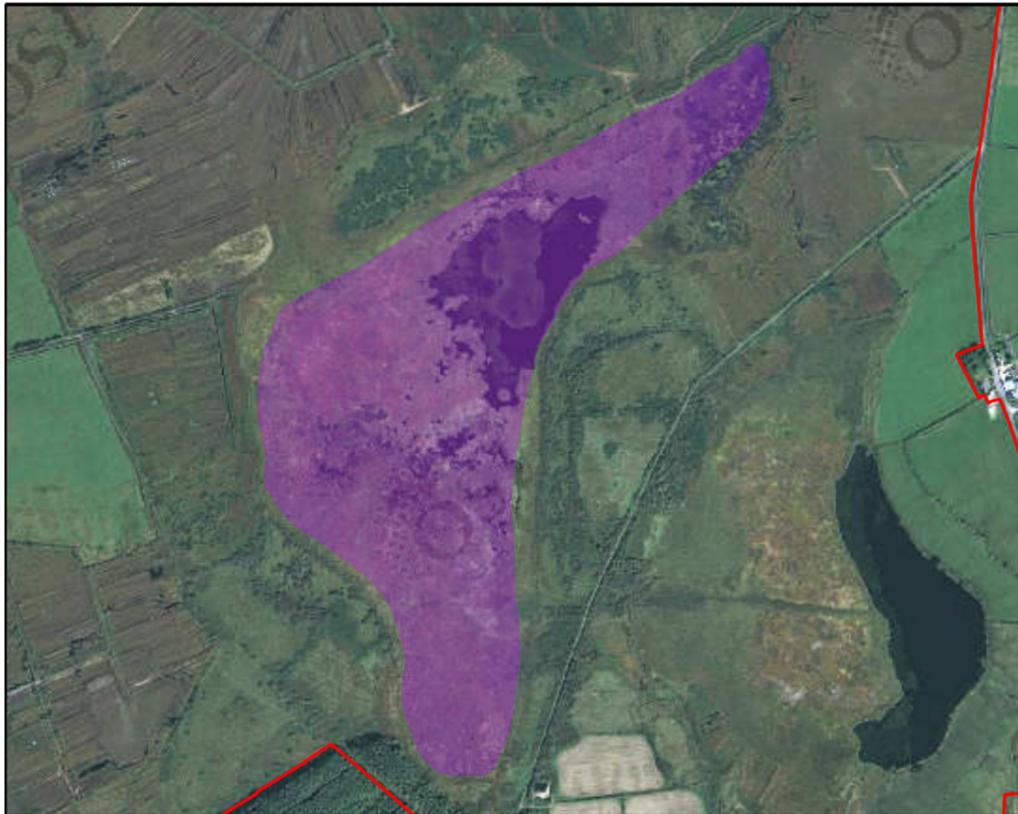
Legend

-  Tulla Lough and Bog SAC 002343
-  High Bog Boundary
-  Drainage Patterns
-  Contour Lines

Elevation



24.66 m
6.96 m



Legend

- Tullaheer Lough and Bog SAC 002343
- Indicative 7140 Indicative transition mires and quaking bogs