

RESTORING RAISED BOG IN IRELAND
Project Reference: LIFE04 NAT/IE/000121

A REPORT ON THE RESTORATION OF PROJECT SITE No. 14

COOLRAIN BOG, Co. LAOIS



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Project Site No. 14 - Coolrain Bog, Co. Laois

1. Introduction

Grid Reference IS2766 9121	Elevation (m) 110	Bedrock Geology Old Red Sandstone
SAC Name and Number Coolrain Bog cSAC (2332)	Project Site Area (ha) 56.5	Main Restoration Methods Clear-fell mature conifer crop Fell to Waste young conifers Block drains with peat dams Block drains with plastic dams Control natural regeneration
SAC Area (ha) 141		
Area of Conifer Cover (ha) 44.4	Area of Open Bog (ha) 10.1	Area of Birch Woodland (ha) c2.0
Noteworthy habitats/plant/animal species present Priority Annex I Habitat, Bog Woodland, of the EU Habitats Directive, occurs on high bog Annex I Species, Merlin, of EU Birds Directive, noted breeding on site		

General site description

Coolrain Bog cSAC is situated 4 km north-east of Borris-in Ossory, Co. Laois. The site comprises a raised bog that includes both areas of high bog and cutover bog. The northern margin is bounded by the Tonet River and the eastern boundary by forestry and old cutover. Peat-cutting and associated tracks occur to the south and west. Apart from the marginal slopes associated with cutover, the bog is relatively flat. Although the bog has no permanent pools, it has well-developed *Sphagnum* hummocks. There are four Pine flushes on the bog, three in the centre of the site and one to the north. These flushes may result from subsidence which directs surface water flow through certain areas of the high bog (NPWS, 2002).

Much of the high bog has vegetation typical of the Midland Raised Bog type consisting of Ling Heather (*Calluna vulgaris*) and Cranberry (*Vaccinium oxycoccos*) on the hummocks with Bog-rosemary (*Andromeda polifolia*), often found in the hollows. Hare's-tail Cotton-grass (*Eriophorum vaginatum*), Common Cotton-grass (*E. angustifolium*), Deer-grass (*Trichophorum caespitosum*) and Bog Asphodel (*Narthecium ossifragum*) are all prominent species. Bog Moss (*Sphagnum* spp.) cover is good with *S. magellanicum*, *S. capillifolium*, *S. imbricatum*, *S. papillosum* and *S. cuspidatum* all recorded on the site. There are four prominent Pine flushes found on the high bog. These flushes, which are dominated by Scot's Pine (*Pinus sylvestris*) with scattered Lodgepole Pine (*Pinus contorta*) have an understory of Downy Birch (*Betula pubescens*) and support abundant moss cover. These flushes represent Bog Woodland, which is listed as Priority Annex I Habitat in the E.U. Habitats Directive. Around the margins of the high bog the lichens *Cladonia portentosa* and *C. uncialis* are found in abundance. The abandoned old cutover is colonized by Cotton-grasses, Purple Moor-grass (*Molinia caerulea*) and Soft Rush (*Juncus effusus*) or by broadleaved woodland dominated by Downy Birch (NPWS, 2002).

Current landuse on the site consists of peat-cutting at the high bog margins and forestry on the cutover bog. East of the bog, old cutover has been planted with Lodgepole Pine, some of which have naturally colonized the high bog surface. Coolrain Bog is subject to high levels of domestic peat-cutting, primarily along the southern margins and this has resulted in the drying out of the adjacent high bog. The forestry and peat-cutting activities have resulted in the loss of habitat and damage to the hydrological status of the site.

Project Site Description (Pre-restoration)

The project area consists of 44.4 hectares of conifer plantation, planted on cutover bog and 12.1 of high bog. Coillte owns about half of the total intact dome area within the cSAC and contains two of the pine flushes. The remainder of the project site is divided into approximately equal areas of young replanted conifers and mature conifer plantation. The site was surveyed in 2003, prior to restoration, which found that the young plantation to the north consisted of poorly growing Sitka Spruce (*Picea stichiensis*) and Lodgepole Pine on damp to wet, shallow cut-over bog. This area grades down, with no obvious drainage outlets, to a narrow floodplain on the Tonet River. The clear-felled conifer plantation to the east consisted largely of Lodgepole Pine and Sitka Spruce on dry cut-over, most of which has been recently felled and not yet replanted (Conaghan, 2003).

Description of intact bog vegetation adjoining the planted areas

Most of the Coillte-owned, intact bog dome can be described as undifferentiated wet bog. It is flat, having no natural pool/hummock system. The bog vegetation is a uniform cover of co-dominant Ling Heather and Hare's-tail Cotton-grass with an unusually widespread and common presence of Cranberry. The surface has a generally good spongy cover of a variety of *Sphagnum* spp and can be said to be in fairly good condition. Two isolated Pine flushes or 'soaks' occur within the Coillte-owned bog. These are natural features exhibiting signs of mineral enrichment having, for example, abundant Cranberry and Crowberry (*Empetrum nigrum*). They also contain Scots pine (probably self-seeded) and one Oak. Lodgepole pine has self-seeded onto them but on one of the soaks they have already been felled to waste by hand. A small section in the north has dry Ling Heather with encroachment of Scots pine. The north-west edge of the bog is abandoned cut-over with a mosaic of dry and damp Ling Heather and Birch wood with patches of Purple Moor-grass in hollows and especially along old drainage lines. Most of the eastern edge of the dome is being actively cut for peat. The resulting cut-over is highly disturbed and often quite bare. There appear to be no drains leading from the dome to the cut-away.

Restoration Actions

At this site the main restoration measures undertaken was the clear-felling and removal of the mature conifer crop, felling to waste of young conifers, wind-rowing of the remaining brash and blocking of drains with peat dams in the clear-fell area and with plastic dams in the fell to waste area. Follow-up work included the control of the natural regeneration of conifer seedlings.

It is most unlikely that the large, recently felled area on dry cut-over could be restored to bog but it may be developed into a wet bog woodland-type which would be consistent with the overall bog restoration goals for the site. There is a system of main drains which are flowing towards the access road. A wet woodland could be created if the water table was raised by blocking these drains to a certain level (without affecting the turbary areas behind) and allow regeneration of Birch and Willow (Conaghan, 2003).

Merlin have been observed breeding in an old hooded crow's nest in a stunted Scot's Pine (*Pinus sylvestris*) on the most northerly flush. Self-seeded Lodgepole Pine have not yet been felled here so any felling should be carried out from September to December, and Scot's pines retained. Merlin is listed in Annex 1 of the E.U. Birds' Directive.

2. Methods

Prior to the start of restoration activities at the site, the habitats and vegetation occurring was surveyed and described (Conaghan, 2003). During the initial restoration work of 2005, permanent quadrats were established on each of the vegetation types within the project site.

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.

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 photographs taken by the Project Ecologist in order to illustrate the vegetation descriptions and changes in the habitats/vegetation present over time.

4. Vegetation of Project Site

Three-quarters (13 ha) of the plantation on dry cut-over to the east of the site was felled in 2002 and has not yet been replanted. The remainder is Lodgepole Pine with Sitka Spruce, due for felling in 2014. Poorly developed conifers with both a wet and a dry under-storey occur on cutover to the north of the site. There is a mosaic of Sitka spruce and Lodgepole Pine of varying quality throughout. A shallow peat bank at the dome has a wet drain filled with *Sphagnum cuspidatum*. The under-storey, comprises lush Ling Heather with cushions of *Sphagnum capillifolium*. In places, the presence of Purple Moor-grass indicates some flushing or groundwater influence. Towards the floodplain of the river the peat becomes a thin layer over a gravelly substrate overlain by drier Ling Heather. Drains are present, running towards the river but they do not have an outlet to the river.

5. Changes in Overall Vegetation/Habitat Cover

Much of the site is now cleared of conifers and brash. The brash which remained after clear-felling has been wind-rowed to allow bog vegetation to re-colonise the exposed peat surface. With the removal of conifers and blocking of drains, there was a rise in the water-table, which allowed for the colonisation of *Sphagnum* mosses.

6. Vegetation Monitoring Quadrats

The vegetation changes which have taken place within the site over the period of the restoration project are shown by means of observed changes in permanent quadrats. Six permanent quadrats were installed on this site, which were described and photographed to monitor changes in vegetation over time. In order to ensure the future position of quadrats the corners have been marked with short stakes and an 8-figure GPS reading was also recorded. Each 10m x10m quadrat, was photographed annually and vegetation tables are presented below.

Quadrat 1: This quadrat was located towards the eastern margin of the project site and occurred on recently clear-felled conifer plantation with a ground cover containing Ling Heather, Willow-herb and some *Hypnum* moss. With the felling of the conifers and blocking of drains, it can be seen that Birch, Ling Heather cover increased along with Willow-herb. There is some natural regeneration of conifer seedlings, which needs to be controlled. Over time, if conditions remain the same, birch woodland will dominate this bog margin, retaining an understory of Ling Heather and the Willow-herb will die out.

Coolrain Quadrat 1

Area: 10 x 10m

Bog Type: Cutover

Landuse: Forestry

Location: 10m West W1

Ecotope: NA

Management: Clearfell

Grid Ref: S2741 9118

Slope: Slight

Altitude: 99m

Aspect: East

Date	19/08/2005	16/08/2006	27/08/2007	17/07/2008
Firmness	Very Dry	Firm	Firm	Firm
Drains	Yes	Yes/blocked	Yes/Blocked	Yes/Blocked
Canopy Cover %	0%	5	0	5
Canopy Height	0	1	0	2
Vegetation Cover %	50%	65	50	75
Vegetation Height (m)		30	30	50
Dwarf Shrub Cover %	30%	30	40	50
Herb Cover %	20%	35	25	25
Bryophyte Cover %	27%	35	25	30
Sphagnum cover %	5%	5	5	5
Open Water %	0%	0	0	0
Brash cover %	10%	20	20	10
Pine Needle cover %	0%	10	10	5
Pine Needle Depth cm	10	10	1	1
Bare Peat %	40%	5	10	10
Species number	11	10	9	11
<i>Pinus contorta</i>		1	1	1
<i>Betula pubescens</i>	3%	10	10	15
<i>Rubus spp</i>	5%	5	5	5
<i>Hedera helix</i>	1%			
<i>Lonicaria periclymenum</i>		1		2
<i>Molinia caerulea</i>		2		
<i>Holcus lanatus</i>	1%			
<i>Pteridium spp</i>	1%		1	1
<i>Epiobium spp</i>	10%	20	10	10
<i>Calluna vulgaris</i>	30%	30	40	50
<i>C. pixidata</i>			1	1
<i>Campylopus atroverins</i>	1%	1		
<i>Hypnum jutlandicum</i>	20%	30	20	20
<i>Polytricum commune</i>	1%			5
<i>S. subnitens</i>	5%	5	5	5

Coolrain Quadrat 1, 2005



Coolrain Quadrat 1, 2008



Quadrat 2: This quadrat was located on the north-eastern margin of the high bog and supports raised bog vegetation of Ling Heather, Cross-leaved Heath, Bog Asphodel, Hare's-tail Cotton-grass, Deergrass and *Sphagnum* moss. Over time, as the adjoining cutover becomes wetter, conditions on this margin will improve and *Sphagnum* cover may increase further.

Coolrain Quadrat 2

Area: 10 x 10m

Location: Marginal Lobe

Grid Ref: S2735 9174

Altitude: 96m

Bog Type: Highbog

Ecotope: Marginal

Slope: Slight

Aspect: West

Landuse: Unplanted

Management: Non-intervention

Date	19/08/2005	16/08/2006	27/08/2007	17/07/2008
Firmness	Soft	Firm	Soft	Soft
Drains	No	Non-int	No	No
Canopy Cover %	0%	0	0	0
Canopy Height	0	0	0	0
Vegetation Cover %	95%	95	95	95
Vegetation Height (m)	30	30	30	20
Dwarf Shrub Cover %	40%	40	40	50
Herb Cover %	55%	55	55	45
Bryophyte Cover %	40%	50	40	46
Sphagnum cover %	50%	45	40	45
Open Water %	0%	1	0	1
Brash cover %	0%	0	0	0
Pine Needle cover %	0%	0	0	0
Pine Needle Depth cm	NA	0	0	0
Bare Peat %	5%	0	5	4
Species number	13	15	11	19
<i>Calluna vulgaris</i>	35%	30	30	30
<i>Erica tetralix</i>	5%	10	10	20
<i>Narthecium ossifragum</i>	15%	15	20	20
<i>Trichophorum caespitosum</i>	7%	10	10	5
<i>Eriophorium vaginatum</i>	30%	20	20	10
<i>E. angustifolium</i>				2
<i>Rhyncospora alba</i>	5%	5	5	5
<i>Andromeda polifolia</i>	1%	2		1
<i>Drosera rotundifolia</i>	5%	3	2	2
<i>Cladonia portentosa</i>	30%	25	20	20
<i>C. pixidata</i>		1		
<i>Hypnum cupressiforme</i>				1
<i>Hypnum jutlandicum</i>		5		
<i>S cuspidatum</i>				1
<i>S. capillifolium</i>	20%	20	20	20
<i>S. papillosum</i>		1		1
<i>S. tenellum</i>				1
<i>S. subnitens</i>	20%	10	10	10
<i>S. magellanicum</i>	9%	15	10	10
<i>S. imbricatum</i>	1%			1
<i>S. fuscum</i>				2

Coolrain Quadrat 2, 2008



Quadrat 3: This quadrat was located towards the northern margin of the raised bog and occurred on cutover bog under open canopy of young conifers. The ground cover contained Ling Heather, Cross-leaved Heath, Hare's-tail Cottongrass and Purple Moor-grass with some *Sphagnum* moss. With the felling to waste of the conifers and blocking of drains, it can be seen that Ling Heather, Cotton-grass and *Sphagnum* dominate. There is some natural regeneration of birch seedlings, which needs to be controlled. Over time, if conditions remain wet, *Sphagnum* cover will increase further and active raised bog habitat may be established.

Coolrain Quadrat 3

Area: 10 x 10m

Location: 30m North W4

Grid Ref: S2705 9117

Altitude: 101m

Bog Type: Cutover

Ecotope: NA

Slope: Distinct

Aspect: North

Landuse: Forestry

Management: Fell to Waste

Date	19/08/2005	16/08/2006	27/08/2007	17/07/2008
Firmness	Firm	Firm	Firm	Firm
Drains	Yes	Yes/Blocked	Yes/blocked	Yes/blocked
Canopy Cover %	0%	0	0	0
Canopy Height	0	0	0	0
Vegetation Cover %	85%	80	80	75
Vegetation Height (m)	30	50	50	50
Dwarf Shrub Cover %	70%	30	30	40
Herb Cover %	15%	25	30	35
Bryophyte Cover %	50%	80	60	60
Sphagnum cover %	20%	40	20	30
Open Water %	0%	0	0	0
Brash cover %	10%	15	20	15
Pine Needle cover %	0%	5	0	5
Pine Needle Depth cm	NA	1	0	1
Bare Peat %	5%	0	0	2
Species number	7	10	9	13
<i>Betula pubescens</i>		5	5	5
<i>Molinia caerulea</i>	5%	10	10	5
<i>Pteridium</i> spp				1
<i>Epiobium</i> spp				1
<i>Calluna vulgaris</i>	60%	30	30	40
<i>Erica tetralix</i>	10%			
<i>Eriophorium vaginatum</i>	10%	10	10	15
<i>E. angustifolium</i>		2	2	5
<i>Vaccinium oxycoccos</i>			2	3
<i>Cladonia portentosa</i>			5	1
<i>Campylopus atroverins</i>				1
<i>Hypnum jutlandicum</i>	30%	40	40	30
<i>Sphagnum recurvum</i>	10%			
<i>S. capillifolium</i>		15	10	20
<i>S. subnitens</i>	10%	25	10	10
<i>S. magellanicum</i>		1		

Coolrain Quadrat 3, 2005



Coolrain Quadrat 3, 2008



Quadrat 4: This quadrat was located in Bog Woodland habitat under an open canopy of conifers. The ground cover contained Ling Heather, Cross-leaved Heath, Crow-berry, Cotton-grasses and abundant *Sphagnum* mosses. Bog woodland is a Priority Annex I Habitat of the EU Habitats Directive and adds to the ecological importance of this site. Therefore no restoration actions occurred here and the Bog Woodland vegetation was retained.

Coolrain Quadrat 4

Area: 10 x 10m

Location: Bog woodland

Grid Ref: S2694 9170

Altitude: 105m

Bog Type: Highbog

Ecotope: Bog Woodland

Slope: Slight

Aspect: North

Landuse: Non-intervention

Management: Non-intervention

Date	19/08/2005	16/08/2006	27/08/2007	17/07/2008
Firmness	Very Soft	Soft	Very Soft	Very Soft
Drains	No	No	No	No
Canopy Cover %	25%	20	15	20
Canopy Height		2	2	2
Vegetation Cover %	100%	100	100	100
Vegetation Height (m)	30	30	50	50
Dwarf Shrub Cover %	80%	60	60	70
Herb Cover %	40%	40	40	30
Bryophyte Cover %	90%	90	85	80
Sphagnum cover %	70%	70	65	70
Open Water %	0%	0	0	0
Brash cover %	0%	0	0	0
Pine Needle cover %	0%	0	0	0
Pine Needle Depth cm	NA	0	0	0
Bare Peat %	0%	0	0	0
Species number	14	17	17	18
<i>Pinus contorta</i>		5	5	10
<i>P. Sylvestris</i>	20%		10	10
<i>Betula pubescens</i>	5%	15	1	1
<i>Empetrum nigrum</i>	20	15	5	5
<i>Calluna vulgaris</i>	60%	40	50	55
<i>Erica tetralix</i>	10%	5	5	10
<i>Narthecium ossifragum</i>	5%	5	10	5
<i>Eriophorium vaginatum</i>	20%	30	20	15
<i>Andromeda polifolia</i>	5%	2	3	3
<i>Drosera rotundifolia</i>		5	2	5
<i>Vaccinium oxycoccos</i>	10%	5	5	2
<i>Cladonia portentosa</i>	10%	15	10	10
<i>Hypnum jutlandicum</i>	20%	20	20	10
<i>S. capillifolium</i>	20%	30	30	30
<i>S. papillosum</i>		1		
<i>S. tenellum</i>				5
<i>S. subnitens</i>	50%	30	20	20
<i>S. magellanicum</i>		5	10	10
<i>S. imbricatum</i>	5%	5	5	5

Coolrain Quadrat 4, 2005



Coolrain Quadrat 4, 2008



Quadrat 5: This quadrat was located towards the centre of the high bog and occurred on active raised bog supporting Ling Heather, Cross-leaved Heath, Bog Asphodel and Hare's-tail Cottongrass with abundant *Sphagnum* moss. As this area supports active raised bog habitat, no restoration measures were carried out and the active raised bog habitat was protected.

Coolrain Quadrat 5

Area: 10 x 10m

Location: 50m East W3

Grid Ref: S2700 9161

Altitude: 103m

Bog Type: High bog

Ecotope: Sub-Central

Slope: Slight

Aspect: North

Landuse: Unplanted

Management: Non-intervention

Date	19/08/2005	16/08/2006	27/08/2007	17/07/2008
Firmness	Very Soft	Soft	Very Soft	V. Soft/quaking
Drains	No	No	No	No
Canopy Cover %	0%	0	0	0
Canopy Height	0	0	0	0
Vegetation Cover %	100%	100	100	100
Vegetation Height (m)	30	30	30	30
Dwarf Shrub Cover %	40%	30	45	45
Herb Cover %	55%	70	55	55
Bryophyte Cover %	65%	65	65	70
Sphagnum cover %	55%	60	55	65
Open Water %	0%	0	0	0
Brash cover %	0%	0	0	0
Pine Needle cover %	0%	0	0	0
Pine Needle Depth cm	0	0	0	0
Bare Peat %	0%	0	0	0
Species number	12	15	12	16
<i>Calluna vulgaris</i>	30%	25	35	35
<i>Erica tetralix</i>		5	10	10
<i>Narthecium ossifragum</i>	20%	15	20	15
<i>Eriophorum vaginatum</i>	30%	40	30	30
<i>E. angustifolium</i>				5
<i>Andromeda polifolia</i>	5%	2		1
<i>Drosera rotundifolia</i>	1%	2	3	2
<i>Vaccinium oxycoccos</i>		1	2	
<i>Cladonia portentosa</i>		1	20	20
<i>C. fleurkiana</i>	1%			
<i>C. uncilais</i>	5%	5		5
<i>C. introflexus</i>	5%	1		
<i>Hypnum jutlandicum</i>	5%	5	10	5
<i>S. capillifolium</i>	20%	15	20	20
<i>S. tenellum</i>				5
<i>S. subnitens</i>	30%	20	10	20
<i>S. magellanicum</i>		20	20	10
<i>S. imbricatum</i>	5	15	5	5
<i>S. fuscum</i>				5

Coolrain Quadrat 5, 2005



Coolrain Quadrat 5, 2008



Quadrat 6: This quadrat was located in the north-western conifer plantation and occurred under closed canopy conifers with a ground cover containing some Ling Heather, Purple Moor-grass, *Hypnum* and *Sphagnum* mosses, but mainly consisted of pine needles. With the felling of the conifers and blocking of drains, Ling Heather, Purple Moor-grass and *Sphagnum* dominate along with encroaching birch. Over time, wet birch woodland will dominate this area with a ground flora of bog vegetation.

Coolrain Quadrat 6

Area: 10 x 10m

Location: 30m South-east W2

Grid Ref: S2756 9142

Altitude: 105m

Bog Type: Cutover

Ecotope: NA

Slope: Slight

Aspect: North

Landuse: Forestry

Management: Clearfell

Date	16/08/2006	27/08/2007	17/07/2008
Firmness	Firm	Firm	Firm
Drains	Yes/Blocked	Yes/Blocked	Yes/Blocked Peat
Canopy Cover %	0	0	0
Vegetation Cover %	45	70	80
Vegetation Height (m)	20	20	20
Dwarf Shrub Cover %	15	40	40
Herb Cover %	30	30	40
Bryophyte Cover %	35	45	40
Sphagnum cover %	5	10	5
Open Water %	10	10	2
Brash cover %	10	5	5
Pine Needle cover %	30	30	10
Pine Needle Depth cm	5	1	1
Bare Peat %	5	0	3
Species number	17	15	18
<i>Betula pubescens</i>	1	2	5
<i>Salix</i> spp.			1
<i>Sorbus</i>	2	1	3
<i>Ilex aquillinum</i>	1		2
<i>Rubus</i> spp.	5	5	5
<i>Lonicaria periclymenum</i>			1
<i>Potentilla erecta</i>		2	
<i>Molinia caerulea</i>	10	5	5
<i>Pteridium</i> spp.	5	10	10
<i>Epiolobium</i> spp.		5	
<i>Empetrum nigrum</i>			2
<i>Vaccinium myrtillus</i>	5	1	5
<i>Calluna vulgaris</i>	10	40	35
<i>Erica tetralix</i>			3
<i>Eriophorium vaginatum</i>			3
<i>E. angustifolium</i>		5	2
<i>Campylopus atroverins</i>	1	10	5
<i>Hypnum jutlandicum</i>	30	20	20
<i>Polytricum commune</i>	1	5	10
<i>Sphagnum recurvum</i>	2		
<i>S cuspidatum</i>		5	5
<i>S. capillifolium</i>	1	5	
<i>S. magellanicum</i>	1		

Coolrain Quadrat 6, 2008



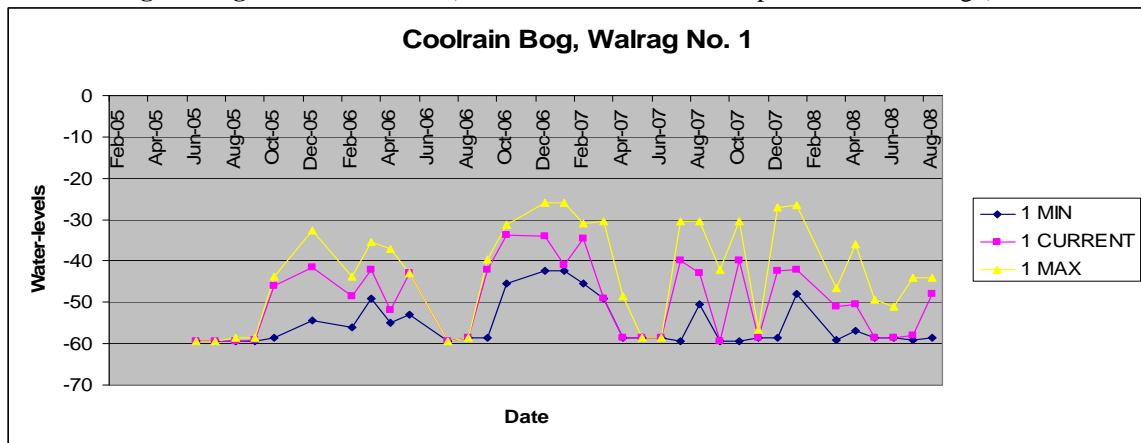
7. Changes in Water-levels

During restoration work, Walrags were installed in the conifer plantation to record any changes in water-levels, due to tree removal and drain blocking. Water-levels were found to be up to **60cm** below the surface. With the removal of conifers and drain-blocking, there was a rise in the water-table within the project site, remains close to the bog surface throughout most of the year.

8. Hydrological Monitoring (Walrag) Graphs

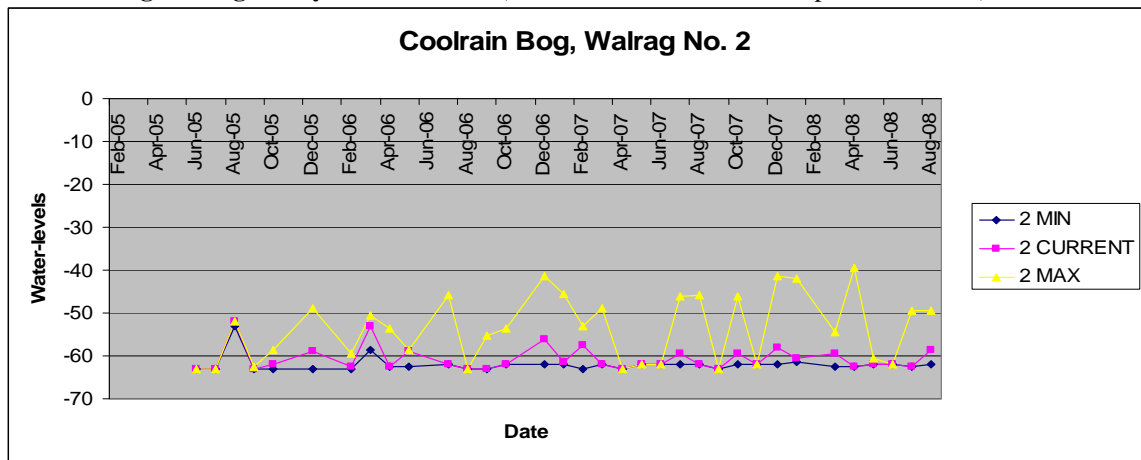
During the clear-felling operation, eight Walrags were installed on this site to record the changes in water-levels. The rise in water-levels is clearly seen in the following graphs.

Coolrain Bog Walrag 1: Clearfell 2004 (Limited rise in water-levels post Drain Blocking*)



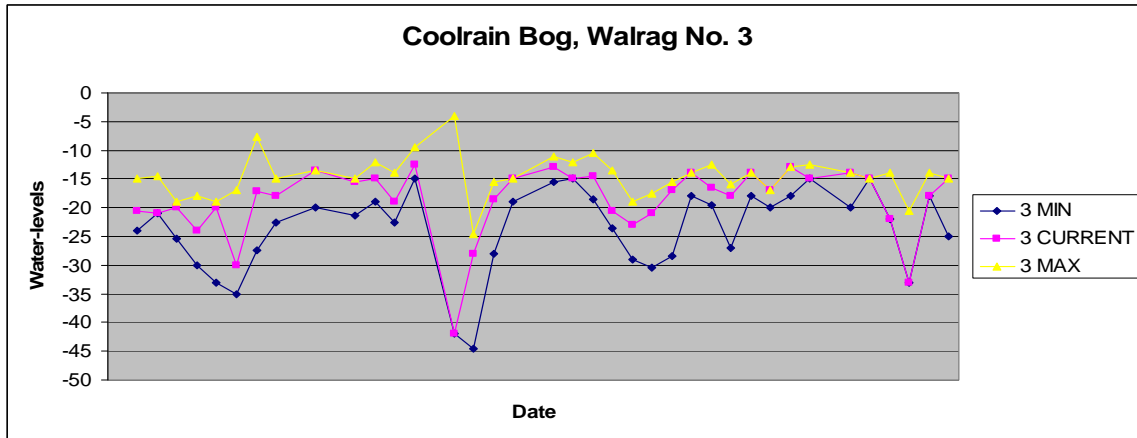
Feb 2005 (Installed) *Drain-blocking Feb2006 Feb2007 Aug 2008

Coolrain Bog Walrag 2: Dry Clearfell 2005 (Limited rise in water-levels, post restoration)



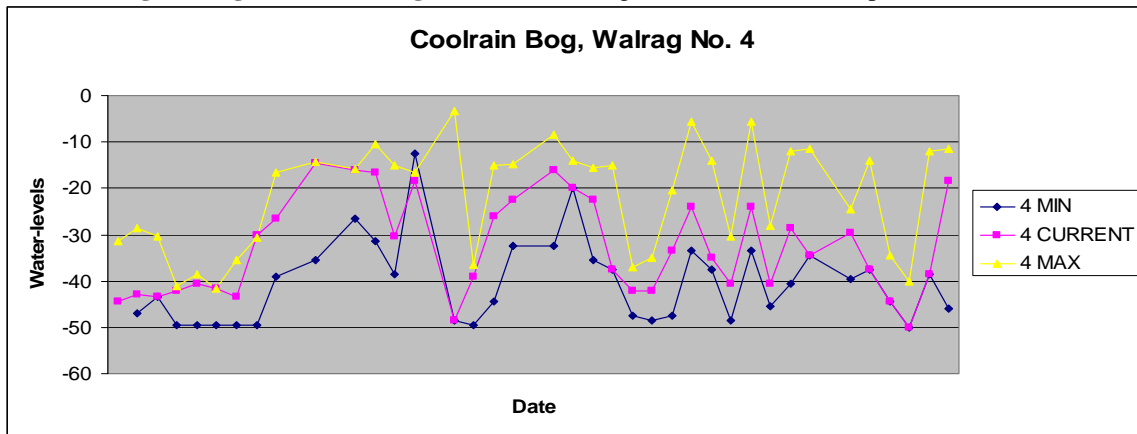
Feb 2005 (Installed) Feb 2006 Feb 2007 Aug 2008
*Clearfell & Drain-blocking

Coolrain Bog Walrag 3: Open Bog, (Distinct drop in water-levels during summer months)



Feb 2005 (Installed) Aug 2005 Aug 2006 Aug 2007 Aug 2008

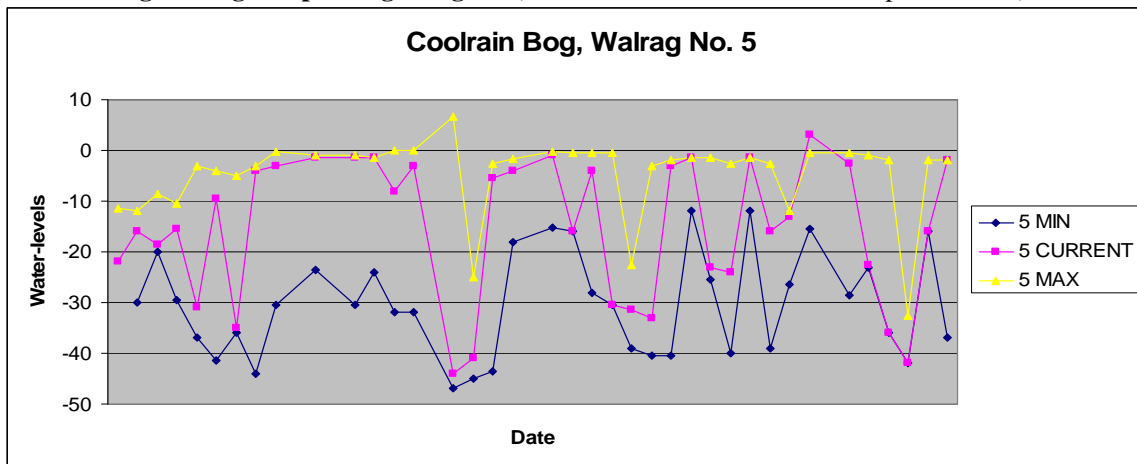
Coolrain Bog Walrag 4: Cutover Bog, fell to waste (Slight rise in water-levels post restoration*)



Feb 2005 (Installed) *Aug 2005 Aug 2006 Aug 2007 Aug 2008

*Clearfell & Drain-blocking

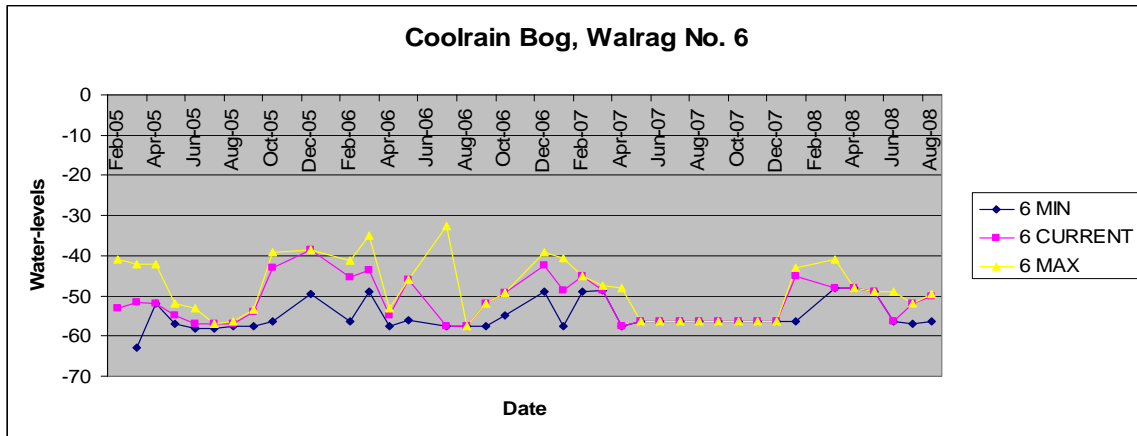
Coolrain Bog Walrag 5: Open Bog Marginal (Variable water-levels, distinct drop in summer)



Feb 2005 (Installed) *Aug 2005 Aug 2006 Aug 2007 Aug 2008

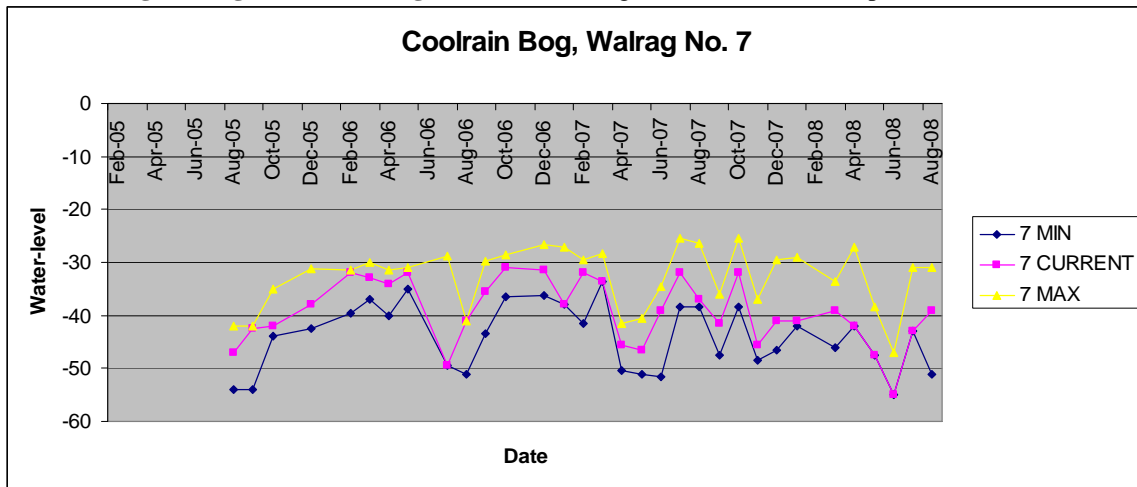
*Clearfell & Drain-blocking

Coolrain Bog Walrag 6: Clearfell 2004, (Limited rise in water-levels post Drain Blocking)



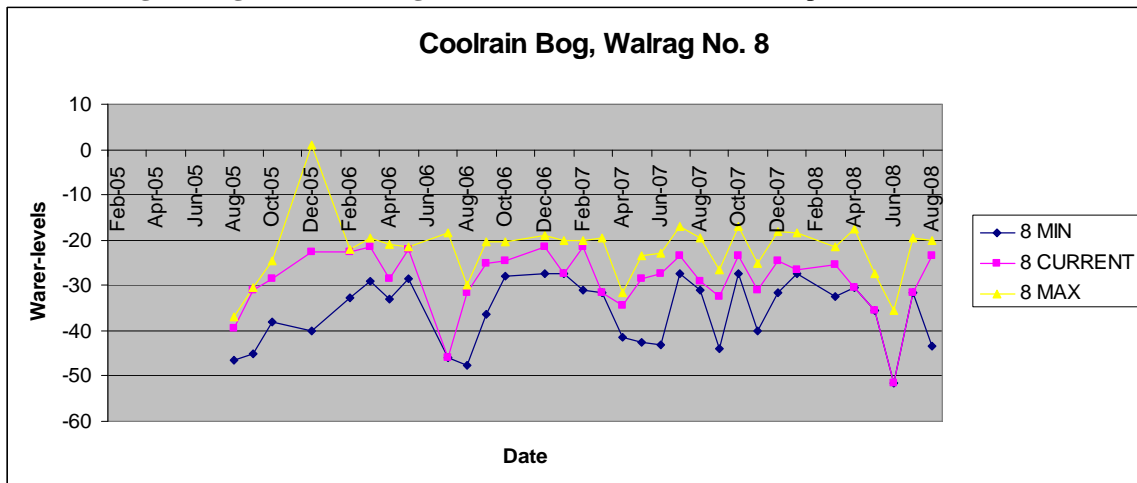
Feb 2005 (Installed) *Aug 2005
*Clearfell & Drain-blocking Aug 2006 Aug 2007 Aug 2008

Coolrain Bog Walrag 7: Cutover Bog, fell to waste (Slight rise in water-levels post restoration*)



Feb 2005 *Aug 2005 (Installed)
*Clearfell & Drain-blocking Aug 2006 Aug 2007 Aug 2008

Coolrain Bog Walrag 8: Cutover Bog, fell to waste (Rise in water-levels post restoration*)



Feb 2005 *Aug 2005 (Installed)
*Clearfell & Drain-blocking Aug 2006 Aug 2007 Aug 2008

9. Conclusion

There are good prospects for the restoration of the raised bog habitat and also of damp Birch woodland on adjacent cut-over at this site. This diverse site has good potential for active raised bog and bog woodland habitat restoration. The open high bog will benefit from restoration work on adjacent cutover, which will reduce water loss from the raised bog system. The fell to waste areas on cutover have good potential for raised bog habitat restoration, due to high water-levels. The clearfell areas on cutover bog are somewhat limited due to the proximity of turbury and will revert to wet birch woodland over time.

10. References

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