

RESTORING ACTIVE BLANKET BOG IN IRELAND

Project reference: LIFE02NAT/IRL/8490

A REPORT ON THE RESTORATION OF PROJECT SITE No. 13.
CROAGHONAGH, CO. DONEGAL.



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Project Site No. 13 – Croaghonagh North, Co. Donegal (Demonstration site)**1. Introduction**

Grid reference H 055 887	Elevation (m) 170	Bedrock geology Sandstone
SAC Name and number Croaghonagh Bog (129)	Site area (ha) 33.0	Main restoration methods Drain-blocking with plastic dams
Area of conifer cover (ha) 0	Area of open bog/heath (ha) 33.0 (c. 8 ha drained)	
Noteworthy plant/animal species occurring <i>Sphagnum imbricatum</i> , <i>Sphagnum fuscum</i> .		

Croaghonagh North comprises 33 hectares of lowland blanket bog located close to Lough Mourne in the Barnesmore Gap, approximately 8 kilometres southwest of Ballybofey, Co. Donegal. The site lies within the Croaghonagh Bog Special Area of conservation which supports some of the best examples of wet lowland blanket bog in the county. The site adjoins two good examples of lowland oligotrophic lake habitat namely Lough Mourne and Lough Carn.

The majority of the project area consists of two portions of unplanted bog both of which lie within the SAC. The northern portion can be divided into two parts an intact north-eastern half and a drained, but unplanted, south-western half. The intact portion of the bog is a good example of intact, active blanket bog which is dominated by species such as purple moor-grass (*Molinia caerulea*), single-headed cotton-grass (*Eriophorum vaginatum*) and cross-leaved heath (*Erica tetralix*) with numerous wet pool areas and a high cover of *Sphagnum* mosses, including the uncommon species *Sphagnum imbricatum* and *S. fuscum*. The smaller southern portion of the site comprises blanket bog on sloping ground beside a stream and is much drier than the northern portion.

The primary restoration measure at this site involves the blocking of the drain network to the north of Lough Carn in order to raise the watertable and rehabilitate the blanket bog habitat. This network of drains was ploughed in the early 1990's however trees were not subsequently planted.

2. Methods

Prior to the start of restoration activities at the site the habitats and vegetation occurring were surveyed and described. Habitats occurring were mapped with the aid of a vertical aerial photograph of the site taken in the year 2000 by the Ordnance Survey of Ireland.

The vegetation occurring at the site was described using the Zurich-Montpellier approach (Mueller-Dombois and Ellenberg, 1979), where the percentage cover of the various vegetation layers and plant species in a defined area is estimated visually. The cover of plant species in relevés was estimated in accordance with the Domin scale which is outlined in the table below.

Table 1. The Domin scale of cover/abundance.

1 = <4% cover with few individuals
2 = <4% cover with several individuals
3 = <4% cover with many individuals
4 = Cover between 4 and 10%
5 = Cover between 11 and 25%
6 = Cover between 26 and 33%
7 = Cover between 34 and 50%
8 = Cover between 51 and 75%
9 = Cover between 76 and 90%
10 = Cover between 91 and 100%

In addition to plant species presence and cover, the following parameters were noted for each relevé:

- (1) Size
- (2) Percentage cover of vegetation, bare soil, water and rock.
- (3) Percentage cover and height of the different vegetation layers, e.g. shrub, dwarf shrub, herb and bryophyte.
- (4) Soil type and depth.
- (5) Slope and aspect.
- (6) Additional details, such as the composition of the surrounding vegetation, degree of grazing and disturbance.

During the initial fieldwork a number of colour photographs of the site and vegetation encountered were taken with a digital camera and a selection of these are presented in this report in order to illustrate the vegetation descriptions and changes in the habitats/vegetation present over time. Mosses, liverworts and higher plants not readily identified in the field were collected and keyed out at a later date using keys in the appropriate publications (see below). During the field survey, particular attention was paid to the possible occurrence of plant and animal species which are considered to be rare in both a

national and local context with particular emphasis on animal species listed in Annex II of the E.U. Habitats Directive and plant species listed in the Irish Red Data Book for vascular plants (Curtis and McGough, 1988), the 1999 Flora Protection Order and Annex II of the E.U. Habitats Directive.

Plant species nomenclature in this report follows Stace (1997) for vascular plant, Smith (2004) for mosses, Smith (1991) for liverworts and Dahl (1968) for lichens.

3. Site Photographs

In order to show the restoration activities which have taken place at this site a number of photographs are presented in the following pages. These include both aerial photographs, supplied by the Ordnance Survey of Ireland, and a selection of ground photographs taken by the author.



An aerial photograph of the northern portion of the site prior to restoration work taking place. Note the extensive network of linear drains to the north-west of Lough Carn. Aerial photograph taken in the year 2000.



At this site an area of blanket bog was drained but not subsequently planted. These drains are

approximately 4 metres apart and are generally c. 1 metre deep. Photographs taken during 2003/2004.



Drains were blocked during 2003/2004 using plastic piling dams.



Drains tend to be dominated by a sparse growth of *Eriophorum angustifolium*.

4. Vegetation of the Site

At this site vegetation description was concentrated in the area of drained blanket bog where restoration work was concentrated. The vegetation is generally dominated by typical blanket bog species such as *Molinia caerulea*, *Racomitrium lanuginosum*, *Erica tetralix*, *Calluna vulgaris* and *Cladonia portentosa*, however there is a variation in the degree of species-richness which is related to the degree of drainage. The drier areas of bog, located closer to the drains, are relatively species-poor and tend to be dominated by *Molinia caerulea* and *Racomitrium lanuginosum* while more species-rich vegetation, with a higher cover of Sphagnum, is also to be found. The drains contain relatively little recolonizing vegetation apart from sparse growths of *Eriophorum angustifolium* with *Sphagnum cuspidatum* also occasionally found in the drains which have permanent water. Examples of this drain vegetation is presented in the monitoring quadrat section.

Table 2. Vegetation table for drained lowland blanket bog at Croaghonagh.

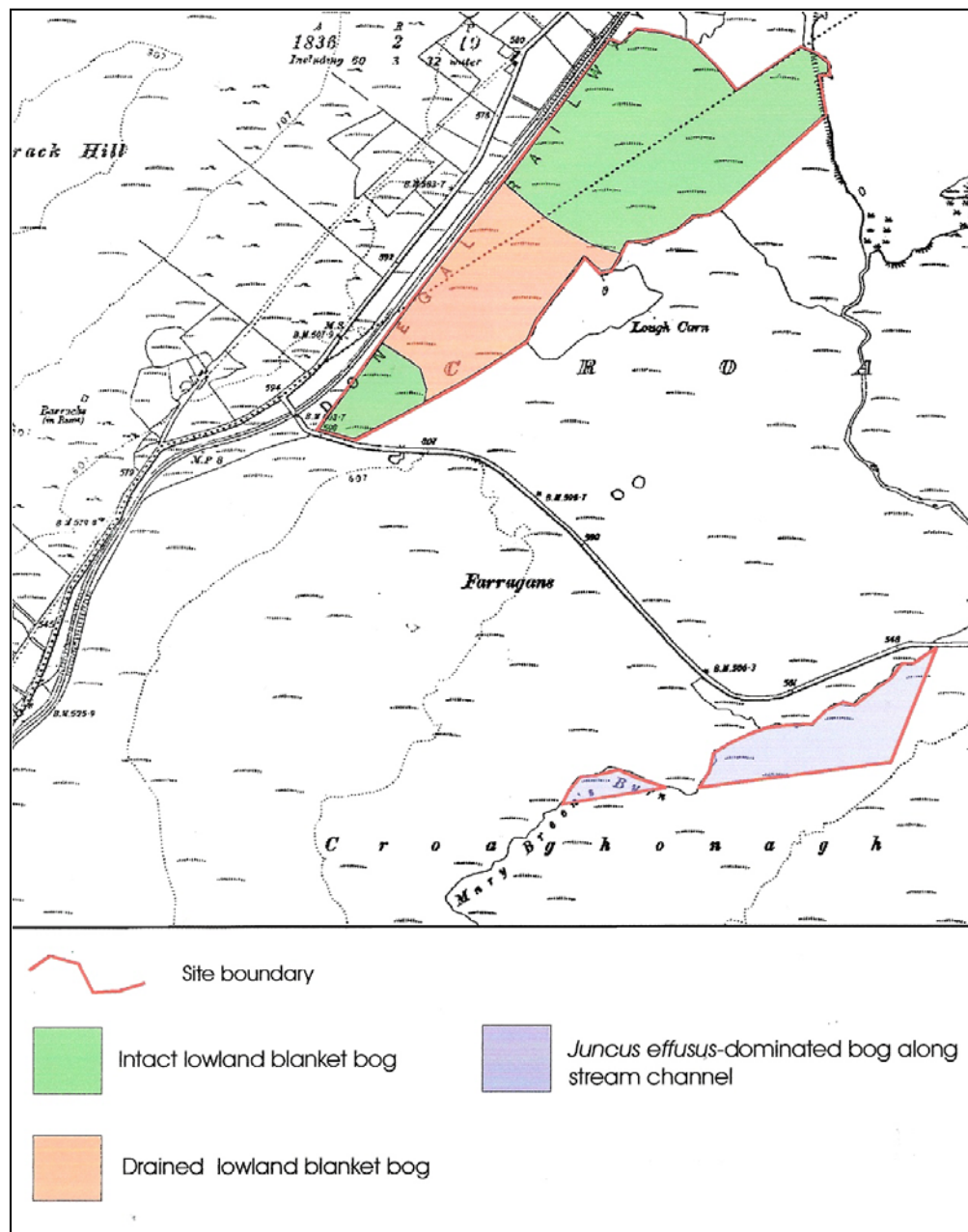
Quadrat code	CW5	CW6	CW7	CW4	CW8	CW9	CW11	CW12	CW1	CW2	CW3	CW10	
Quadrat size (m ²)	4	4	4	4	4	4	4	4	4	4	4	4	
Slope (degrees)	0-3	1-5	1-3	0-3	0	0	0	0-5	0-3	0-5	5-10	0	
Vegetation cover (%)	100	100	100	100	100	100	98	90	100	100	95	98	
Bare rock (%)	0	0	0	0	0	0	0	0	0	0	0	0	
Bare soil (%)	0	0	0	0	0	0	2	3	0	0	5	3	
Open water (%)	0	0	0	0	0	0	0	7	0	0	0	0	
Dwarf shrub cover (%)	20	35	30	25	40	30	20	45	40	30	20	30	
Herb cover (%)	80	70	75	85	70	70	75	75	70	60	60	80	
Bryophyte cover (%)	60	80	85	90	70	90	70	40	85	85	60	90	
Ht. of vegetation (cm)	20	25	15	20	20	20	15	15	15	10	15	15	
No. of species	10	11	11	13	15	13	15	14	16	16	15	21	
<i>Molinia caerulea</i>	8	8	8	8	7	8	5	6	8	6	6	5	
<i>Racomitrium lanuginosum</i>	7	5	8	9	8	9	6	6	8	8	6	8	
<i>Erica tetralix</i>	5	4	5	5	7	5	5	5	5	5	5	5	
<i>Calluna vulgaris</i>	3	5	5	4	4	5	3	4	5	5	4	4	
<i>Cladonia portentosa</i>	5	7	5	4	5	4	5	4	4	4	4	4	
<i>Potentilla erecta</i>	4	4	4	3	3	3	3	3	3	3	1	3	
<i>Pleurozia purpurea</i>	1	1	1	3	3	3	5	4	3	4	3	4	
<i>Polygala serpyllifolia</i>	1	1	2	1	1	2	1	1	1	1	1	1	
<i>Eriophorum vaginatum</i>			4	5	4	3	5	4	4	5	5	5	
<i>Sphagnum tenellum</i>		3			3	3	4	1		3	1	3	
<i>Sphagnum capillifolium</i>	3	7			4	4			4	5	1	4	
<i>Trichophorum cespitosum</i>				3	3	3	5	4		5	4	4	
<i>Narthecium ossifragum</i>			3		3		5	4	1	3	4	4	
<i>Eriophorum angustifolium</i>				4	1	1	6	5		4	5	5	
<i>Cladonia uncialis</i>	1		3	1		1	1		1	3	3	1	
<i>Sphagnum subnitens</i>					4			3	3			4	
<i>Sphagnum papillosum</i>									3	4		4	
<i>Hypnum cupressiforme</i>		4							1			1	
<i>Odontoschisma sphagni</i>		3							1			3	
<i>Drosera rotundifolia</i>							1					1	
<i>Campylopus atrovirens</i>				1									
<i>Myrica gale</i>								4					
<i>Sphagnum imbricatum</i>												3	
<i>Sphagnum</i>												1	

cuspidatum

Vegetation survey carried out on the 5/6/2003

5. Changes in overall vegetation/habitat cover

The rate of vegetation change at this site following drain blocking appears to be very slow. Monitoring quadrats at this site were located in the drains as those areas were thought to be where vegetation change would be first to occur. Three years after drain blocking however there is still little observable change in the composition and cover of drain vegetation. Sphagnum cover is still low and it is likely that the widespread natural recolonization of Sphagnum in these drains will take a substantial length of time. This process could be accelerated by the harvesting of *Sphagnum cuspidatum* from other areas of the site and moving them to the drains.



A habitat/vegetation map of the Craighonagh site.

6. Monitoring quadrats

In the following pages a number of permanent quadrats taken from blocked drains are presented. A total of 6 permanent quadrats were described and photographed at this site. In the case of each quadrat photographs and vegetation tables are presented. In order to ensure the future relocation of quadrats the corners have been marked with short sticks and a 10-figure GPS reading was also recorded. The cover of plant species within the quadrats is presented in accordance with the scale outlined in the following table.

Cover of species in quadrat	Cover in presented quadrat tables
<1%	1
1 to 5%	2
5 to 10%	3
10 to 25%	4
25% to 50%	5
50 to 75%	6
75% to 100%	7

The observed vegetation changes in these quadrats following drain-blocking have been small, however this is not surprising as the site is quite exposed and the main expected recolonizing species, i.e. *Sphagnum cuspidatum*, is rare in the adjoining blanket bog. As outlined previously, if a more rapid colonization of *S. cuspidatum* in the drains is required then the transfer of the species from other pool areas within the site will be required.



Permanent quadrat 1 – September 2004



Permanent quadrat 1 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 1		
Near Walrag? – No		
GPS – H 05591 88774		
Size – 3m x 0.7m		
Slope – +/- 0 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	10	10
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	10	10
Bryophyte cover (%)	0	0
No. of plant species	1	2
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	4	4
<i>Molinia caerulea</i>		1
<p>History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.</p>		



Permanent quadrat 2 – September 2004



Permanent quadrat 2 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 2		
Near Walrag? – No		
GPS – H 05608 88741		
Size – 3m x 0.7m		
Slope – 2 to 5 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	10	20
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	10	20
Bryophyte cover (%)	0	0
No. of plant species	2	2
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	4	4
<i>Drosera rotundifolia</i>	1	-
<i>Molinia caerulea</i>		2
<p>History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.</p>		



Permanent quadrat 3 – September 2004



Permanent quadrat 3 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 3		
Near Walrag? – No		
GPS – H 05651 88757		
Size – 3m x 0.7m		
Slope – +/-0 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	25	20
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	15	10
Bryophyte cover (%)	10	10
No. of plant species	3	3
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	4	4
<i>Sphagnum cuspidatum</i>	4	4
<i>Rhynchospora alba</i>	2	1
<i>Narthecium ossifragum</i>		1
<p>History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.</p>		



Permanent quadrat 4 – September 2004



Permanent quadrat 4 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 4		
Near Walrag? – No		
GPS – H 05697 88771		
Size – 3m x 0.7m		
Slope – +/-0 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	55	75
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	30	35
Bryophyte cover (%)	30	45
No. of plant species	4	4
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	5	5
<i>Sphagnum cuspidatum</i>	5	5
<i>Utricularia</i> sp.	4	3
<i>Sphagnum papillosum</i>	3	3
<p>History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.</p>		



Permanent quadrat 5 – September 2004



Permanent quadrat 5 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 5		
Near Walrag? – No		
GPS – H 05661 88709		
Size – 3m x 0.7m		
Slope – <3 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	10	20
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	10	15
Bryophyte cover (%)	0	5
No. of plant species	2	3
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	3	4
<i>Utricularia</i> sp.	2	2
<i>Sphagnum papillosum</i>		3
<p>History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.</p>		



Permanent quadrat 6 – September 2004



Permanent quadrat 6 – September 2007

Site – Croaghonagh		
Perm. Quadrat No. - 6		
Near Walrag? – No		
GPS – H 05640 88708		
Size – 3m x 0.7m		
Slope – <3 degrees		
Vegetation Height (m)	20 to 30	20 to 30
Vegetation cover (%)	30	30
Open water cover (%)	100	100
Dwarf shrub cover (%)	0	0
Herb cover (%)	30	30
Bryophyte cover (%)	0	0
No. of plant species	2	1
Survey date	17/9/04	13/9/07
<i>Eriophorum angustifolium</i>	5	5
<i>Molinia caerulea</i>	2	-
History – Area drained in the early 1990's but trees not subsequently planted. Drains blocked with plastic piling in the summer of 2003.		

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