



Ramsar Information Sheet

Published on 16 March 2022

Update version, previously published on : 6 December 1988

Ireland Clara Bog



Designation date	6 December 1988
Site number	415
Coordinates	53°19'18"N 07°37'45"W
Area	460,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Clara Bog is located in the midlands of Ireland in the County of Offaly. The nearest large town is Clara which lies approximately 0.5 km north of the site. The large midlands town of Tullamore is 10 km south-east of the site. The site consists of a relatively intact area of raised bog lying between the Brosna River to the north and the Silver River to the south. A series of esker ridges run along the northern fringe of the bog and also at a further distance to the south. Much of the surrounding land is under agricultural production with small areas of commercial forestry on the extreme eastern and western end of the site on lower lying ground. Numerous other raised bogs occur in the general landscape though most of these have been subjected to extensive cutting of peat and drainage, and thus are no longer considered to be active raised bogs. Clara Bog is regarded as one of the most important raised bogs in the country, being the largest remaining example of the true midland sub-type. It has well-developed hummock and hollow complexes, and one of the few remaining soak systems. At Clara, these soaks are mineral-rich pools and small lakes that are fed from groundwater and rain, and support alkaline plant life. The site supports high bog with both active raised bog (wet and actively peat forming) and degraded raised bog which is adversely affected by peat cutting and drainage but is capable of regeneration. The site also supports bog woodland, two rare midges, a rare click beetle and a rare moss. The scarce breeding bird, Merlin is known to breed at this site. Clara Bog has been subject to detailed hydrological and ecological studies and is considered to be one of the best studied bogs in Europe. Clara Bog has been a national nature reserve since 1987.

Clara Bog is a Special Area of Conservation (SAC) under the EU Habitats Directive, as it contains representative and unique examples of natural wetland types within the Atlantic biogeographic region i.e. Active raised bogs, Degraded raised bogs still capable of natural regeneration, Depressions on peat substrates of the Rhynchosporion, Bog woodland and Semi-natural dry grasslands and scrubland facies on calcareous substrates. These habitats are protected under Annex I of the Habitats Directive and active raised bog is listed as a priority habitat.

Clara Bog Nature Reserve has a visitor centre with boardwalk and education services. This SAC is part of the Living Bog Restoration Project.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and address of the compiler of this RIS

Responsible compiler

Institution/agency	National Parks and Wildlife Service, Department of Housing, Local Government and Heritage
Postal address	National Parks and Wildlife Service, 90 North King Street, Smithfield, Dublin, Ireland D07 N7CV

National Ramsar Administrative Authority

Institution/agency	National Parks and Wildlife Service, Department of Housing, Local Government and Heritage
Postal address	National Parks and Wildlife Service, 90 North King Street, Smithfield, Dublin, Ireland D07 N7CV

2.1.2 - Period of collection of data and information used to compile the RIS

From year	<input type="text" value="2004"/>
To year	<input type="text" value="2019"/>

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)	<input type="text" value="Clara Bog"/>
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2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A. Changes to Site boundary	Yes <input type="radio"/> No <input checked="" type="radio"/>
(Update) B. Changes to Site area	No change to area
(Update) For secretariat only: This update is an extension	<input type="checkbox"/>

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?	Not evaluated
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2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<2 file(s) uploaded>

Former maps	<input type="text" value="0"/>
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Boundaries description

Clara Bog Ramsar site follows the same boundary as that of Clara Bog Nature Reserve which was designated in 1987. The Ramsar Site and Nature Reserve are contained entirely within the larger Clara Bog Special Area of Conservation (SAC). The Ramsar site includes the high bog at Clara, while the SAC includes the high bog and the transitional zone between the high bog and surrounding mineral soils. Details of the SAC can be found here: <https://www.npws.ie/protected-sites>. Within the Ramsar site boundary a number of GIS data layers were used to define the Ramsar habitats within the site. These included:

- CORINE (Co-Ordinated Information on the Environment) land cover data sets (2012).
- Bing Maps Aerial - © Harris Corp, Earthstar Geographics LLC © 2017 Intermap Earthstar Geographics SIO © 2017 Microsoft Corporation.
- Environmental Protection Agency of Ireland Rivers and Lakes layers data layers.

The mapped layers were subsequently inspected by a site visit to confirm the presence of the habitats. Habitat areas were subsequently estimated by reference to the available imagery and layers and should be considered representative but approximate.

The mapped area, as calculated from the GIS boundary, differs slightly from the official boundary of the Ramsar site. This is due to historic mapping issues generally as a result of differing mapping projections and variations in high and low water marks.

2.2.2 - General location

RIS for Site no. 415, Clara Bog, Ireland

a) In which large administrative region does the site lie?

b) What is the nearest town or population centre?

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes No

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes No

2.2.4 - Area of the Site

Official area, in hectares (ha):

Area, in hectares (ha) as calculated from GIS boundaries

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Atlantic
EU biogeographic regionalization	Atlantic

Other biogeographic regionalisation scheme

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

- Criterion 1: Representative, rare or unique natural or near-natural wetland types

Hydrological services provided

The nature of a bog is controlled by hydrological processes, its existence depends upon retaining water and its characteristics depend upon the origin, volume, chemical quality and variability of water supply. Peatlands with near natural hydrological conditions are not only important habitats in their own right, but also perform additional functions such as regulating water quality and possibly attenuating hydrological responses in downstream watercourses during high rainfall/storm events to reduce the occurrence and magnitude of floods (Mackin et al, 2015).

Other ecosystem services provided

In their natural state peatlands act as long-term sinks for atmospheric carbon dioxide. A persistently high water table is necessary for this function. Peatlands are the most important long-term carbon store in the terrestrial biosphere. It is highly likely that continued global warming will impact this habitat in the future. In Ireland the long-term carbon storage function of 47% of our original peatland area has been severely diminished through domestic and mechanical peat extraction (Irish Peatland Conservation Council).

Clara Bog is important for its diversity of habitats, plant communities, birds and invertebrates associated with the raised bog habitat. The site is home to hundreds of plant and animal species, with many rare plants totally unique to this site. Restoration works at this site (Living Bog Life Project) sought to restore over 180 hectares of Active Raised Bog at Clara. This is an important location for biological monitoring and for research into raised bog ecology and restoration

Clara Bog provides an important record of peatland history. The history of peat harvesting at this and other raised bog sites in Ireland is presented to the public at the Clara Bog Visitor Centre and the bog is open to tourists and visitors with tours and looped board walks.

Other reasons

Active raised bogs, once characteristic of central Ireland, are now rare and vulnerable, and have been recognised by the E.U. as habitats of international importance. Clara Bog has long been regarded as one of the most important raised bogs in the country, being the largest remaining example of the true midland sub-type.

- Criterion 2 : Rare species and threatened ecological communities

- Criterion 3 : Biological diversity

Justification

Active raised bogs, once characteristic of central Ireland, are now rare and vulnerable, and are well recognised by a number of EU and international conventions as habitats of international importance. The biodiversity of raised bogs, represented by the habitats and species they support, is unique and threatened on a global scale.

- Criterion 4 : Support during critical life cycle stage or in adverse conditions

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification
Plantae								
TRACHEOPHYTA/ LILIOPSIDA	<i>Carex acuta</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LC	<input type="checkbox"/>	Red Listed vascular plant in Ireland	Red Listed species (Near Threatened)
BRYOPHYTA/ BRYOPSIDA	<i>Dicranum undulatum</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Red Listed Bryophyte in Ireland (Regionally Extinct)	Assessed as Regionally Extinct until found at Clara Bog in 2014.
BRYOPHYTA/ BRYOPSIDA	<i>Tetraplodon angustatus</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Flora Protection Order Species. Red Listed Bryophyte in Ireland (Data Deficient)	Only known Irish Station for FPO moss and Red Listed species.

The following data are taken from NPWS (2016):

- The rare moss, Slender/Narrow Cruet-moss (*Tetraplodon angustatus*), was previously recorded at the site, its only known Irish station. This moss is found growing on the scats of carnivores (usually fox), often perched on rocks or mounds of moss in scree and by paths (Atherton et al. 2010). The species was last recorded from the bog in 1988. In Britain it is regarded as a rare northern species, recorded from c. 10 localities (mostly Scottish montane).
- White sedge (*Carex curta*), rare in the south and west of the country, has been recorded in the western part of Lough Roe (Kelly 1993; Crushell 2008). This species (now known as *Carex canescens*) is Red Listed in Ireland and classified as Least Concern (Wyse-Jackson et al, 2016).
- Slender tufted sedge (*Carex acuta*), has only 13 post-1949 10 km records in Ireland. It was recorded by Kelly (Kelly & Schouten 2002) growing in a remnant lagg zone at the north-eastern margin of the bog.
- Waved fork-moss (*Dicranum undulatum*), a moss species previously thought to be extinct in Ireland (Lockhart et al. 2012) has recently been recorded on Clara Bog East.

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion				Species contributes under criterion				Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
		2	4	6	9	3	5	7	8								
Others																	
ARTHROPODA / INSECTA	<i>Euphydrys aurinia</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Annex II species	Annex I species, maintaining biodiversity
ARTHROPODA / INSECTA	<i>Ilybius chalconatus</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Red Listed species in Ireland	National Red List, maintaining biodiversity.
ARTHROPODA / INSECTA	<i>Lasiodiamesa sphagnicola</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>		Only Irish Record for this species. Maintaining biodiversity.
CHORDATA / MAMMALIA	<i>Lepus timidus hibernicus</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Red Listed species in Ireland (Least Concern)	Maintaining biodiversity.
CHORDATA / MAMMALIA	<i>Lutra lutra</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Annex II (Habitats Directive) and Red Listed mammal in Ireland (Least Concern).	Annex II listing, maintaining biodiversity
CHORDATA / AMPHIBIA	<i>Rana temporaria</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	Protected under 1976 Wildlife Act. Red Listed in Ireland (Least Concern)	Maintaining biodiversity.
CHORDATA / REPTILIA	<i>Zootoca vivipara</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	Protected under 1976 Wildlife Act. Red Listed in Ireland (Least Concern)	Maintaining biodiversity.
Birds																	
CHORDATA / AVES	<i>Alauda arvensis</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	Amber Listed (Birds of Conservation Concern in Ireland)	Maintaining biodiversity.
CHORDATA / AVES	<i>Anthus pratensis</i>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>	Red Listed (Birds of Conservation Concern in Ireland)	Red Listed species, maintaining biodiversity breeding
CHORDATA / AVES	<i>Falco columbarius</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input type="checkbox"/>	<input type="checkbox"/>	Annex I (Birds Directive), Amber Listed (Birds of Conservation Concern in Ireland)	Annex listing and National Red Listing, breeding
CHORDATA / AVES	<i>Falco peregrinus</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				LC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Annex I (Birds Directive)	Annex listing foraging
CHORDATA / AVES	<i>Numenius arquata</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				NT	<input type="checkbox"/>	<input type="checkbox"/>	Red-listed (Birds of Conservation Concern in Ireland)	National Red Listing breeding

1) Percentage of the total biogeographic population at the site

According to NPWS (2016) Marsh Fritillary butterfly (*Euphydryas aurinia*), is breeding on the site; this species is afforded protection under Annex II of the EU Habitats Directive.

Mammals recorded from the site include Irish Hare (*Lepus timidus hibernicus*), regularly found on the high bog; Otter (*Lutra lutra*) is recorded from nearby watercourses. The Otter has been protected in Ireland under national legislation since 1976 (Wildlife Act 1976) and is listed on Annex II and Annex IV of the EU Habitats Directive. According to Marnell et al., (2009) the Otter is deemed Near Threatened within Ireland as this species has shown a decline of 20-25% between 1980 and 2006, with most of that occurring in the first decade (i.e. 1980-1990), the cause of this decline is unclear. The IUCN deem the Eurasian Otter to be Near Threatened within Europe and globally.

Amphibians - the Common Frog (*Rana temporaria*) is present at the site; this species is protected on a national level by Wildlife Act, 1976 & Wildlife (Amendment) Act, 2000 and is also listed on the EU Habitats directive Annex V.

Reptiles - Common Lizard (*Lacerta vivipara*) is present on the site; this species is protected on a national level by Wildlife Act, 1976 & Wildlife (Amendment) Act, 2000.

The following notable invertebrate species (mostly from Ryan et al. 1992) have been recorded; however, the current status of these species at the site is not known:

- *Lasiodiamesa sphagnicola* (a bloodworm), the only Irish record for this species is from Clara Bog
- *Parhelophilus consimilis* (a hoverfly), commonly associated with bog pools in Ireland. Its occurrence in Ireland is of international significance.
- *Ampedus pomorum* (a click beetle)
- *Dictaenidia bimaculata* (a large cranefly), localized distribution
- *Argyra elongata* (a fly), highly characteristic of soaks
- *Cordylura rufipes* (a fly) highly characteristic of soaks
- *Llybius chalconatus* (a water beetle) is listed as vulnerable in recent red list (Kingston 2012).

Historical data - The bog formerly had relatively high numbers of Red Grouse (*Lagopus lagopus*), however the most recent record is 1994 and they appear to be locally extinct. Red Grouse has declined in Ireland in recent years and is now a Red-listed species. Greenland White-fronted Geese (*Anser albifrons flavirostris*) listed under Annex I of the EU Birds Directive, also formerly used this bog, but there are no recent records.

3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Depressions on peat substrates of the Rhynchosporion [7150]	<input checked="" type="checkbox"/>		Annex I (Habitats Directive)
Active Raised bog community [7110]	<input checked="" type="checkbox"/>		Annex I (Habitats Directive)
Bog woodland [91D0]	<input checked="" type="checkbox"/>		Annex I (Habitats Directive)
Degraded raised bogs still capable of natural regeneration [7120]	<input checked="" type="checkbox"/>		Annex I (Habitats Directive)

Optional text box to provide further information

The Clara Bog Ramsar site is part of a larger Clara Bog Special Area of Conservation which includes the following Annex I habitats: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*).

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

Clara Bog has long been regarded as one of the most important raised bogs in Ireland, being the largest remaining example of the true midland sub-type. It has well-developed hummock and hollow complexes, and one of the few remaining soak systems. One of the most unusual features of the bog is the presence of an infilling lake which supports mesotrophic fen vegetation. There is an associated soak area which is dominated by a well-developed wet birch woodland. This area of bog woodland is one of the best examples of the habitat in the country and supports a rich invertebrate flora. The largest part of the uncut high bog surface is comprised of degraded raised bog. Although the areas of degraded raised bog have a relatively well-developed raised bog flora, they are affected by water loss both from surface water flow and groundwater losses around the margins of the high bog, and thus the degraded bog tends to be associated with the more marginal, sloping areas of the high bog. Notable species of flora recorded from the site include Slender/Narrow Cruet-moss (*Tetraplodon angustatus*; its only Irish station), White sedge (*Carex curta*), Slender tufted sedge (*Carex acuta*) and Rannoch Rush (*Scheuchzeria palustris*; transplanted to the site and now thought to be extinct). The waved fork-moss (*Dicranum undulatum*), thought to have been extinct in Ireland, was rediscovered at the site in 2014. The site supports a number of species protected under national legislation including the Irish Hare, (*Lepus timidus hibernicus*), the otter (*Lutra lutra*), the common frog, (*Rana temporaria*), the common lizard (*Lacerta vivipara*) and the Marsh fritillary (*Euphydryas aurinia*). The site supports 1-2 pairs of breeding Merlin, a scarce species in Ireland and one that is listed on Annex I of the E.U. Birds Directive. Common bogland species such as Meadow Pipit and Skylark also breed within the site.

4.2 - What wetland type(s) are in the site?

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Lakes and pools >> Tp: Permanent freshwater marshes/pools				
Fresh water > Marshes on peat soils >> U: Permanent Non-forested peatlands	Raised bog	1	464	Unique

4.3 - Biological components

4.3.1 - Plant species

<no data available>

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	% occurrence	Position in range /endemism/other
CHORDATA/AMPHIBIA	<i>Lissotriton vulgaris</i>				

Optional text box to provide further information

Smooth newt (*Lissotriton vulgaris*), a species not typically associated with raised bog has also been reported from soaks and water bodies on Clara Bog.

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
C: Moist Mid-Latitude climate with mild winters	Cfc: Marine west coast (Mild with no dry season, cool summer)

In their natural state peatlands act as long-term sinks for atmospheric carbon dioxide. A persistently high water table is necessary for this function. Climate change may diminish this function if rainfall levels reduce and long periods of drought become a feature of Ireland's climate in the future.

4.4.2 - Geomorphic setting

a) Minimum elevation above sea level (in metres)

a) Maximum elevation above sea level (in metres)

Entire river basin

- Upper part of river basin
- Middle part of river basin
- Lower part of river basin
- More than one river basin
- Not in river basin
- Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

The site consists of a relatively intact area of raised bog lying between the Brosna River to the north and the Silver River to the south.

4.4.3 - Soil

Organic

(Update) Changes at RIS update No change Increase Decrease Unknown

No available information

Are soil types subject to change as a result of changing hydrological conditions (e.g., increased salinity or acidification)? Yes No

Please provide further information on the soil (optional)

Most of the site is underlain by low permeability Waulsortian limestone. The southern section is underlain by relatively impermeable massive limestone. This bedrock is overlain by sands, gravels and boulder clays which in turn are overlain by a layer of lacustrine clay. Shell marl is seen in a few places. The peat layer developed on top of this. (NPWS 2015b)

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually permanent water present	

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from precipitation	<input type="checkbox"/>	No change
Water inputs from surface water	<input type="checkbox"/>	No change
Water inputs from groundwater	<input type="checkbox"/>	No change

Water destination

Presence?	Changes at RIS update
Unknown	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels largely stable	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology.

The ecohydrology of a bog system relies on the maintenance of high water levels in the peat. The “groundwater” found in peat is generally conceptualized as being isolated from “groundwater” in the deeper groundwater body or regional aquifer system. However, this hydrological separation does not apply where peat develops directly on more permeable materials such as gravels and karstified limestone. Under these circumstances hydraulic gradients acting between the wetland and substrate materials can be a determinant in the maintenance of the conservation status of the peatland. Extensive research has confirmed that such a situation prevails at Clara Bog (Regan et al., 2019). While drains within the raised bog itself have a negative impact by causing water loss and subsidence, it has been established that drainage works around the marginal ‘cutover’ southern part of Clara Bog has caused negative impacts on the regional groundwater body by inducing changes in the hydraulic properties of the deep peat, with peat compression decreasing hydraulic conductivity and storativity while simultaneously introducing localized secondary porosity and effective storage.

(ECD) Connectivity of surface waters and of groundwater

see above

4.4.5 - Sediment regime

Sediment regime unknown

4.4.6 - Water pH

Acid (pH<5.5)

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

4.4.7 - Water salinity

Fresh (<0.5 g/l)

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

4.4.8 - Dissolved or suspended nutrients in water

Oligotrophic

(Update) Changes at RIS update No change Increase Decrease Unknown

Unknown

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself: i) broadly similar ii) significantly different

Surrounding area has greater urbanisation or development

Surrounding area has higher human population density

Surrounding area has more intensive agricultural use

Surrounding area has significantly different land cover or habitat types

Please describe other ways in which the surrounding area is different:

Land use in the surrounding lands and catchment is primarily agricultural based on grazing by cattle and sheep, with small amounts of tillage. Small areas of commercial forestry on the extreme eastern and western end of the site on lower lying ground. Scattered rural housing is widespread within the catchment and the medium sized town of Clara is located to the north of the site. Numerous other raised bogs occur in the general landscape though most of these have been subjected to extensive cutting of peat and drainage, and thus are no longer considered to be active raised bog.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Pollution control and detoxification	Water purification/waste treatment or dilution	Low
Climate regulation	Local climate regulation/buffering of change	Medium
Climate regulation	Regulation of greenhouse gases, temperature, precipitation and other climactic processes	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Spiritual and inspirational	Aesthetic and sense of place values	Medium
Spiritual and inspirational	Spiritual and religious values	Medium
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	Medium
Spiritual and inspirational	Inspiration	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High
Scientific and educational	Major scientific study site	High
Scientific and educational	Type location for a taxon	High
Scientific and educational	Educational activities and opportunities	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part	High
Soil formation	Sediment retention	Low
Soil formation	Accumulation of organic matter	Low
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	Low
Nutrient cycling	Carbon storage/sequestration	Low

Outside the site: 10 000s

Have studies or assessments been made of the economic valuation of ecosystem services provided by this Ramsar Site? Yes No Unknown

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland

ii) the site has exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland

iii) the ecological character of the wetland depends on its interaction with local communities or indigenous peoples

Description if applicable

There are currently 460 hectares of Clara Bog in state ownership, but the entire SAC is 837 hectares. The remainder is in private ownership and is owned by several different stakeholders. Raised bog restoration involves partnerships between State bodies, conservation groups and local community groups. The Living Bog Project (EU Life Project) seeks to achieve raised bog restoration at Clara Bog, something which can only be achieved in partnership with other stakeholders including the local community.

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
National/Federal government	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Private ownership

Category	Within the Ramsar Site	In the surrounding area
Other types of private/individual owner(s)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Provide further information on the land tenure / ownership regime (optional):

Majority of the site is owned by NPWS (Statutory Nature Reserve) with the remainder under multiple private ownership.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

National Parks & Wildlife Service (NPWS), Department of Culture, Heritage and the Gaeltacht.
Offaly County Council.
Environmental Protection Agency (EPA).
Department of Communications, Climate Action and Environment.

Provide the name and/or title of the person or people with responsibility for the wetland:

Maurice Eakin

Postal address:

National Parks and Wildlife Service,
90 North King Street,
Smithfield, Dublin,
Ireland
D07 N7CV

E-mail address:

maurice.eakin@housing.gov.ie

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Housing and urban areas	Low impact	Medium impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Water regulation

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Drainage	High impact	High impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Agriculture and aquaculture

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Wood and pulp plantations	unknown impact	Low impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change
Livestock farming and ranching	unknown impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Energy production and mining

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Mining and quarrying	unknown impact	Medium impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Roads and railroads	Medium impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Biological resource use

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	unknown impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input type="checkbox"/>	No change

Natural system modifications

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Vegetation clearance/land conversion	Low impact	Medium impact	<input checked="" type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Agricultural and forestry effluents	unknown impact	Medium impact	<input type="checkbox"/>	No change	<input checked="" type="checkbox"/>	No change

Please describe any other threats (optional):

Threats listed above are taken from NPWS 2015a.

5.2.2 - Legal conservation status

Regional (international) legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
EU Natura 2000	Clara Bog SAC Site Code: 000572.	https://www.npws.ie/protected-sites/sac/000572	whole

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
National Reserve	Clara Bog	https://www.npws.ie/nature-reserves/offaly	whole

5.2.3 - IUCN protected areas categories (2008)

- Ia Strict Nature Reserve
- Ib Wilderness Area: protected area managed mainly for wilderness protection
- II National Park: protected area managed mainly for ecosystem protection and recreation
- III Natural Monument: protected area managed mainly for conservation of specific natural features
- IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
- V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
- VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Measures	Status
Legal protection	Implemented

Habitat

Measures	Status
Habitat manipulation/enhancement	Implemented
Land conversion controls	Implemented
Hydrology management/restoration	Implemented

Human Activities

Measures	Status
Regulation/management of wastes	Implemented
Livestock management/exclusion (excluding fisheries)	Implemented
Research	Implemented
Regulation/management of recreational activities	Implemented
Harvest controls/poaching enforcement	Implemented

Other:

The Clara Bog Ramsar site lies within the Clara Bog SAC. Under European and national legislation Ireland must maintain at favourable conservation status areas designated as Special Areas of Conservation and/or Special Protection Areas. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites. Conservation objectives of this site have been set for the SAC; these can be accessed on NPWS.ie. The main objectives are

- To maintain the Annex I habitat for which the SAC has been selected at favourable conservation status i.e. Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia), Active raised bogs (priority habitat), Degraded raised bogs still capable of natural regeneration, Depressions on peat substrates of the Rhynchosporion and Bog woodland.

It is Departmental policy that no hunting occurs on State-owned lands, such as Clara Bog Nature Reserve.

Clara Bog is part of the The Living Bog – Raised Bog Restoration Project (LIFE14 NAT/IE/000032) underway at 12 bogs across 7 counties in Ireland, thanks to EU LIFE Nature & Biodiversity funding and further assistance from the Dept of Arts, Heritage, Regional, Rural and Gaeltacht Affairs. <http://raisedbogs.ie/about-the-living-bog/>

5.2.5 - Management planning

Is there a site-specific management plan for the site? In preparation

Has a management effectiveness assessment been undertaken for the site? Yes No

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning processes with another Contracting Party? Yes No

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site:

Clara Bog is a national nature reserve and has a visitor centre with educational facilities and a board walk across the bog. This site is part of an EU Life Raised Bog restoration project - the Living Bog.

<https://www.clarabognaturereserve.ie/>
<http://raisedbogs.ie/about-clara-bog/>

URL of site-related webpage (if relevant): <https://www.clarabognaturereserve.ie/> <http://raisedbogs.ie/about-clara-bog/>

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? Yes, there is a plan

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Water regime monitoring	Implemented
Water quality	Implemented
Birds	Implemented
Animal community	Implemented
Plant species	Implemented

As an EU Natura 2000 site, it is required under Article 17 of the EU Habitats Directive that the status and trends of the conservation objectives within the site are monitored and reported on every 6 years. The Living Bog –Raised Bog Restoration Project monitors the site. The site is regularly inspected by the National Parks and Wildlife Service Conservation Rangers.

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

Colhoun, K. and Cummins, S. 2013. Birds of conservation concern in Ireland 2014-2019. *Irish Birds* 9: 523-544

Crushell, P.H. (2008) Soak Systems of an Irish Raised Bog: a multidisciplinary study of their origin, ecology, conservation and restoration. PhD thesis, Wageningen University'

Foster, G. N., Nelson, B. H. & O Connor, Á. (2009) Ireland Red List No. 1 – Water beetles. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland

Kingston, N. (2012) Checklist of protected & rare species in Ireland. Unpublished National Parks & Wildlife Service Report.

Kelly, M.L. (1993) Hydrology, Hydrochemistry and Vegetation of two raised bogs in County Offaly. Thesis for Doctor of Philosophy. TCD.

Kelly, L. & Schouten, M.G.C. (2002) Vegetation. In: Schouten, M.G.C. (ed.), Conservation and restoration of raised bogs: geological, hydrological and ecological Studies. Dúchas – The Heritage Service of the Department of the Environment and Local Government, Ireland; Staatsbosbeheer, the Netherlands; Geological Survey of Ireland, Dublin. pp. 110-169.

Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) Ireland Red List No.8: Bryophytes. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Mackin, F., Flynn, R., Arbuckle, L. and A.G. Barr. The Role of Hydrology in Restoring Ireland's Raised Bogs: A Review of a Nationwide Study.

Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Regan, S., Flynn, R., Gill, L., Naughton, O., & Johnston, P. (2019). Impacts of groundwater drainage on peatland subsidence and its ecological implications on an Atlantic raised bog. *Water Resources Research*, 55, 6153–6168.

Ryan, J., Warner, P. & Douglas, C. (1992) Management Plan for Clara Bog National Nature Reserve, Co. Offaly. Unpublished report to the National Parks and Wildlife Service, Dublin.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

NPWS (2016) Conservation Objectives: Clara Bog SAC 000572. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

NPWS (2015a) Natura 2000 Form: Clara Bog SAC 000572. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015b) Site Synopsis: Clara Bog SAC 000572. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

IUCN Red List of Threatened Species 2007: e.T19518A8950866. Downloaded on 11 November 2017

<http://raisedbogs.ie/about-the-living-bog/>

<http://www.ramsar.org>

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)

<no file available>

iii. a description of the site in a national or regional wetland inventory

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<no file available>

vi. other published literature

<no file available>

<no data available>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Clara Bog (NPWS, May 2013)



Active Raised Bog displaying Sphagnum magellanicum low hummocks and lawns and Sphagnum cuspidatum pools. (Fernando Fernandez, 24-03-2011)



Sphagnum magellanicum & S. cuspidatum lawns within a soak system at Clara West. (Fernando Fernandez, 11-03-2016)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation 1988-12-06