RAISED BOG RESTORATION PROJECT

A CONTINUATION OF THE INVESTIGATION INTO THE CONSERVATION AND RESTORATION OF SELECTED RAISED BOG SITES IN IRELAND

PART 3
SITE REPORTS
CLONYDONNIN- DAINGEAN

A REPORT TO DÚCHAS, THE HERITAGE SERVICE, DUBLIN.

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March 2000

CLONYDONNIN, CO. OFFALY

1. SUMMARY OF SITE DETAILS

NHA no.:	565	6" Sheet:	OY 6+7, WH 36
Grid Ref.:	N122 335	1:126,000 Sheet	15
O.S. Aerial Photo:	37B(6747)	1:50,000 Sheet:	48
Other Photo:	N561	Area (ha):	95.07ha
Date(s) of Visit:	20/1/2000		

Townlands: Clonydonnin, Corracullin, Esker, Castletown, Bolinarra.

2. INTRODUCTION

2.1 BACKGROUND

This site was selected because although it was extensively drained, it was reported to have good restoration potential as the drains are shallow. There is also very little active peat cutting apparent from the aerial photograph.

The 1986 bog survey states that 50% of the bog was burnt and devoid of pools. There wer some tear pools in the north-east.

The 1993 NHA survey found poor vegetation due to burning and drainage. The drains were shallow (50cm) and could be blocked. The bog edges were relatively intact.

2.2 LOCATION AND ACCESS

A good sized bog located on the Offaly-Westmeath border, 8km south-west of Moate. It can be accessed off the local road R444 between Shannonbridge and Moate.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Moate G.S. weather station for the years 1960-73 indicates that the area recieves appproximately 939mm of rainfall annually (R). The nearest synoptic station at Birr indicates that the site has up to 150 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Birr of 454 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 939 - 454 = 485mm.
(See Fig. 1)

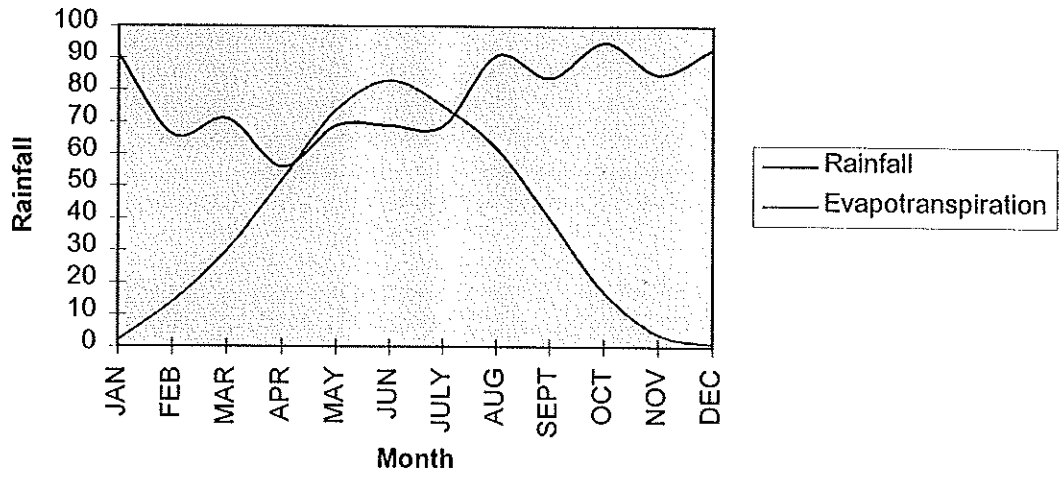


FIG. 1: Meteorology for Clonydonnin

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

This bog has gradual, internal slopes associated with drainage. To the west, there is an extensive slope westwards to the margin, through a tear pool system. There are also marginal slopes associated with the cutaway.

4.1.2 Slopes of the High Bog

Slopes 1: A series of marginal slopes associated with cutaway (75cm/50m).

Slope 2: A gradual slope eastwards towards cutaway (25cm/100m).

Slope 3: An internal slope south-east across the high bog associated with the drainage system (50cm/100m).

Slope 4: An internal slope running south-west towards the margin associated with the drainage system (50cm/100m).

Slope 5: A series of internal slopes running north-west towards the margin (50cm/100m).

Slope 6: A marginal slope associated with a tear pool system (50cm/50m).

4.2 TOPOGRAPHY OF THE BOG MARGINS

The cutaway to the north-east is the only extensive area of cutaway. It is level and below the height of the road and therefore is suitable for restoration work. However, it adjoins level reclaimed fields. The level cutaway to the north and south-west has been reclaimed for agriculture. There is a thin margin of cutaway to the north-west and south-east which adjoins sloping agricultural land.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

This bog is underlain by argillaceous Bioclastic limestone (ABL) according to the GSI/Chevron series maps.

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peats

The peat at this site was classified by Hammond as Man-Modified.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

This bog has an extensive drainage system in the south-east which covers over half of the bog. These are water-filled and in-filling and would be suitable for restoration work.

Drain D1: An old drain 0.5m wide, 1m deep with a small flow of water off the bog in the east. It is lined with *Calluna vulgaris*. At its western end where it is joined by D8 this drain is 0.5m wide with 10cm of water flowing eastwards. This drain if blocked would help reflooding of the high bog. Where it is joined by D6 it is completely water filled with some *Sphagnum cuspidatum* in the water and *S. capillifolium* at the margins. The surrounding area is flooded and very wet.

Drain D2: The first in a series of drains running from the southern bog margin to D1, clearly visible on the aerial photo. It is 0.5m wide and 0.5m deep with 10cm of water. It is a recently excavated drain with no vegetation in the drain itself. It is lined by *Calluna vulgaris*.

Drain D3: One of a series of drains which are 20m apart and are similar, being 0.5m wide and 0.5m deep. This drain, however, has 25cm of water with some *Sphagnum cuspidatum* and is in-filling from the margins with *S. capillifolium*, *Calluna vulgaris* and *Eriophorum angustifolium*. There is no apparent flow.

Drain D4:The next drain is also 0.5m wide and 0.5m deep but the water at its base is flowing to D1. It is lined with *Calluna vulgaris* and closing over in places.

Drain D5: This is also 0.5m wide and 0.5m deep. There is 10cm of water with no flow. It is lined with *Calluna vulgaris*, *Campylopus introflexus* and *Cladonia floerkeana*. There has been a recent burn here.

Drains D6: A series of three drains which are similar, being 0.5m wide and 0.5m deep with 10cm of water. There is no vegetation in the drains and no flow.

Drains D7: Similar to previous drains but these are closing over and only 30cm wide. They are lined with tall *Calluna vulgaris*. There is a slight flow of water towards active peat cutting.

Drains D8: A series of five drains all 0.5m wide, 0.5m deep with 10cm of water and burnt margins.

Drain D9: The final drain in this series. It is also 0.5m wide and 0.5 m deep with 10 cm of water, but the margins are unburnt. Where this drain joins D1 it is completely water-filled with *Sphagnum cuspidatum*. Water is flooding out of the drains at this point. Water flowing into D1 where it flows to the east.

Drains D10 and D11: Two drains at south-west margin which link the drains of D8 to the cutaway. Drain D10 runs parallel to the margin and drains into D11. Both drains are 0.5m wide and 1m deep with 20cm of water. They are lined with *Calluna vulgaris* and *Molinia caerulea*.

Drain D12: A drain running from D1 to the north-east margin. It is 0.5m wide and 1m deep with 10cm of water. It is algal and lined with *Calluna vulgaris*.

Drain D13: A completely in-filled drain 0.5m wide and in-filled with *Calluna vulgaris*.

5.2.2 Bog Margin Hydrology

The limited drainage noted in the cutaway margins is associated with old peat cuttings and the road running to the east of the site.

Drain d1: A large drain running alongside the road to the east of the bog. It is 1.5m wide and water-filled with very little flow To the south of the bog-track. There is some *Typha latifolia* present and it is bordered by *Betula pubescens* and *Ulex europaeus* with *Agrostis* spp and *Rubus fruticosus*. There is some dumping here. To the north of the bog-track there is some outflow with the water freely flowing at this point. The base is stoney here, stream-like.

Drain d2: A 1m wide drain in old cutaway, which is 1m deep with water at its base. It is lined with *Ulex europaeus* scrub and there is some *Juncus effusus* present.

Drain d3: Old *Ulex europaeus* covered drain in old peat cutting.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This bog was originally contained within a small basin, with mineral soil on all sides. To the south there was a steeply sloping mineral ridge. There was an outflow to the east.

Description of the present-day bog
There has been extensive cutaway to the east with a road running along the present day eastern margin. The drains in this region are fast-flowing and act as the main drainage to the bog. There is level cutaway between the road and the high bog, but some of this has been reclaimed for agriculture.

To the south-east there is a very thin margin between the high bog and the sloping mineral soil. This margin is dominated by *Juncus effusus* and *Molinia caerulea* and could have potential as a lagg zone. To the south-west there is level cutaway backed by sloping land, but this has also been reclaimed for agriculture.

To the west there has been a bog-burst with tear pools occurring on steeply sloping high bog. This borders an area of *Molinia caerulea* dominated cutaway and with run-off from the high bog, there is some potential for restoration work.

The northern cutaway is mostly dominated by *Betula pubescens* wood. To the north-east there is an area of level cutaway backed by sloping agricultural land. This cutaway is dominated by *Molinia caerulea* and *Ulex europaeus*. This would have some potential for restoration work.

There has been extensive drainage on the high bog. These drains are shallow and in-filling. Blocking these drains would cause re-wetting of the high-bog and this has already occurred in places, where these drains have overflowed causing secondary re-wetting.

6. VEGETATION

6.1 VEGETATION SUMMARY

This bog has been extensively damaged by burning and drainage. This has led to a lot of marginal and sub-marginal ecotope type vegetation, even through the centre of the bog. No central ecotope was found and the sub-central ecotope is very fragmented. There are young *Betula pubescens* dotted over the whole bog.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex 1
This vegetation is typically dominated by robust *Calluna vulgaris* bushes at the face-bank on the bog edges.

Complex 2
An area of bare peat and *Trichophorum caespitosum* associated with active peat cutting in the south of the site. This vegetation type also occurs on a slope by the northern abandoned cutaway.

Complex 7
This type is tall, robust *Calluna vulgaris*-dominated vegetation associated with the edges of the main drain D1.

Complex 7/3
This vegetation type occurred immediately after Complex 1 on the slopes up to the level part of the bog. This vegetation is co-dominated by *Calluna vulgaris* (50%)and *Carex panicea* (40%). *Narthecium ossifragum* (15%), *Erica tetralix* (15%) and *Trichophorum caespitosum* (15%) tussocks are prominent. *Cladonia portentosa* (10%) is common. Small pockets of standing water featured *Sphagnum capillifolium* (+) and *S. papillosum* (+). There are also areas of bare ground with *Cladonia floerkeana* (+) and *Campylopus introflexus* (+). Occasional *Andromeda polifolia* (+) and *Hypnum jutlandicum* (+) were also noted. *Eriophorum angustifolium* is also present but there are also many dead leaf bases.

Complex 3a RB (R4, P15 & P16)
This area was burnt very recently (within the past few months). The only green vegetation are tiny *Calluna vulgaris* and *Erica tetralix* seedlings (all <5cm). There are also some *Carex panicea* and *Hypnum jutlandicum* plants. There is plenty of dead, black *Calluna vulgaris* bushes with dead, burnt *Sphagnum* and *Cladonia portentosa*. It appears that the burn happened during the previous summer as there are *Narthecium ossifragum*, *Carex panicea* and *Trichophorum caespitosum* plants which have died back for the winter after having sprouted just after the fire. *Andromeda polifolia* seems to be doing quite well and in marginal areas where *Ulex europaeus* grew previous to the burn before senescent Agrostis species are growing with young *U. europaeus* reappearing. There are extensive patches of dead *Cladonia portentosa* indicating that this area has not been frequently burnt in the past. Some *Sphagnum* at the centre of hummocks seem to have survived.

Sub-Marginal Complexes

Complex 7/3/10
This vegetation is an extension of Complex 7/3 but off the marginal slope. *Sphagnum* species are more prominent at 20% with *S. capillifolium*, *S. subnitens*, *S. papillosum*. *Cladonia uncialis* also featured here. There are occasional *Calluna vulgaris* hummocks dotted across the surface. All the *C. vulgaris* plants have lichen epiphytes so there is no fire damage on this part of the site.

Complex 7/3a/9 - burnt

This area has been burnt within the past three years. There are plenty of burnt *Calluna vulgaris* bushes with very little new *C. vulgaris* growth. The burn must not have been too fierce as there are half burnt *C. vulgaris* bushes and still quite a good *Sphagnum* cover. This was despite burning and drainage, therefore this area must be very wet. *S. papillosum* and *S. magellanicum* with *S. cuspidatum* in the areas of standing water. *Drosera anglica* and *Andromeda polifolia* are growing through the *Sphagnum* . On closer inspection these areas of standing water appear to be long, sinuous old pools in- filling with *S. cuspidatum, S. magellanicum, Eriophorum angustifolium, Rhynchospora alba* and *Narthecium ossifragum*. Some pools are algal and some are lined with *Sphagnum* species. In between the pools, the burnt vegetation is co-dominated by *Eriophorum vaginatum* (30%)/ *Eriophorum angustifolium* (20%)/ *Calluna vulgaris* (20%)/ *Erica tetralix* (20%). There are large hummocks of dead burnt *Sphagnum* covered in *Campylopus introflexus* (10%) and *Eriophorum angustifolium* with some original *Calluna vulgaris* surviving. *Cladonia floerkeana, Cladonia pyxidata* and *Andromeda polifolia* are growing on the bare ground. *Trichophorum caespitosum* (5%) is scattered through the vegetation with *Narthecium ossifragum* (15%) very prominent. *Sphagnum capillifolium* (+) and *Aulacomnium palustre* (+) grow sparsely on the bare ground. *Carex panicea* (10%) is prominent in parts of the complex reaching 30% cover along with *N. ossifragum* in some parts. The ground is soft and wet mostly due to the dead moss underfoot.

Tear Pools

An area of large tear pools at the end of the slopes 5 and 6. The tear pools are in-filling with *Narthecium ossifragum, Calluna vulgaris, Rhynchospora alba, Drosera anglica, Sphagnum capillifolium, S. cuspidatum* and *S. magellanicum*. The vegetation in between pools was *Calluna vulgaris, Molinia caerulea, Erica tetralix*, some *Trichophorum caespitosum* tussocks and lots of *Cladonia portentosa*. There is profuse *Eriophorum angustifolium* marking out the pools. The ground between the pools is very hard with just a few patches of *S. capillifolium*. There are *Betula pubescens* trees and *Ulex europaeus* bushes all around the edges with some *B. pubescens* growing in the tear pools area.

Sub-Central Complexes

Complex 7/10/9 + *Cladonia*

This vegetation type is a further progression from Complex 7/3/10 described above. *Calluna vulgaris* (60%), *Eriophorum angustifolium* (10%) and *Cladonia portentosa* (20%) are more prominent with *Carex panicea* (10%) less so. *Narthecium ossifragum* (15%) is found in hollows. *Eriophorum vaginatum* (5%) and *Trichophorum caespitosum* (5%) are found in small amounts. *Sphagnum* cover is good at 35% with plenty of *S. imbricatum* hummocks. Also *S. capillifolium, S. magellanicum, S. papillosum* and *S. fuscum* are present. The acrotelm is variable at 0-5cm. The ground is reasonably wet until the first of the internal drains. Here the ground is harder and *Calluna vulgaris* is more robust growing to 30cm in places. *Eriophorum vaginatum* (20%) becomes more prominent. There are, however, several bare peat patches with *Cladonia floerkeana, Cladonia pyxidata* and dead *Sphagnum* which are all signs of desiccation. Algae are growing along the sides of the drains. Moving across the drains, the vegetation returns to Complex 7/3/10.

Complex 10/9/7

A small unburnt area that is very difficult to walk over. The area has probably been burnt a long time ago with undulating hard hummocks and wet hollows in between. The vegetation is co-dominated by *Calluna vulgaris* (60%)/ *Eriophorum vaginatum* (30%). The *Sphagnum* cover was 40% with *S. capillifolium* and *S. magellanicum*. *Carex panicea* (5%), *Eriophorum angustifolium* (5%) and *Trichophorum caespitosum* (15%) tussocks are prominent. There is some *Cladonia portentosa* (+) and bare peat patches feature *Cladonia floerkeana* and *Cladonia pyxidata*. Where the area intersected with the ends of the drains, it is very wet underfoot and the vegetation is dominated by *Eriophorum angustifolium*. An area of secondary re-wetting due to overflow from these drains has a *Sphagnum* cover of 80%. Here the *Calluna vulgaris* is dying off and *Eriophorum vaginatum* (60%) is doing well. A few *Leucobryum glaucum* and *Hypnum jutlandicum* hummocks are also present.

Complex 7/9/10 + Cladonia
This complex occurs away from the drainage and burning and consequently the vegetation improves. The vegetation is co-dominated by *Calluna vulgaris* (60%)/ *Eriophorum vaginatum* (30%)/ *Cladonia portentosa* (30%). *Erica tetralix* (10%) is prominent, with *Trichophorum caespitosum* (5%), *Eriophorum angustifolium* (5%) and *Carex panicea* (5%) also present. *Sphagnum* cover (30%) is quite good with hummocks of *S. capillifolium, S. fuscum, S. papillosum*. The acrotelm is variable at 0-5cm. There is plenty of *Narthecium ossifragum* (10%) in the hollows with very small pools containing *S. cuspidatum* and *Eriophorum angustifolium*. Lichen epiphytes are growing on the *Calluna vulgaris* bushes. There are occasional bare patches with *Cladonia floerkeana* (+) and *Cladonia pyxidata* (+). *Hypnum jutlandicum* (+), *Polytrichum commune* (+), *Andromeda polifolia* and *Cladonia uncialis* occur occasionally. There is one solitary young *Pinus sylvatica*. The ground then begins to slope westwards (Slope 5) and the vegetation changes with the ground becoming harder and *Carex panicea* more plentiful.

Complex 14/7/9 + *Cladonia* (R4, P17)
A lush area of vegetation co-dominated by *Calluna vulgaris* (40%)/ *Eriophorum vaginatum* (30%)/ *Sphagnum* (50%) with prominent *Cladonia portentosa* (20%) and pools. The pools here may possibly be old tear pools associated with drainage or remnants of a central complex dried out because of drainage. Many pools are in-filling with *Sphagnum cuspidatum* and *Eriophorum angustifolium*. Most are bordered by *Sphagnum* and some *S. fuscum*. *Calluna vulgaris* has lichen epiphytes. However, *Narthecium ossifragum* (10%) is prominent in hollows and *Carex panicea* (5%) occurs in patches. There is also the odd *Trichophorum caespitosum* (5%) tussock. *Drosera anglica* is in some pools and *Rhynchospora alba* in others some of which were algal.

Central Complexes

There are no central complexes noted on this bog.

6.2.2 Flushes and Soaks

No flushes or soaks were noted on this bog.

6.3 DETAILED VEGETATION OF THE HIGH BOG MARGINS

There is very limited cutaway on this bog. To the north, the thin cutaway margin is dominated by *Betula pubescens* wood. There is some old cutaway dominated by *Molinia caerulea* and *Ulex europaeus*. To the north-east there is agricultural grassland and some *Juncus effusus* dominated cutaway. There is *Ulex europaeus* scrub by the road to the east. The whole southern margin is very narrow, adjoining sloping agricultural land. *J. effusus* and *M. caerulea* dominate here. There is some agricultural reclamation and active cutting in the south-west and the western cutaway is dominated by *B. pubescens* scrub and *M. caerulea*.

7. BOG TYPE
This is probably a Basin bog.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting
Active peat cutting occurs in the north-east and also in the south.

8.1.2 Forestry
There was no coniferous forestry near the bogs.

8.1.3 Fire History

There was extensive burning over the bog with two areas recently burnt, one of which was still charred.

8.1.4 Dumping

No dumping was recorded at this bog.

8.1.5 Agriculture

There is agricultural reclamation to the north-east and south-west of this bog.

8.2 NHA BOUNDARY CHANGES

No change to the NHA boundary is needed.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

1. This bog was surveyed because there was little active peat cutting and it was known that the drains on the bog were shallow and possibly suited for restoration.

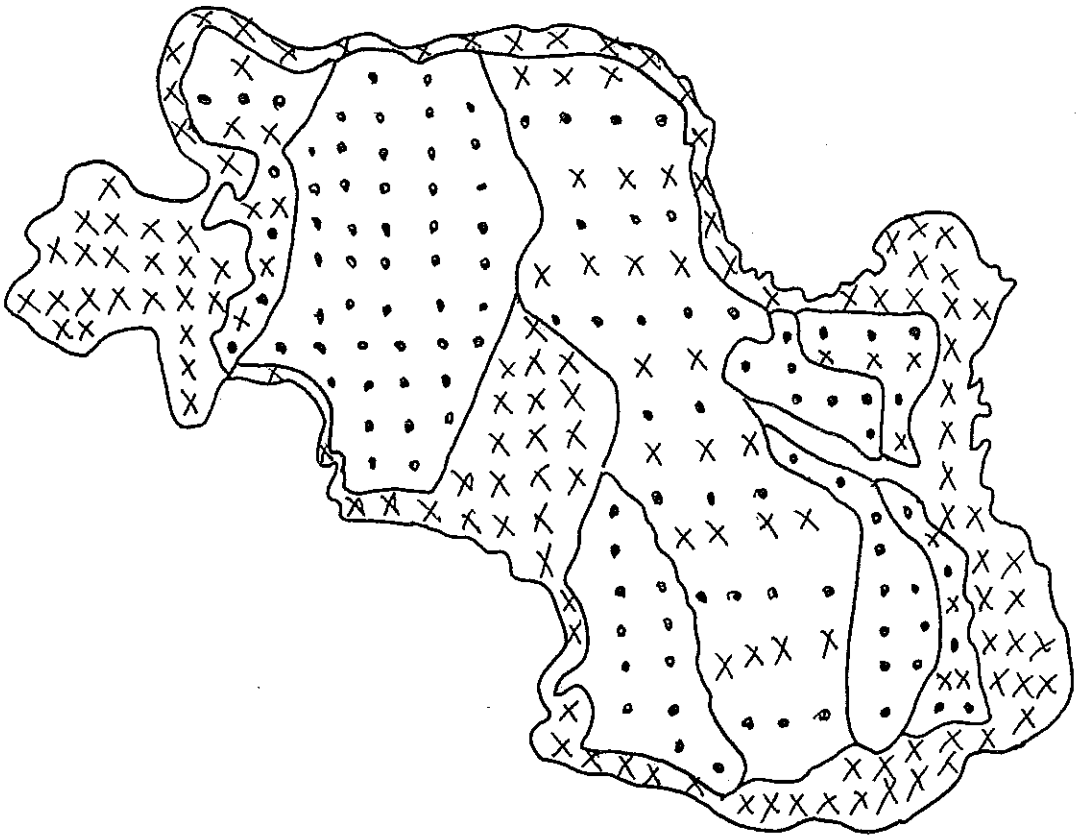
2. The visit confirmed that these drains would be suitable for restoration and already secondary re-wetting had occurred. The bog was, however, recently burnt.

3. There was extensive drainage on this bog which would be suitable for restoration work. This would lead to re-wetting of the centre of the bog.

4. The cutaway to the north-east is the only extensive area of cutaway. It is level and below the height of the road and so suitable for restoration work. However, it adjoins reclaimed fields which may need to be re-wetted.

Clonydonnin bog (565)
Cos Offaly & Westmeath
Ecotopes

N



Clonydonnin bog (565)
Cos Offaly & Westmeath
Vegetation complexes

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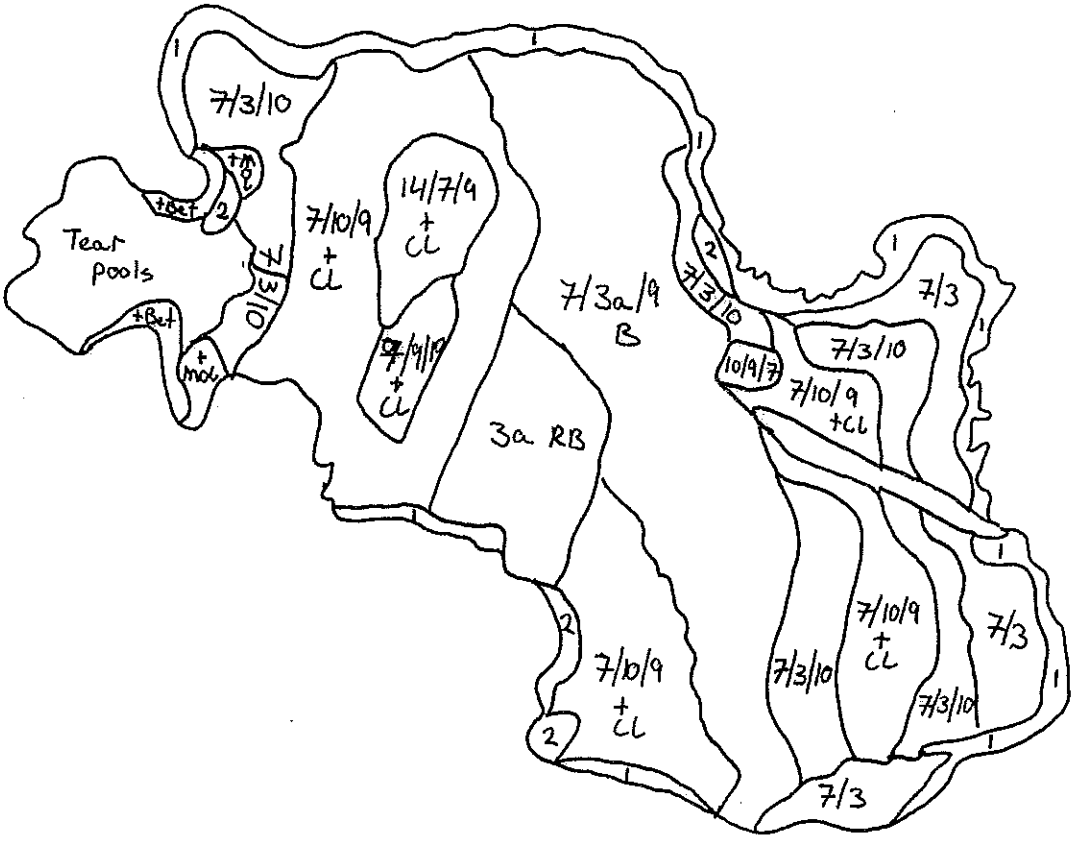

Clonydonnin bog (565)
Cos Offaly & Westmeath
Drainage

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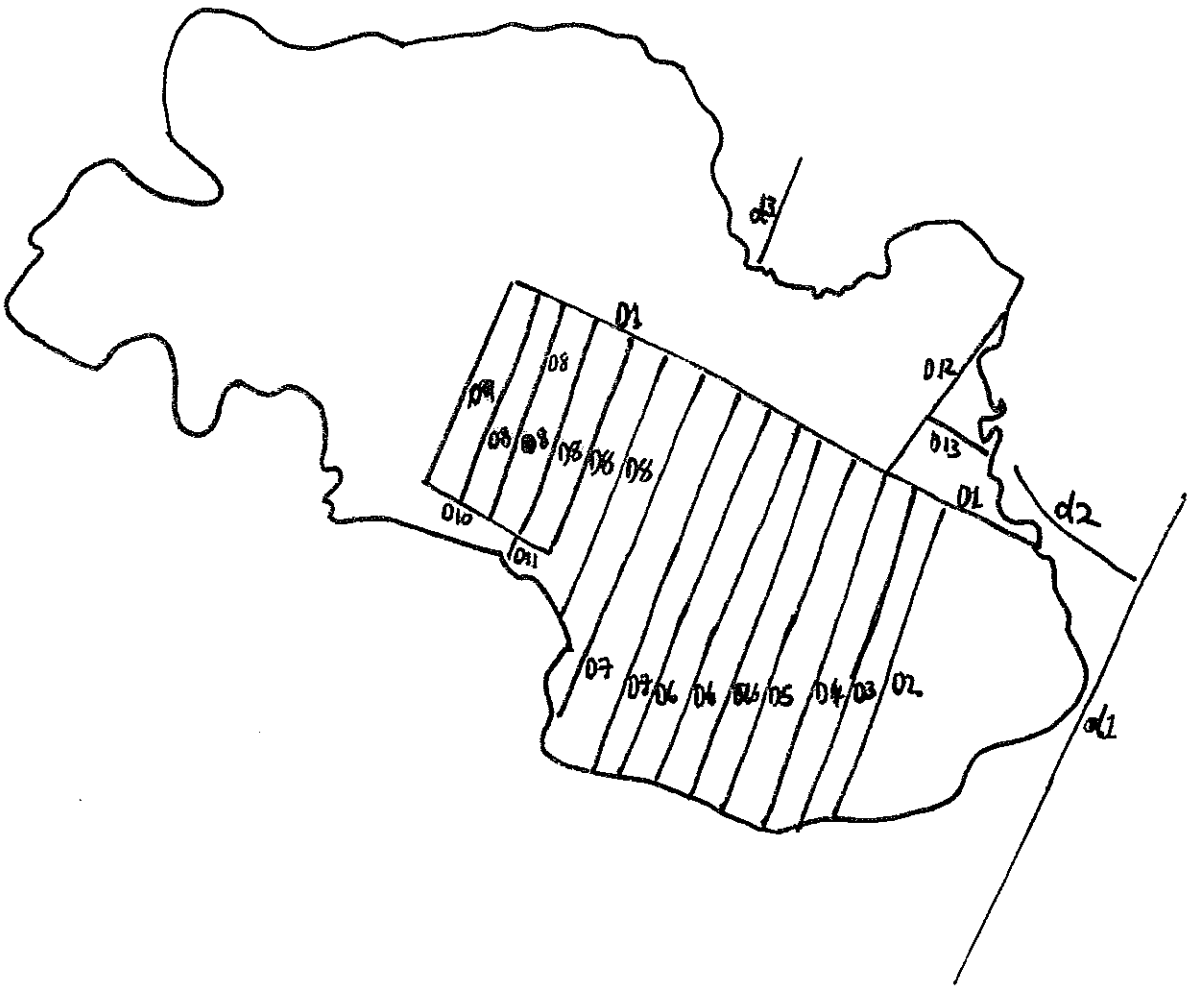
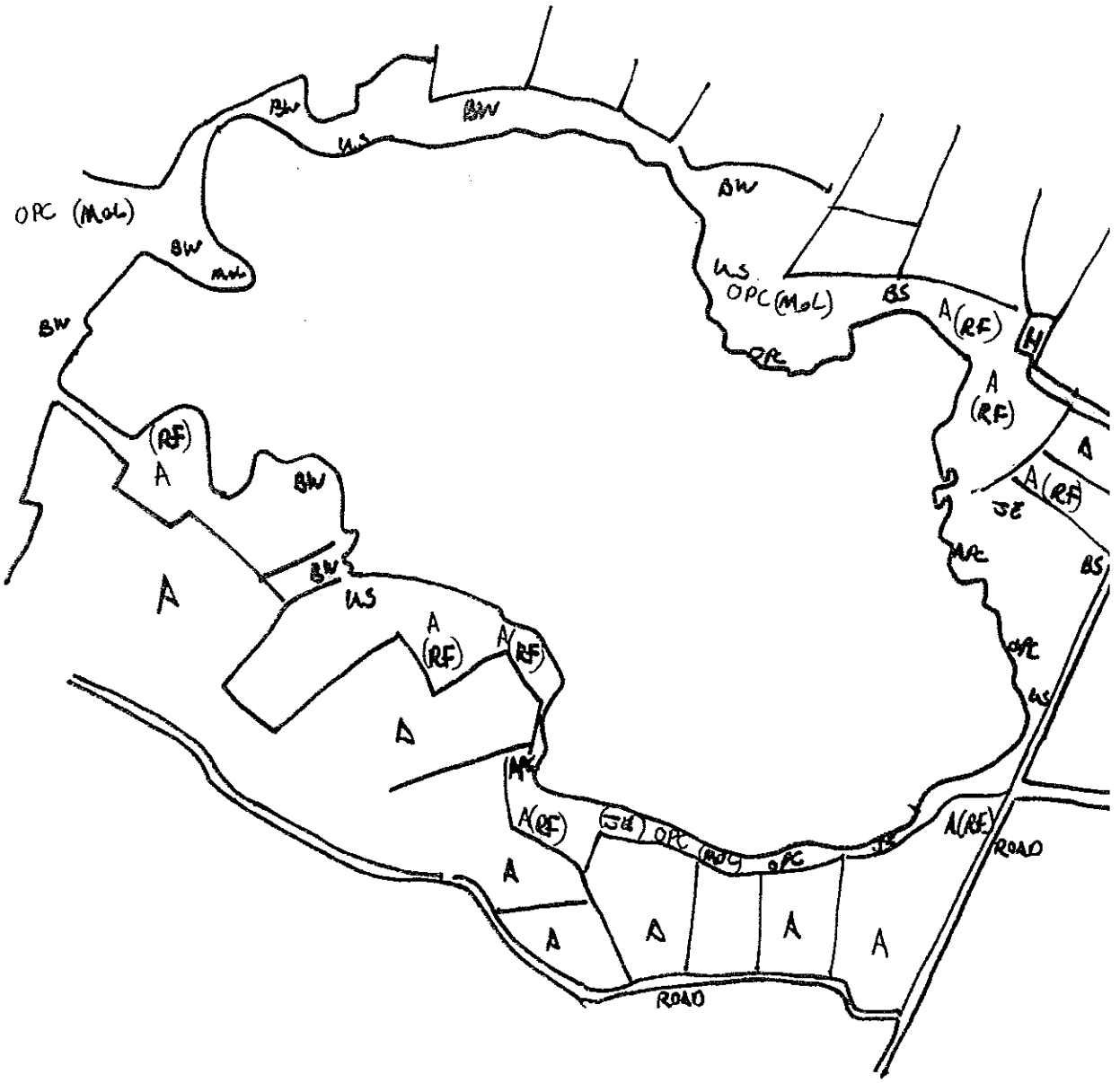


Clonydonnin bog (565)
Cos Offaly & Westmeath
Slopes

Clonydonnin bog (565)
Cos Offaly & Westmeath
Landuse

N



CLOONEEN BOG, CO. LONGFORD

1. SUMMARY OF SITE DETAILS

NHA no.:	445	6" Sheet:	
Grid Ref.:	N070 840	1:126,000 Sheet:	12
G.S.I. Aerial Photo:	38 (8270)	1:50,000 Sheet:	33
Other Photo:	N716	High bog area (ha):	94.84
Date(s) of Visit:	7/12/1999		

Townlands: Clooneen (Beirne), Clooneen (Shanley), Clooneen (Kennedy), Clooneen (Cox), Edercloon, Cloonart north and Cloonart south,

2. INTRODUCTION

2.1 BACKGROUND

This site is near Ballykenny/Fisherstown. It was selected for this survey as it has a very large wooded flush and there is very little active peat cutting evident. The proximity of this site to Lough Forbes and the River Shannon enhances the habitat diversity of this area.

The 1994 NHA survey states that there is a large flush of lichen encrusted *Betula pubescens*.

2.2 LOCATION AND ACCESS

A small, narrow bog on the east bank of the river Shannon, just north of Lough Forbes. It is located 3km south-east of Roosky, Co. Leitrim and can be accessed from a cutaway track off the N4 (Dublin to Sligo road).

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Cloondra weather station for the years 1960-90, indicates that the area recieves appproximately 924mm of rainfall annually (R). The nearest synoptic station at Mullingar indicates that the site has up to 159 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Mullingar of 455 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 924 - 455 = 469mm. (See Fig. 1)

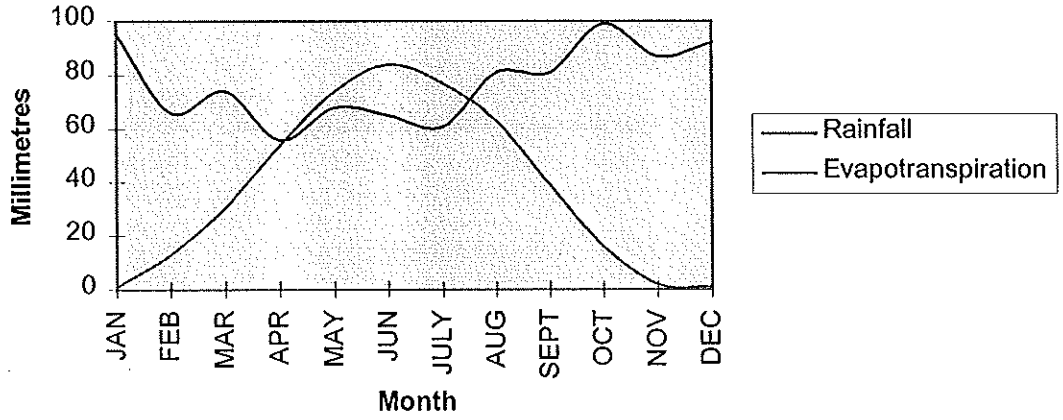


FIG. 1: Meteorology for Clooneen

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

The bog was relatively flat with gradual, marginal slopes associated with the cutaway. On the high bog there were two gradual slopes in a north and south direction from a central low ridge.

4.1.1 Slopes of the High Bog

High Bog Slopes

Slope 1: A series of marginal slopes at the northern cutaway (1.5m/100m).

Slope 2: A gradual slope northwards along the centre of the bog (0.5m/100m).

Slope 3: A marginal slope towards the eastern cutaway (2m/100m).

Slope 4: A steep, short slope associated with Flush F2 (1m/50m).

Slope 5: A gradual slope in the flush F2 (0.25m/100m).

Slope 6: A gradual slope southwards along the centre of the bog (0.5m/100m).

Slopes 7,8 & 9: A series of marginal slopes towards the western cutaway (0.5m/100m).

4.2 TOPOGRAPHY OF THE BOG MARGINS

Cutaway Slopes
The cutaway is mostly level with agricultural land sloping down to it. However, in the south the extensive cutaway slopes towards the lake.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

Resent geological maps by Hitzman (Chevron/GSI, 1993) show that the area is underlain by dark grey muddy fossiliferous Carboniferous limestones (shown as ABL, on map).

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peat

The peat at this site has been classified by Hammond as True Midland type.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

There is very little drainage evident on the high bog. There is only one very old drain across the narrowest point of the bog.

Drain D1: Very old in-filled drain, 10cm wide which corresponds to a townland boundary. Completely in-filled with *Sphagnum cuspidatum* and very difficult to distinguish from the surrounding vegetation.

5.2.2 Bog Margin Hydrology

There is a little active peat cutting to the north of the bog but there is no other active cutting and very little active drainage noted.

Drain d1: A 1m wide water-filled drain in old cutaway. This lateral drain has smaller drains running from it to the cut bank. These are 0.5 m wide and 1m deep with some water. *Juncus effusus* and *Ulex europaeus* grow along these drains.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century

This bog originally bordered the eastern bank of the Shannon and at its southern tip it adjoined Lough Forbes It was bordered to the east and west by mineral outcrops and drainage off the bog was west towards the Shannon and south towards the lake. There was a mineral outcrop between the bog and the Shannon with a Megalithic Tomb.

Description of the present-day bog

There has been limited peat cutting by this tomb, but an extensive area has been cutaway in the south-west. This area is level but most of this has been reclaimed for agriculture. There has been extensive cutaway in the south with Molinia dominated cutaway sloping to the lake. There is a road and a wet meadow margin between the bog and the lake. The cutaway to the north is also level but some has been reclaimed for agriculture. To the east the land slopes down to level cutaway, some of this is dominated by *Calluna vulgaris* and would be suitable for restoration work. However there are reclaimed fields here also.

There is a very large *Betula* flush on the high bog indicating that there is some mineral input at this point of the high bog. This type of flush is rare and worth protecting. There is only one in-filled drain across the centre of the high bog and no drains at the cut-face. The only drying effects are from the cutaway.

6. VEGETATION

6.1 VEGETATION SUMMARY

The bog features a mix of vegetation types mostly associated with burning and a very rich *Betula pubescens* soak in the north of the bog. These vegetation types, however, were mainly classified into sub-marginal types with a very limited area of sub-central ecotope. There is also a large flush in the south-east corner associated with marginal slopes.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex 1
A narrow band of face-bank vegetation dominated by tall *Calluna vulgaris* bushes. These marginally sloped areas had many cracks associated with the slopes.

Complex 2 - recently burnt
Dominated by *Trichophorum caespitosum* clumps (50%) as this area slopes down to the cutaway. In between the *T. caespitosum* clumps lots of young *Calluna vulgaris* (30%) and *Erica tetralix* (30%) growth (R2, P14). The whole area has obviously been burnt within the past 3 years. There is plenty of bare peat with associated lichens - *Cladonia floerkeana* and *C. pyxidata*. A few small *Narthecium ossifragum* (<5%) and *Carex panicea* (<5%) plants were noted. There are several cracks parallel with the cutaway margin. Some burnt *Andromeda polifolia* plants (+) are present. *Campylopus introflexus* (+) is growing on the bare peat. Also *Eriophorum angustifolium* (<5%) is found scattered through the vegetation. This vegetation type also occurs in the east of the site by the flush F2.

Complex 6/2
Narthecium ossifragum (30%) and *Trichophorum caespitosum* (30%) co-dominate in this area. *Calluna vulgaris* (20%) is present with hollows of *Eriophorum angustifolium* and *Rhynchospora alba*. Tall old hummocks of *C. vulgaris* are noted and the presence of *Cladonia portentosa* indicate that this area has escaped burning. There is some *Pinus sylvestris* encroachment at the margin.

Complex 4/7/2 - burnt
Rhynchospora alba is more dominant in this area. The area does not seem affected by the previously mentioned recent burn with clumps of *Cladonia portentosa* (+) becoming noticeable. The vegetation is dominated by *Calluna vulgaris* (30%), *Trichophorum caespitosum* (30%) and *Rhynchospora alba* (30%). The ground is wetter underfoot with a patchy acrotelm (0-5cm). *Erica tetralix* (10%) and *Eriophorum angustifolium* (5%) are prominent with some *Carex panicea* (<5%). There is some *Sphagnum magellanicum* (5%) and *S. papillosum* and *S. capillifolium* cover but it is patchy. There are occasional occurrences of *Andromeda polifolia* (+) and *Narthecium ossifragum* (5%) hollows are present. Some *Calluna vulgaris* bushes reach 30-40cm. Some *Hypnum jutlandicum* patches are associated with *Calluna vulgaris*. The area was not recently burnt but probably burnt in the past. There are occasional small patches of *Racomitrium lanuginosum*. The southern area of this vegetation is co-dominated by *Rhynchospora alba/ Calluna vulgaris/ Erica tetralix/ Trichophorum caespitosum. Narthecium ossifragum* and *Eriophorum angustifolium* are prominent. The odd *Myrica gale* bush is present here along with some scattered *Carex panicea*.

Complex 4/7 - burnt
Rhynchospora alba (40%) and *Erica tetralix* (40%) co-dominate with *Narthecium ossifragum* (10%) in hollows and *Eriophorum angustifolium* (10%) all through the vegetation. There are a lot of hummocks of dead burnt moss. However, there is young regenerating *Calluna vulgaris* (5%) with patches of associated *Hypnum jutlandicum* (+). Good hummocks of *Sphagnum capillifolium* (5%) indicate that the burn may not have been very fierce. *Trichophorum caespitosum* is growing through the vegetation but not in the dominant tussock form of Complex 2 described above. There is no acrotelm.

Sub-Marginal Complexes

Complex 2/7/9 - recently burnt
An area south of the soak F1. The area is quite wet underfoot despite having obviously been burnt. The area is co-dominated by *Trichophorum caespitosum* (30%), with *Calluna vulgaris* (30%), *Erica tetralix* (20%) and *Eriophorum vaginatum* (20%). As a result of burning the ericoids are depauperate in stature. Small *Carex panicea* (5%) plants are quite prominent. *Eriophorum angustifolium* (5%) is growing through the vegetation. The bare peat patches feature an algal mat and the typical *Cladonia* species. Neither *Cladonia portentosa* nor *C. uncialis* are present in the area. There are small patches of *Sphagnum magellanicum* (+) and *S. capillifolium* (+) but the area has no acrotelm.. The whole area is on a slight slope down towards the soak (F1) and is punctuated with clusters of *Myrica gale* - in one case a cluster also has a few young *Betula pubescens* trees. *Myrica gale* (5%) and *Andromeda polifolia* (+) are also scattered through the general vegetation. *Narthecium ossifragum* (5%) occurs in patches and *Rhynchospora alba* (+) occurs occasionally.

Complex 4/7 + tear pools - burnt
This area features similar vegetation to Complex 4/7B described above but has tear pools associated with marginal slopes (slopes). The tear pools are small but they do contain *Sphagnum cuspidatum*. Bushes of *Myrica gale* (5%) are also associated with these slopes.

Sub-Central Complexes

Complex 7/10 + pools
In the central area of the bog there are small pools containing *Sphagnum cuspidatum* and their margins are bordered with *S. capillifolium* and *S. magellanicum*. Pools become more frequent with *Menyanthes trifoliata* and *Drosera anglica* found in some. *Sphagnum* cover is quite good in between with *S. fuscum* noted. These areas are co-dominated by *Calluna vulgaris*. The pools degenerate to algal pools with dried and burnt vegetation in between towards Complex 4/7 + TP at the narrow neck of the bog. *Rhynchospora fusca* is present in one of the pools.

Central Complexes

There is no central complex found on this bog.

6.2.2 Flushes and Soaks

Soak F1: Complex 2RB grades very naturally into the soak area. *Molinia caerulea* slowly becomes more dominant. It is apparent that the edges of the soak are burnt in the same fire although the centre of the soak seems to have escaped. Gradually the bryophyte cover comes in underfoot with some *Sphagnum magellanicum*. The centre of the soak has a diverse collection of species with an abundant moss cover underfoot but it is safe enough to walk on. Tall *Betula pubescens* dominate with some reaching 5m (R2, P17). There are also a few tall *Ilex aquifolium* bushes. The ground is covered with hummocks of various mosses including *Pseudoscleropodium purum*, *Hylocomium splendens*, *Breutelia chrysocoma* as well as several *Sphagnum* species. There are several ericoid species present all growing well: *Calluna vulgaris, Empetrum nigrum, Vaccinium oxycoccus, Vaccinium myrtillus* and *Erica tetralix* along with the shrubs *Myrica gale* and *Ulex europaeus*. *Molinia caerulea* is growing in stout tussock form with *Eriophorum vaginatum* growing amongst it. *Betula pubescens* trees are festooned with lichens both crustose and foliose (R2, P16) and some Birch polypore fungus is growing on a dead trunk. There are also several ferns amongst the trees *Blechnum spicant* and *Dryopteris dilatata* The southern end of the soak is very wet underfoot and is dominated by *Myrica gale* (1m tall in places) and *Molinia caerulea*. *Pteridium aquilinum* is also present. *Vaccinium oxycoccus* is abundant over *Sphagnum*, *Polytrichum commune* and *Breutelia chrysocoma* hummocks.

Flush 2: A *Molinia caerulea* dominated flushed area. This flush may be located on some type of burst or collapse. There are occasional clumps of *Myrica gale, Erica tetralix* and *Eriophorum angustifolium.* Several clumps of bare peat are covered in the typical *Cladonia* species which indicate burning in the past. Two small *Rhododendron ponticum* bushes are growing in the middle of the flush along with some patches of *Rubus fruticosus.* A small area bordering F2 has prominent *Phragmites australis* and an area of *Sphagnum* with *Vaccinium oxycoccus* growing over it. There are still signs of burning with dead moss hummocks but very little bare ground.

6.3 DETAILED VEGETATION OF THE HIGH BOG MARGINS

There are reclaimed fields in the north-west, north-east and east. The cutaway to the north is dominated by *Molinia caerulea* with some *Pteridium aquilinum* and there is some active peat-cutting (R2, P15). There is some active regeneration in the north-east with *Eriophorum angustifolium* present along with *Sphagnum cuspidatum* in the very wet places. There is a small area of *Betula pubescens* woodland here also. The eastern old cutaway is *Calluna vulgaris* heath with some small conifer plantations. In the west there is old cutaway dominated by *Ulex europaeus* scrub and *Betula pubescens* wood. These border an old field system with a Megalithic tomb marked on the 6" map. To the south, the cutaway slopes quite naturally towards Lough Forbes. It is completely dominated by *Molinia caerulea* and runs down to the road. Between the road and the lake the are semi-improved fields which were flooded at the time of this visit.

7. BOG TYPE

This is probably a broad floodplain bog associated with the River Shannon.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting

There is limited peat cutting in the north, mainly hopper peat cutting.

8.1.2 Forestry

There is some forestry to the east of the site consisting of small conifer plantations.

8.1.3 Fire History

The bog has been burnt several times in the past.

8.1.4 Dumping

There is some dumping of vegetative garden waste to the north by the track and an old car is dumped at the south-western cutaway.

8.1.5 Agriculture

Some of the old cutaway in the north and east has been reclaimed for agriculture.

8.2 NHA BOUNDARY CHANGES

No changes to the NHA boundaries are necessary.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

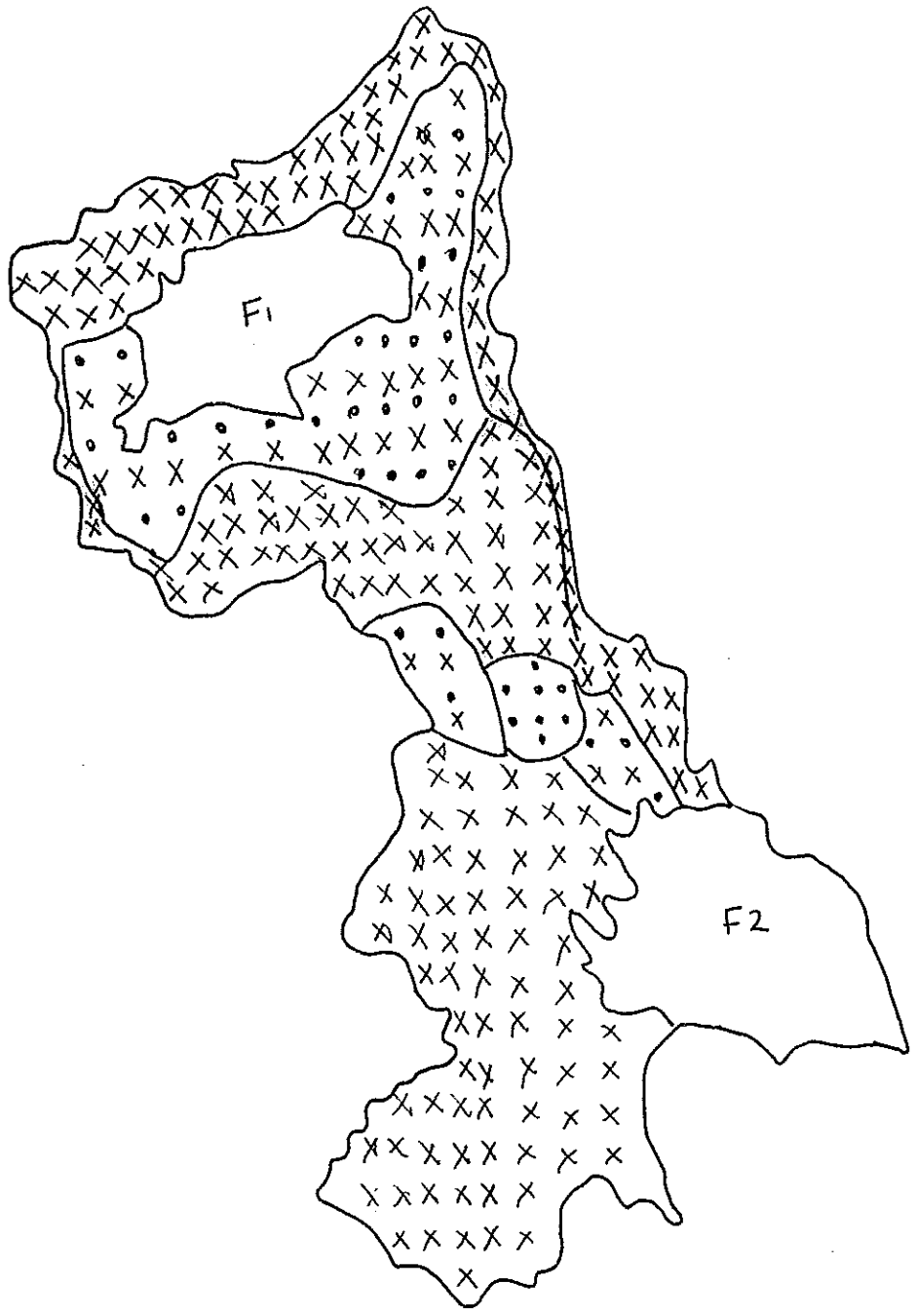
1. This site was surveyed because it appeared to have a very interesting flush at its northern end

2. The survey confirmed that the soak at the northern end was botanically rich and diverse. This type of habitat becoming increasingly less common and is worthy of conservation.

3.The bog has no active drainage, although there are tear pools along the margins in the narrow central region of the bog.

4. There is some active regeneration in the northern cutaway and this is the most suitable area for restoration work, being closest to the wooded flush.

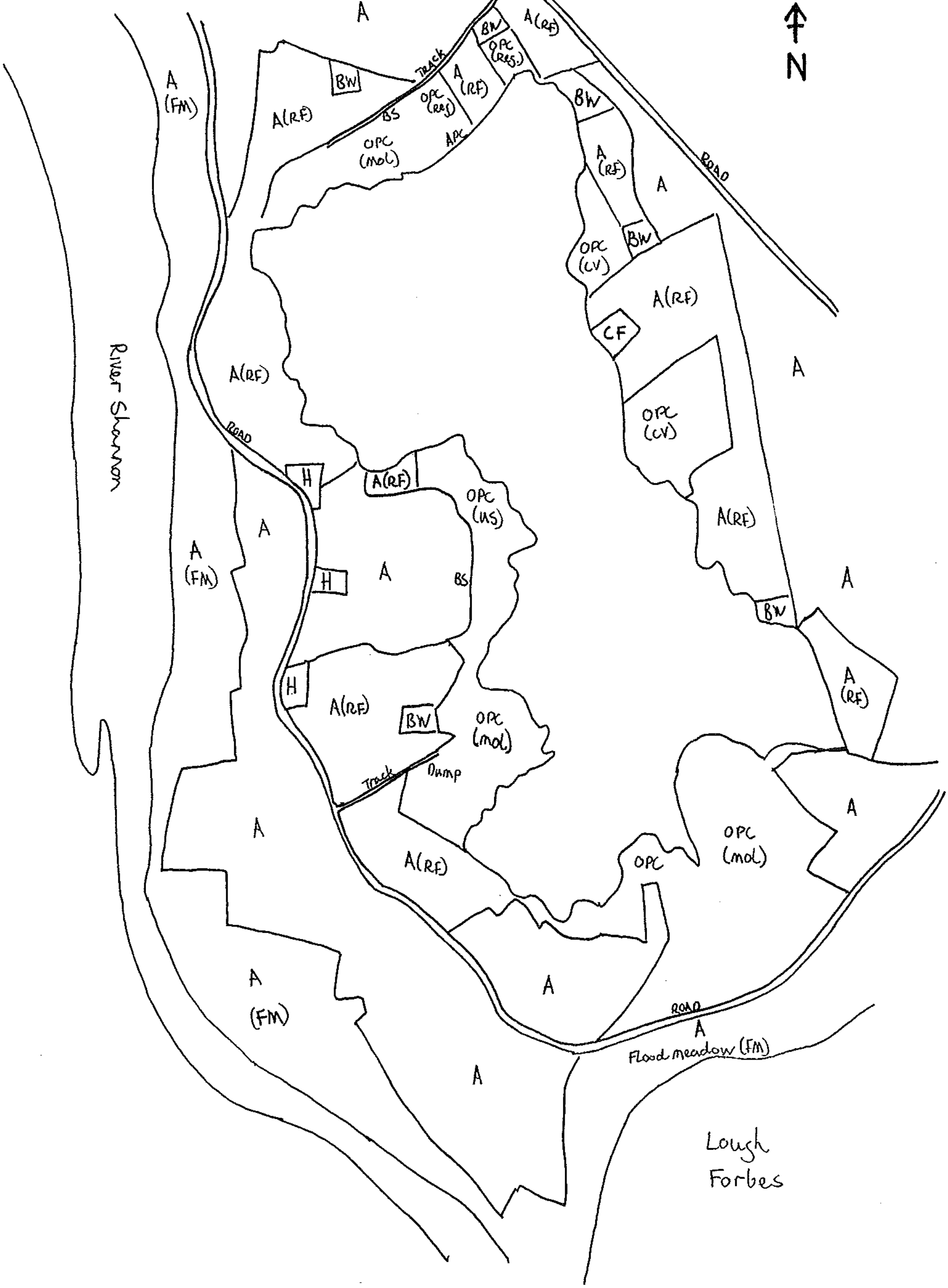
Clooneen bog (445)
Co. Longford
Ecotopes



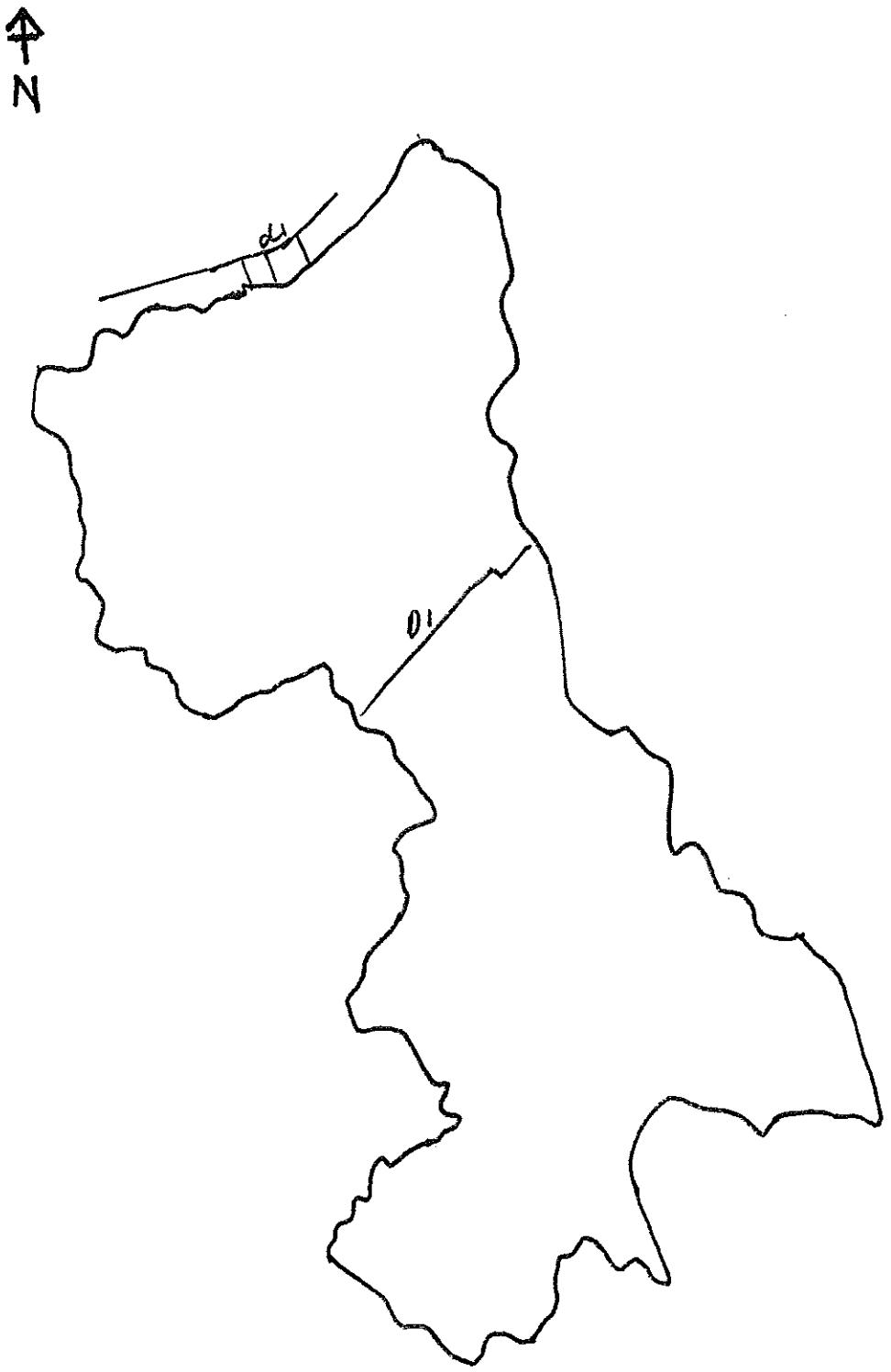
Clooneen bog (445)
Co. Longford
Vegetation complexes

Clooneen bog (445)
Co. Longford
Slopes

Clooneen bog (445)
Co. Longford
Landuse



Clooneen bog (445)
Co. Longford
Drainage



CLOONGOONAGH BOG, CO. SLIGO

1. SUMMARY OF SITE DETAILS

NHA no.:	1657	6" Sheet:	SO37 & 42
Grid Ref.:	G445 070	1:126,000Sheet:	7
G.S.I. Aerial Photo:	27 (7819)	1:50,000 Sheet:	32
Other Photo:	G177	High bog area:	164.0ha
Date(s) of Visit:	15/11/1999		

Townlands: Cloongoonagh, Curraghboy and Coolrawer

2. INTRODUCTION

2.1 BACKGROUND

This site was selected for this survey as it was alrge bog with extensive cutaway. It is located in the extreme north-west of the range of sites to be surveyed. The aerial photographs appeared to show a semi-intact margin to the river at the north of the site. A flush system and tear pools were also apparent.

The 1986 bog survey states that the hydrology of the site has been damaged. The 1993 NHA survey describes pool complexes, subterranean channels, swallow holes, hummocks and willow scrub margins. *Sphagnum magillanicum* and *Arctostephyllus uva-ursi* were also noted.

2.2 LOCATION AND ACCESS

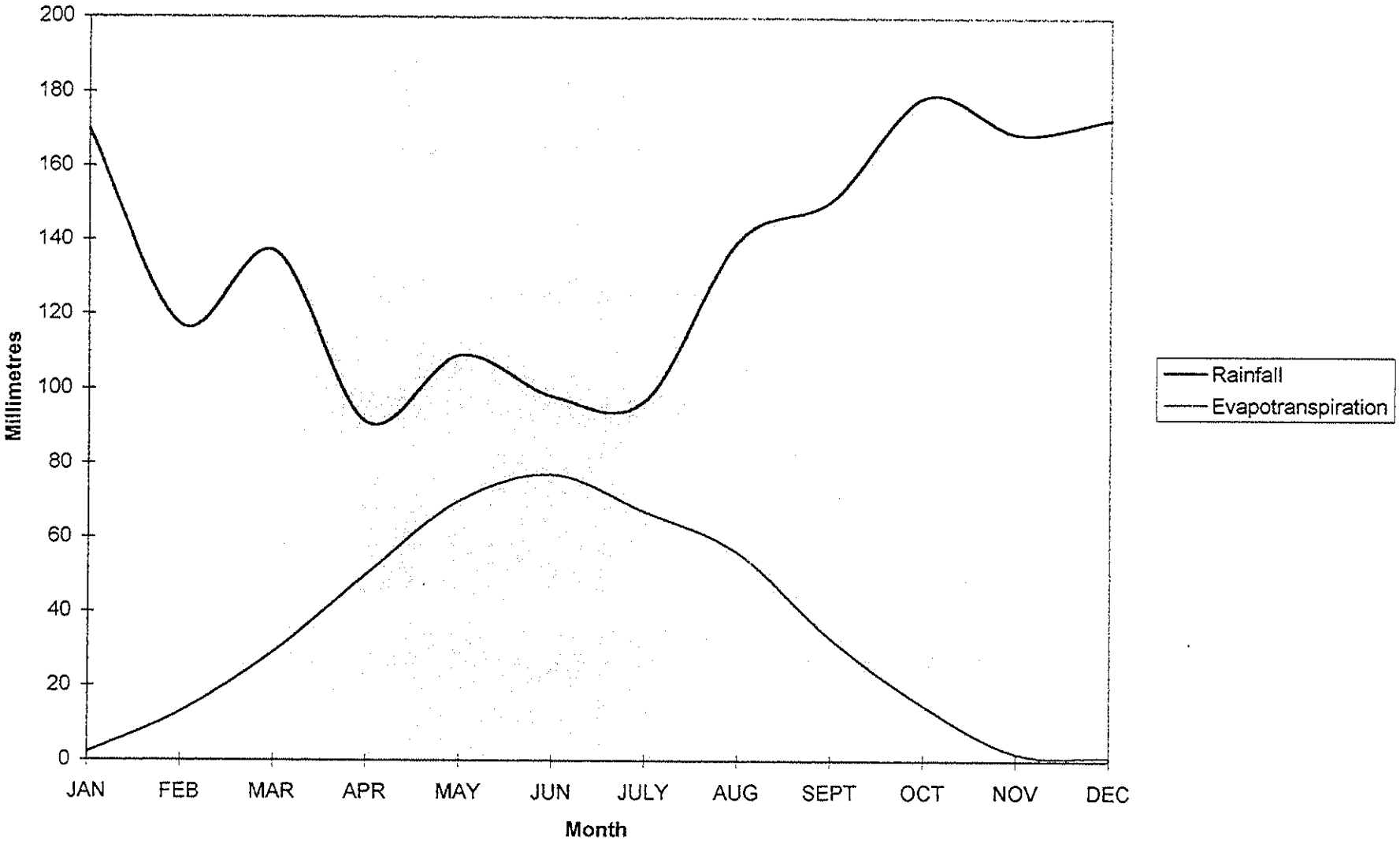
This is a medium sized bog situated immediately south of the meeting point between the rivers Moy and Owengarve. It is located 6km north-west of Charlestown and can be accessed off the local road linking Bellahy to Banada.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Cloonacool (Lough Easky) weather station for the years 1960-90, indicates that the area recieves appproximately 1632mm of rainfall annually (R). This is the highest rainfall for any bog in this survey. The nearest synoptic station at Claremorris indicates that the site has up to 177 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Claremorris of 415 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 1632 - 415 = 1217mm.
(See Fig. 1)

CLOONGOONAGH CLIMATE DATA



4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

The eastern section of this bog was relatively flat but the rest of the bog featured extensive slopes. In the north there are marginal slopes associated with the Owengarve river. The rest are gradual internal slopes associated with a flush in the north-west and a bog-burst in the south-west.

4.1.1 Slopes of the High Bog

Slope 1,2 + 3: A series of slopes from the high bog down to the flush F1 (0.5m/100m).

Slopes 4 + 5: A series of slopes in a north-westerly direction off the high bog towards the cutaway margin of the flush F1 (0.25m/100m).

Slopes 6, 7,10 + 11: A series of slopes off the high bog in a southerly direction at the top of the bog-burst (0.25m/100m).

Slope 8 = A slope in an area of parallel pools going down to the bog's southern margin (0.5m/100m).

Slope 9 =A slope northwards from the central area towards the flush F2 (0.5m/100m).

4.2 TOPOGRAPHY OF THE BOG MARGINS

The old cutaway in the east is level with a lot of standing water. The southern cutaway, slopes gradually to the stream (1m/100m) and has little potential for rewetting. To the north, the reclaimed fields slope towards the Moy river. The old cutaway in the north has a very steep slope to the stream (2m/100m). So the only cutaway suitable for rewetting is in the east.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

This site is underlain by two rock types: Lisgorman Shale formation (LG) and the Oakpark (OK) limestone formation on the GSI/Chevron series maps.

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peats

The peat at this site was classified by Hammond as Man-Modified.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

There is very little drainage on this bog, with the drains that are present, restricted to the margins. These drains are not actively draining the bog, apart from one (Drain d2) which is actively draining a pool system.

Drain D1: An old drain, 1m wide, 50cm deep with water at its base, running south from the end of the trackway to the stream. It is in-filling with *Eriophorum angustifolium* and there is some subsidence around the drain. There are tear pools on the bog associated with this drain.

Drain D2: An old cutaway drain that has been recently extended into the bog. It now terminates in a tear-pool system and is actively draining these.

Drain D3: Deep drain, 1m wide, in-filling with *Sphagnum cuspidatum* in places. There is open water visible for the middle third of the drain. The eastern section is in-filled with *Molinia caerulea*.

Drain D4: An old drain in-filled with *Molinia caerulea, Calluna vulgaris* and *Cladonia portentosa*. This drain runs alongside an old overgrown track.

Drain D5: An old wide drain running along track with *Betula pubescens* and *Ulex europaeus* along margins. Water is present and this drain connects with D1.

5.2.2 Bog Margin Hydrology

There is quite extensive cutaway to the south and east of this bog. However, the original shape of the bog is clearly defined by the river to the north and the stream to the south. Besides these streams there is little drainage of note in the cutaway.

Drain d1: A small natural stream running along the southern margin of the bog. Drain D2 flows into this. On both sides of this stream old cutaway slopes down to the banks.

Drain d2: The Moy River flows along the northern margin of the site. In the north-west, fields reclaimed from old cutaway slope down to the river.

Drain d3: The Owengarve river flows to the north-east and the old cutaway here slopes steeply to the river with *Betula pubescens* scrub along the river bank.

Drains d4: There are drains along the track, through old cutaway. These are 1m wide and water- filled. *Betula pubescens* and *Ulex europaeus* grow along these drains with *Molinia caerulea* and some *Typha latifolia*. The cutaway is very wet in places with these drains overflowing. Good potential for re-wetting.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This large bog was originally formed at the confluence of the Rivers Moy and Owengarve. The Owengarve flows into the Moy to the north-east of the bog and these two rivers formed the north and western boundary to the original high bog. The Mullaghaoe river flows into the Moy to the south-west of the bog. The southern and eastern margins adjoined mineral soil.

Description of the present-day bog
To the north there is a narrow band of old cutaway, dominated by *Molinia caerulea* and *Ulex europaeus* scrub. This slopes down to the Owengarve river. It is dominated by *M. caerulea* with *U. europaeus* scrub at the bog margin and *Betula* scrub by the river. To the north-west, most of the old cutaway has been reclaimed for agriculture and slopes down to the Moy river.

There has been extensive cutaway to the south, east and west. To the west the cutaway slopes away from the high bog. An island of mineral soil, which originally occurred on the high bog, is now in old cutaway. To the south of this outcrop there is coniferous forestry. There is some active peat cutting on the cut-face near this outcrop.

A stream runs close to the south of the high bog. There is extensive cutaway on the southern side, which slopes down to the stream. This cutaway is dominated by *Betula* and *U. europaeus* scrub.

The extensive cutaway to the east is level and would be suitable for restoration work. There are numerous turf banks and wet hollows and it is dominated by *Calluna vulgaris* and some *Betula* scrub. There is a section of old cutaway stretching into the bog from the east. This is flooded in places and has very good regeneration potential. *Typha latifolia* is present in places.

A large *Molinia caerulea* dominated flush runs across the high bog towards the Moy River. There are slopes from the bog towards this flush. To the south-west an extensive tear-pool system occurs on the high bog marginal slope. This system however is being actively drained and these drains need to be blocked.

6. VEGETATION

6.1 VEGETATION SUMMARY

Only a very small area of central vegetation complex was found on this bog. Apart from this small area of pools, most of the bog is termed marginal, this complex is concentrated in the eastern section where it is associated with old peat cutting. There is also a large area of sub-marginal vegetation concentrated in the western half of the bog. Apart from these vegetation types there are also two flushed areas.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex 7

Most of this area is marginal parts of the bog associated with cutaway. The vegetation is dominated by *Calluna vulgaris*. In the flooded old cutaway *Typha latifolia, Eriophorum angustifolium* and *Juncus effusus* also feature. The rest of the marginal complex is on areas that slope down to the surrounding rivers and streams.

Complex 2/4+CL

In the northern area a similar vegetation type was found on Slope 9. This vegetation is dominated by *Trichophorum caespitosum* (50%) and *Rhynchospora alba* (50%) with *Erica tetralix* (10%). *Carex panicea* (10%) and *Calluna vulgaris* (20%) are quite common. Bryophyte cover is poor with some *Sphagnum magellanicum* (5%), *Sphagnum cuspidatum* (5%) and *Racomitrium lanuginosum* (5%). *Cladonia portentosa* (+), *Eriophorum angustifolium* (+) and *Cladonia uncialis* (+) are also present in small amounts.

Sub-Marginal Complexes

Complex 2/4+Cl+TP

This area is at the end of the lane which cuts through the southern end of the bog. There is a 0.5m wide drain running west, perpendicular to the lane at its end. Parallel to this there are some long tear pools. These are about 60% filled with *Sphagnum cuspidatum* with some *Menyanthes trifoliata* (+) and *Rhynchospora fusca* (+) with *Sphagnum magellanicum* (10%) at the pool edges. The surrounding vegetation is dominated by *Trichophorum caespitosum* (30%) and *Rhynchospora alba* (30%) with *Cladonia portentosa* (30%) also strong. *Calluna vulgaris* (20%) and *Erica tetralix* (15%) are present with *Carex panicea* (15%). There are some pools in-filled with *Sphagnum cuspidatum* and *Sphagnum magellanicum* also featuring *Drosera rotundifolia* (+). *Narthecium ossifragum* (15%) are also prominent. The acrotelm is variable from 0-5cm in depth. *Eriophorum vaginatum* (5%) is also present. *Pedicularis sylvatica* (+), *Campylopus atrovirens* (+), *Sphagnum imbricatum* (+), *Racomitrium lanuginosum* (+) occur as the bog sloped towards the flush F1.

Complex 2/3 + *Cladonia* + Tear pools
Located in the south of the bog, this is an area of frequent long narrow winding pools, mostly filled with *Sphagnum cuspidatum, Menyanthes trifoliata* and some *Drosera anglica*. The pools are parallel to each other, aligned on Slopes 7-10 indicating their tear-pool origins. The water level in these pools is quite low apparently caused by the active drain D2 located in the vicinity. The pools are interspersed with areas dominated by *Trichophorum caespitosum* (30%), *Cladonia portentosa* (30%), *Carex panicea* (20%), *Eriophorum angustifolium* (20%) and *Calluna vulgaris* (20%). *Cladonia uncialis* (+) and *Pleurozia purpurea* (+) are also present. *Hypnum jutlandicum* and *Erica tetralix* (5%) also occur. Several prominent 1m high *Racomitrium lanuginosum* hummocks occur. *Campylopus atrovirens* is noted at the pool edges. *Sphagnum magellanicum* (10%) and *Sphagnum capillifolium* (10%) are prominent.

Sub-Central Complexes

Complex 7/9 + *Cladonia*
An area dominated by *Calluna vulgaris* (50%). *Cladonia portentosa* (50%) and *Eriophorum vaginatum* (20%) with occasional *E. angustifolium* and *Trichophorum caespitosum* and *Vaccinium myrtillus*. The ground is very wet under the 50cm high *Calluna vulgaris* and 20cm deep *Cladonia portentosa*. Hummocks of *Pleurozium schreberi* are common with *Sphagnum capillifolium* and occasional *S. magellanicum*. This area opens out onto the following area.

Complex 7/9 + *Cladonia* - recently burnt
This area begins with a very clear demarcation line that must be marking a very old fire line. The *Calluna vulgaris* (60%) is still dominant but shorter (20cm) with *Cladonia* down to 15% cover and *Carex panicea* (20%) has moved in. Also a new moss here is *Breutelia chrysocoma*. Good *Sphagnum* (60%) cover - mostly *Sphagnum capillifolium*. *Eriophorum vaginatum* (10%) and *E. angustifolium* (+) are also present.

Central Complexes

Complex 10/7/15
This area is termed central because of the frequent pools, all of which are in-filling with *Sphagnum cuspidatum, Sphagnum magellanicum* and *Trichophorum caespitosum* (10%). *Drosera anglica* and *Rhynchospora alba* also feature in the pools. Between the pools, the vegetation is dominated by *Sphagnum capillifolium* (60%), *Sphagnum magellanicum* (20%) and *Calluna vulgaris* (70%). *Erica tetralix* (10%), *Eriophorum vaginatum* (10%), *Eriophorum angustifolium* (10%), *Cladonia portentosa* (5%) and *Hypnum jutlandicum* (5%) are also common.

6.2.2 Flushes and Soaks

Flush F1: This flush is marked by a change in vegetation colour - *Molinia caerulea* (60%) is dominant with *Calluna vulgaris* (30%) and a few bushes of *Myrica gale* (R1, P12) growing through it. *Eriophorum angustifolium* (10%), *Carex panicea* (15%), *Erica tetralix* (5%), *Eriophorum vaginatum* (5%), and *Cladonia portentosa* (5%) are common. *Potentilla erecta* (+) and *Trichophorum caespitosum* (+) are present. The head of the flush is marked by a patch of *Calluna vulgaris* (1m high) and *Salix* sp. scrub growing over what appears to be a swallow-hole. *Blechnum spicant* is also present. The acrotelm is variable with few *Sphagnum* species - the main species being *Sphagnum capillifolium* (10%). *Narthecium ossifragum* and an algal mat are growing on areas with no acrotelm.

Flush F2: This flush has vegetation which grades from Complex 2 type vegetation. *Molinia caerulea* is co-dominant with some *Myrica gale* close to the drain. This vegetation covers a wide area around intersecting drains. A few *Sphagnum papillosum* hummocks are present.

6.3: DETAILED VEGETATION OF THE HIGH BOG MARGINS

There is a section of old cutaway in the east which is very wet, with *Eriophorum angustifolium* and *Juncus effusus* on flooded cutaway (R1, P9 & P10). There is some *Typha latifolia* present in drains (R1, P11). This area would have good potential for bog restoration work as it is already very wet, it is quite level and does not adjoin any agricultural land. The northern cutaway is dominated by *Molinia caerulea* and *Ulex europaeus* scrub. There is *Betula pubescens* scrub along the bank of the Owengarve river (d3). The cutaway to the south has large turf banks of *Calluna vulgaris* with *M. caerulea, B. pubescens* and *U. europaeus* scrub and slopes to the stream.

7. BOG TYPE

This probably a ridge river bog formed between two river systems.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting

Most of the cutaway has been abandoned. There is some active peat cutting in the west and there are extensive old peat cuttings to the east and south of the bog.

8.1.2 Forestry

There is no forestry on this bog.

8.1.3 Fire History

There is some evidence of burning in the centre of the bog.

8.1.4 Dumping

There is some dumping alongside the track in the eastern cutaway.

8.1.5 Agriculture

There is some cutaway in the north-west has been reclaimed for agriculture. This slopes down to the Moy river.

8.2 NHA BOUNDARY CHANGES

The NHA boundary needs to be expanded to include the cutaway in the south-east and south-west.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

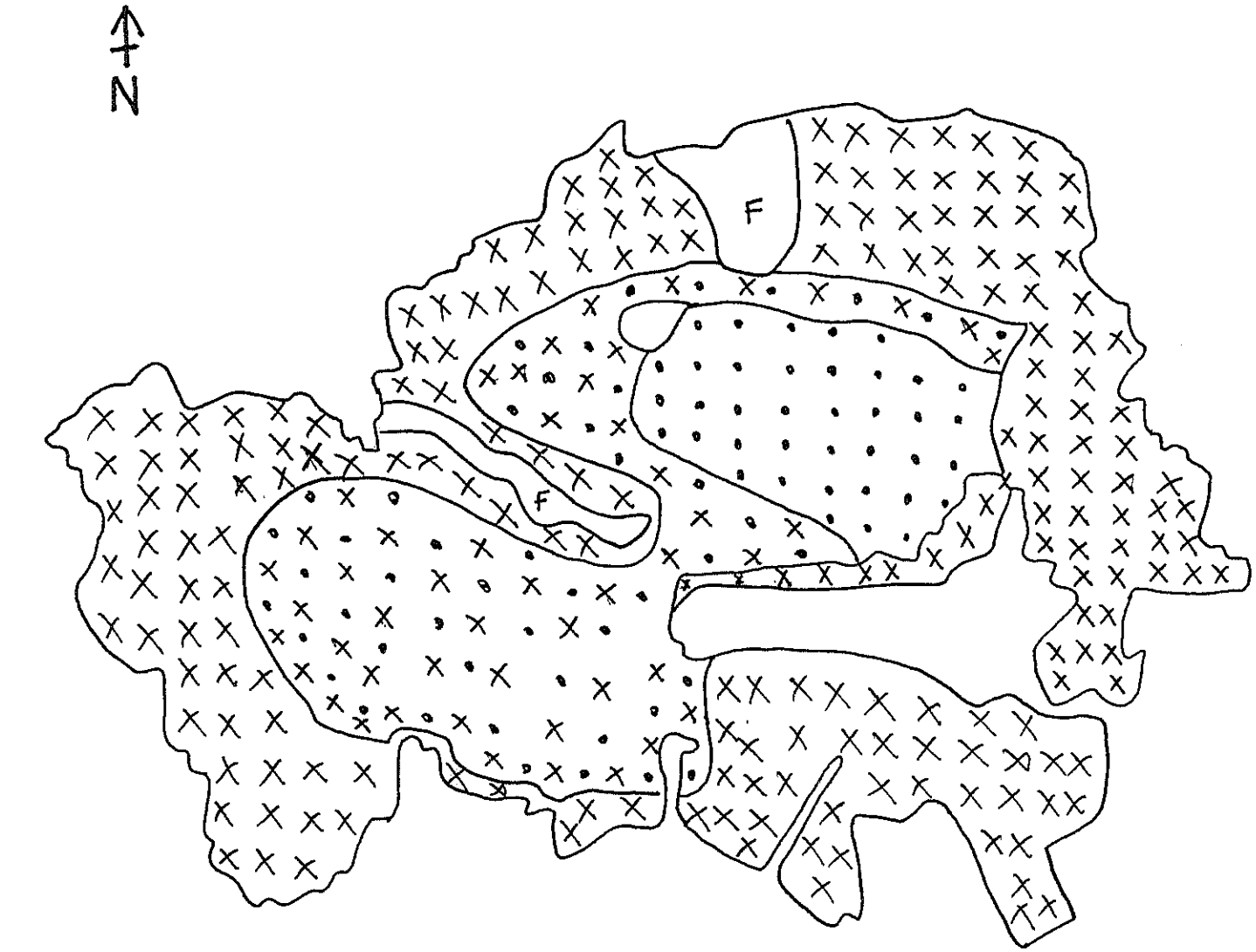
1. This bog is the most north-westerly site and judging by the aerial photograph there seemed to be a large area of intact bog.

2. The visit found that much of the bog had been affected by drainage with a large bog-burst to the south and large areas to the east affected by cutaway.

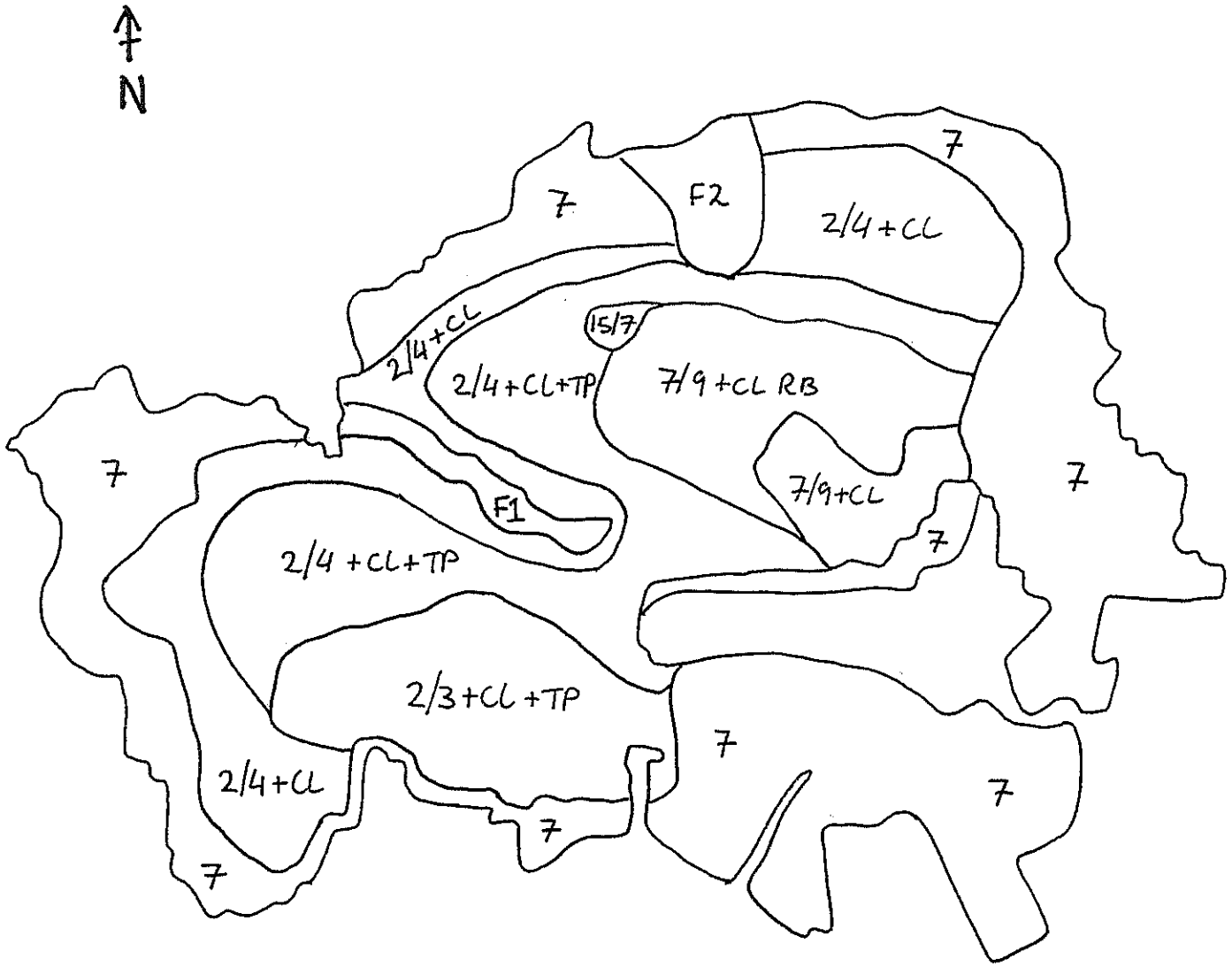
3. Active drainage to the south is having serious impacts on the tear pool system in the south of the bog. There is also natural drainage to the river systems in the north and south.

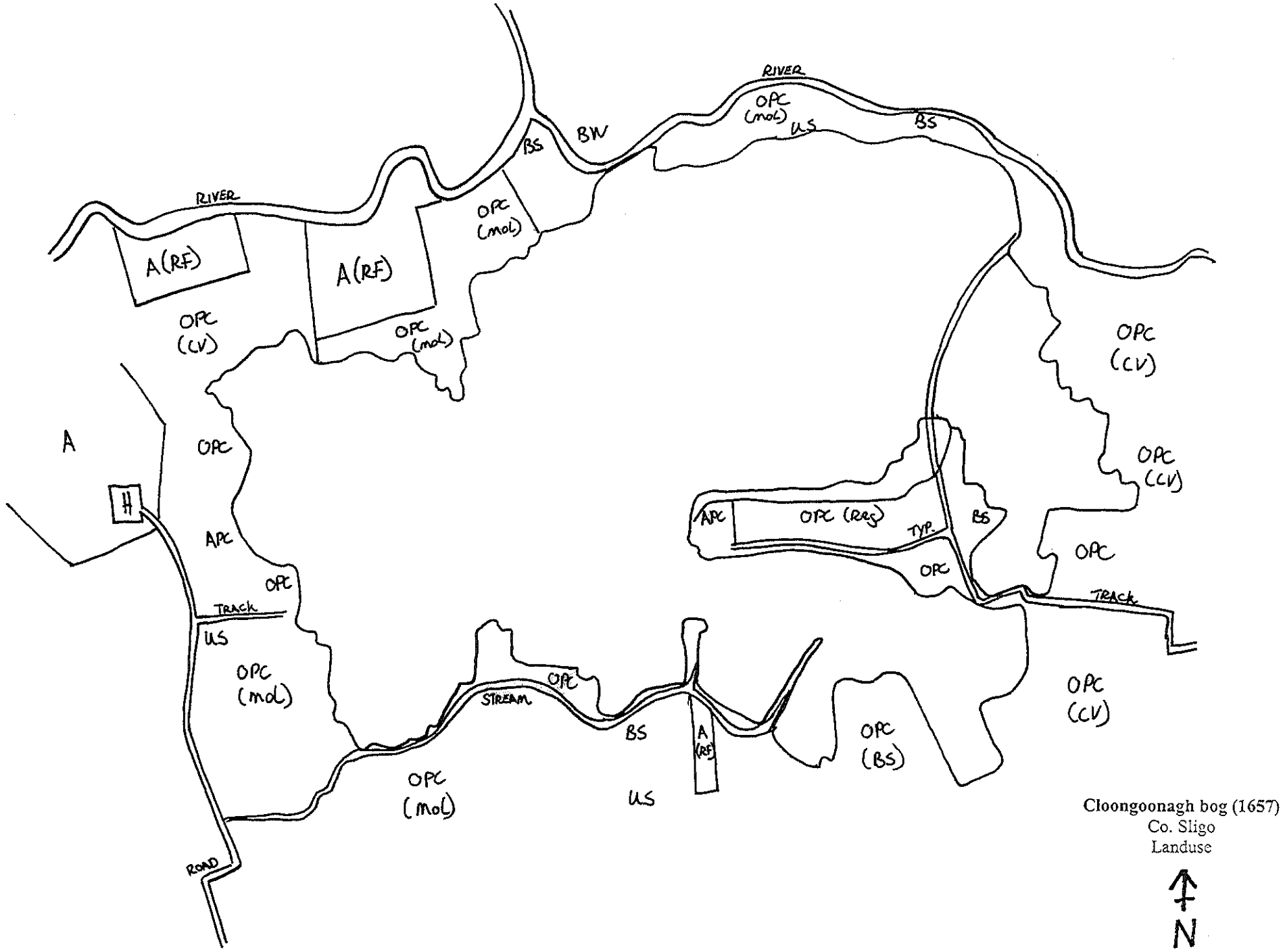
4. Most of the cutaway slopes to river systems and would be unsuitable for bog restoration. The extensive cutaway in the east is very wet and there is active regeneration and would be suitable for bog restoration work.

Cloongoonagh bog (1657)
Co. Sligo
Ecotopes

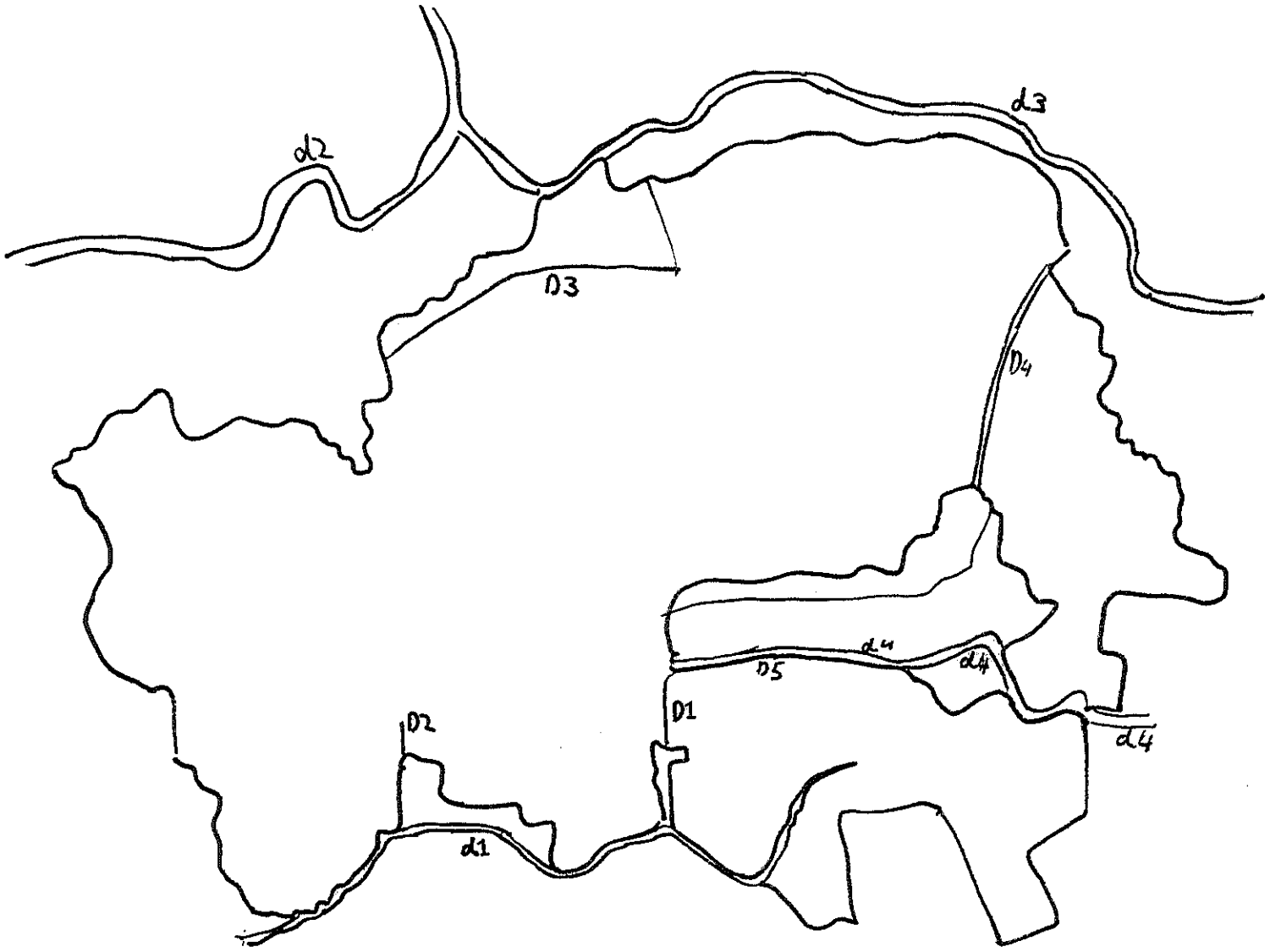


Cloongoonagh bog (1657)
Co. Sligo
Vegetation complexes



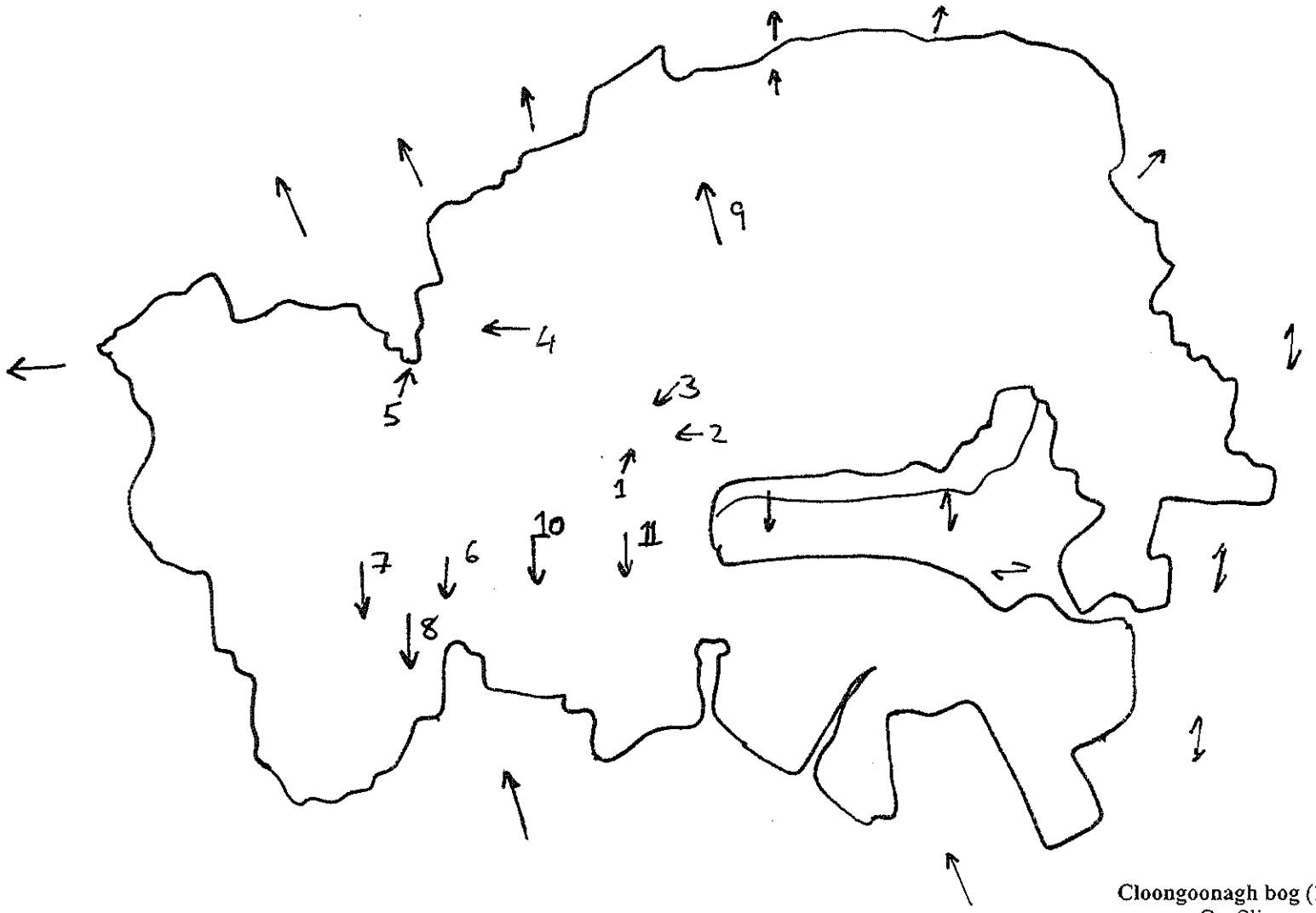


Cloongoonagh bog (1657)
Co. Sligo
Landuse



Cloongoonagh bog (1657)
Co. Sligo
Drainage

N



Cloongoonagh bog (1657)
Co. Sligo
Slopes

N

CLOONLOUMMORE BOG, CO. CLARE

1. SUMMARY OF SITE DETAILS

NHA no.:	Not an NHA	6" Sheet:	CE35
Grid Ref.:	R530 766	1:126,000 Sheet:	17
O.S. Aerial Photo:	47(6242)	1:50,000 Sheet:	58
Other Photo:		High bog area (ha):	59.9
Date(s) of Visit:	2/12/1999		

Townlands: Cloonloum More, Clooncool

2. INTRODUCTION

2.1 BACKGROUND

This previously unsurveyed bog was selected for survey as it is in Co. Clare where there are few raised bogs recorded. From the aerial photograph it appears that the bog has been extensively cut in the past, but there is no active peat cutting and no active drainage.

2.2 LOCATION AND ACCESS

This is a small raised bog, 1km west of the village of O'Callaghansmills in east County Clare. The site can be accessed from a forestry track off the local road leading south from O'Callaghansmills that crosses the East Clare Way.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Tulla weather station for the years 1960-90, indicates that the area recieves appproximately 1085mm of rainfall annually (R). The nearest synoptic station at Shannon Airport, indicates that the site has up to 160 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Shannon Airport of 539 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 1085 - 539 = 546mm.
(See Fig. 1)

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

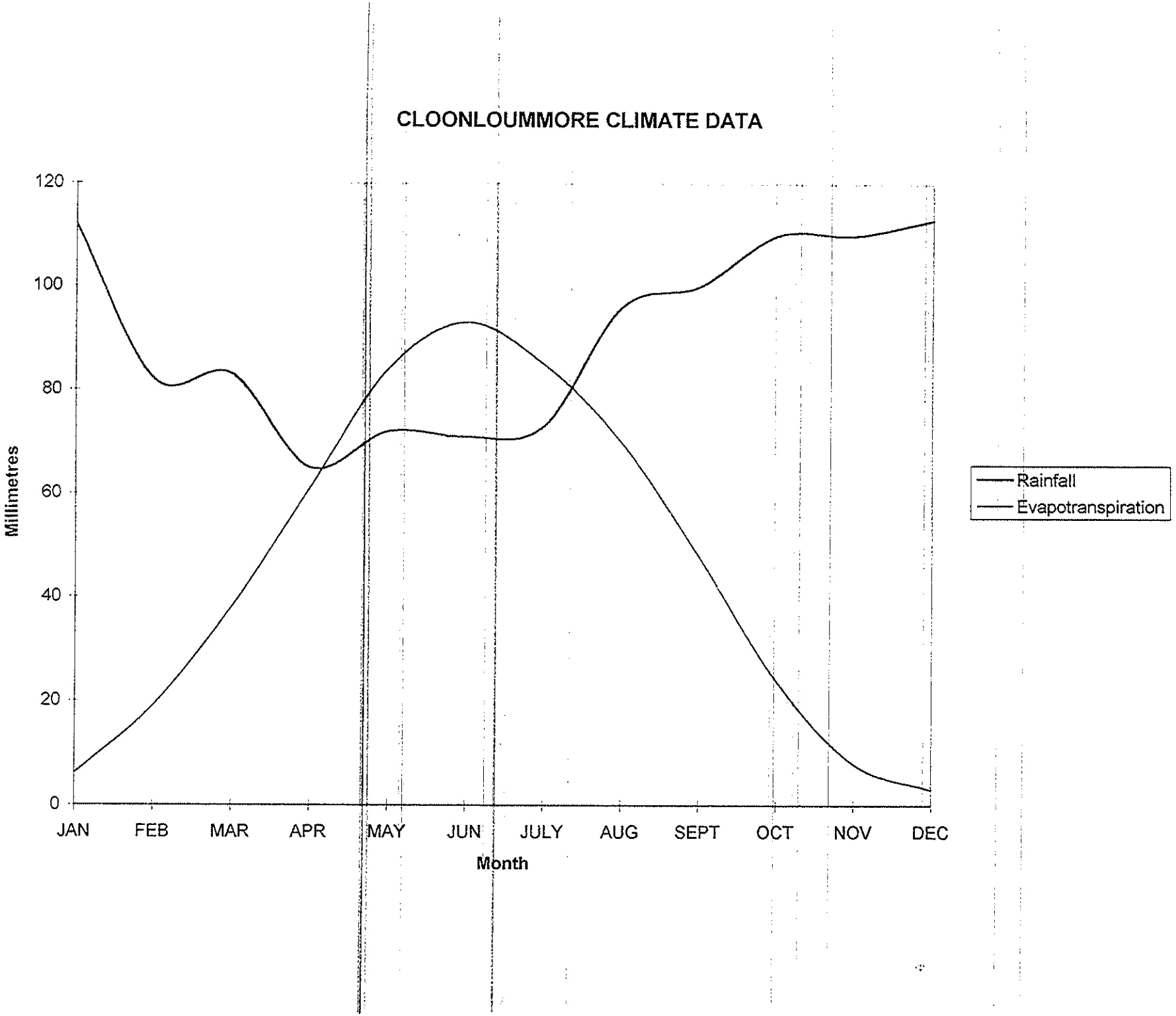
This bog has many internal slopes associated with Difco peat-cutting and drainage.

Slope 1,2,& 3: 0.25m/100m

Slope 4 & 5: 0.5m/100m

Slopes 6 & 7: long slopes to the margins 0.25m/100m

Slopes 8,9 & 10: Short slopes on a central ridge (1m/100m)


CLOONLOUMMORE CLIMATE DATA
120
100
80
60
40
20
0
Millimetres
JAN
FEB
MAR
APR
MAY
JUN
JULY
AUG
SEPT
OCT
NOV
DEC
Month
Rainfall
Evapotranspiration

Slopes 11-14: 0.5m/100m

Slope 15: 0.25m/100m

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

Recent geological maps by Hitzman (Chevron/GSI, 1993) show that the area is underlain by massive pale grey biomicrites called Waulsortian limestones (fossiliferous mudmounds).

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peat

The peat at this site was classified by Hammond as Man-Modified.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

Several drains cross the margins of the high bog. Most of these are old and in-filled except for two large drains in the north-west.

Drain D1: An old, in-filling drain 0.5m wide and 10cm deep filled with aquatic algae. *Rhynchospora alba* and *Calluna vulgaris* are also in-filling the drain with the latter species and *Carex panicea* at the margins. This drain is having little effect on the surrounding vegetation.

Drain D2: A similar drain, running parallel to D1, 10m apart.

Drain D3: A very old drain running north-west form a small pool system at top of D1 and D2.

Drain D4: A 1.5m wide and 0.5m deep drain. This drain is water-filled with no flow. It is in-filling with *Sphagnum cuspidatum* and *Drosera anglica.*

Drain D5: An old in-filling drain running parallel to D4, 10m apart. It is almost completely in-filled with *Eriophorum angustifolium* and *Rhynchospora alba.* This drain is almost completely dried out at the eastern end.

Drain D6: An old in-filling drain running from D5 to cutaway.

Drains D7and D8: Two old dry drains in the south-eastern margin, filled with *Calluna vulgaris.*

Drains D9 and D10: Two old, dry drains, in-filling with *Calluna vulgaris* by the cutaway margin in the south-east.

5.2.2 Bog Margin Hydrology

Only four drains of note in the cutaway, these are in the eastern old cutaway.

Drains d1 and d2: These are two parallel drains in old cutaway to the south-east. They are water-filled with no flow.

Drains d3 and d4: Two parallel drains in old cutaway to the east, lined by *Ulex europaeus* scrub.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This bog was located in a small basin to the west of O'Callaghansmills village. It was bordered by mineral soil on all sides with Lough Avuddig at its southern tip. The small Lough Garr was located at the south-east margin. The drainage appears to be towards Kilgory Lough to the north-east.

6. VEGETATION

6.1 VEGETATION SUMMARY

This bog is very uniform with only two vegetation types noted. Most of the bog is the one marginal vegetation type with a small area of sub-marginal vegetation with algal pools.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex 3a/7/2 B (R2, P9; P10; P11; P12 & P13)
This vegetation complex consists of a mosaic of two vegetation types depending on slope and water flow across the bog surface. The wetter areas are co-dominated by *Rhynchospora alba* (50%) and *Trichophorum caespitosum* (30%). The ground is soft underneath with an acrotelm varying from 0-5cm. The prominent *Sphagnum* (80%) cover is composed of *S. capillifolium* (50%) and *S. cuspidatum* (30%). *Eriophorum vaginatum* (30%) is also prominent with frequent *Andromeda polifolia* and *Narthecium ossifragum* (10%). Some *Erica tetralix* (5%) and *Calluna vulgaris* (+) are present with *Carex panicea* (+) growing through the vegetation.

On the drier areas the ericoids become more prominent and *Sphagnum* species all but disappears. *Rhynchospora alba* also disappears. The vegetation in these areas is co-dominated by *Calluna vulgaris* (30%), *Carex panicea* (30%) and *Narthecium ossifragum* (30%) with prominent *Erica tetralix* (10%) and *Eriophorum vaginatum* (5%). There is no acrotelm and *Trichophorum caespitosum* (10%) is also prominent. The area has been burnt about five years ago and relicts of *Sphagnum capillifolium* (+) and *S. papillosum* (+) are present. Also small clumps of *Sphagnum magellanicum* and *S. fuscum* are present on areas where the burn may not have been so fierce. On the slope towards the sub-marginal area water-flow has enabled *Sphagnum* regeneration with several clumps of *Sphagnum magellanicum* (10%) doing well. Also *S. capillifolium* (10%) is noticeable. On the drier parts (remnants of burnt hummocks) *Hypnum jutlandicum* (5%) is doing well and a few *Leucobryum glaucum* (+) hummocks are also present.

Sub-Marginal Complexes

7/9 + Algal Pools, Burnt
An area of small algal pools which do not appear to be following a pattern, most are small and algae-filled. A couple of larger ones, however, contain *Sphagnum cuspidatum, Menyanthes trifoliata* and *Drosera anglica* as well as algae. A spike of flowering *Andromeda polifolia* is growing in one pool. Some *Narthecium ossifragum* and *Eriophorum angustifolium* are encroaching from pool edges. In between the pools it is clear that there has been burning although perhaps less recent than surrounding areas. Here the vegetation is dominated by *Calluna vulgaris* (60%) with prominent *Eriophorum vaginatum* (15%) and *Eriophorum angustifolium* (15%). *Narthecium ossifragum* (10%), *Carex panicea* (5%), *Erica tetralix* (10%) and *Trichophorum caespitosum* (5%) are also prominent. The ground is soft underneath with a variable acrotelm of 0-5cm. *Sphagnum* cover is good at 40% with plenty of hummocks of *S. capillifolium* (25%), *S. papillosum* (10%) and some *S. auriculatum* (5%). *Hypnum jutlandicum* (+) is found on drier parts and there are several dead hummocks of burnt moss. *Sphagnum* regeneration is better here, possibly due to water influx into this depression.

Sub-Central Complexes

No sub-central complexes were found at this site.

Central Complexes

No central complexes were found at this site.

6.3 DETAILED VEGETATION OF THE HIGH BOG MARGIN

Old, abandoned cutaway surrounds most of this bog. It is dominated by *Molinia caerulea* and *Ulex europaeus* scrub. There is, however, some active Difco cutting in the north and south-east of the site. A small lake to the south, Lough Gara, is surrounded by *Phragmites australis* and *Typha latifolia*.

7. BOG TYPE

This site is probably a basin bog that was never much bigger than its present size (including cutaway).

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting

There is some limited Difco peat cutting in the north and south-east of the site.

8.1.2 Forestry

There is a conifer plantation to the south of the bog on a cutaway area.

8.1.3 Fire History

The bog has been extensively burnt in the past.

8.1.4 Dumping

There is dumping at the end of the bog track and on an old cutaway area in the south of the bog.

8.2 NHA BOUNDARY CHANGES

This bog is not an NHA at the moment, but we believe the site to be worthy of this designation.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

1. This site was surveyed as it is only one of two raised bogs in County Clare. It is not an NHA but was located using aerial photographs and due to its location was deemed worthy of a visit.

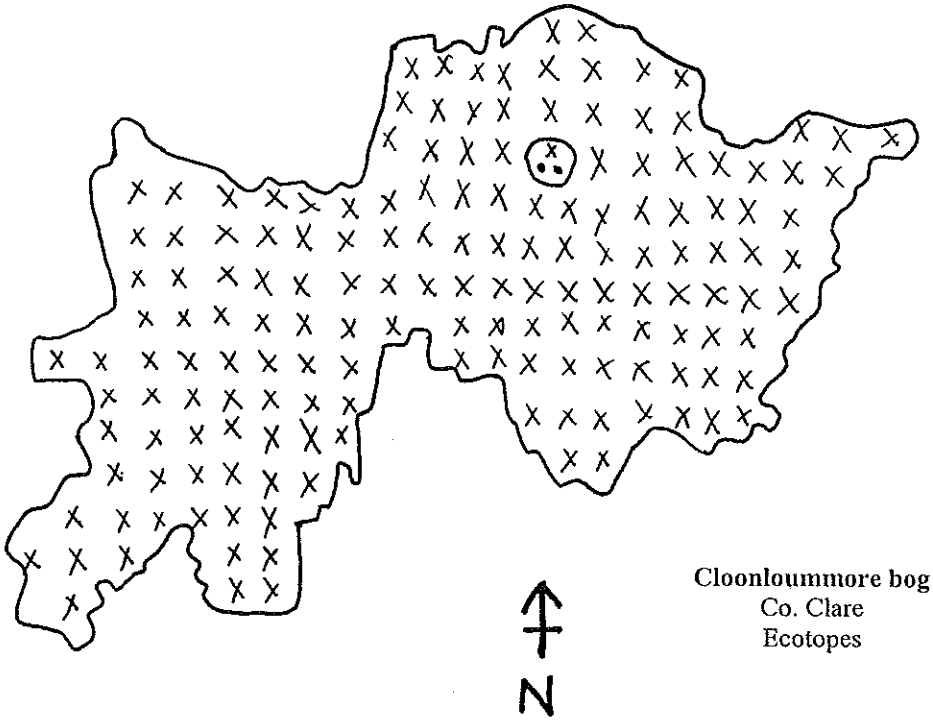
2. The visit determined that although not an active bog worthy of SAC designation, the bog together with Lough Gara would make a suitable NHA.

3. Old drainage on the bog has resulted in a deterioration of the bog with very little *Sphagnum* cover present.

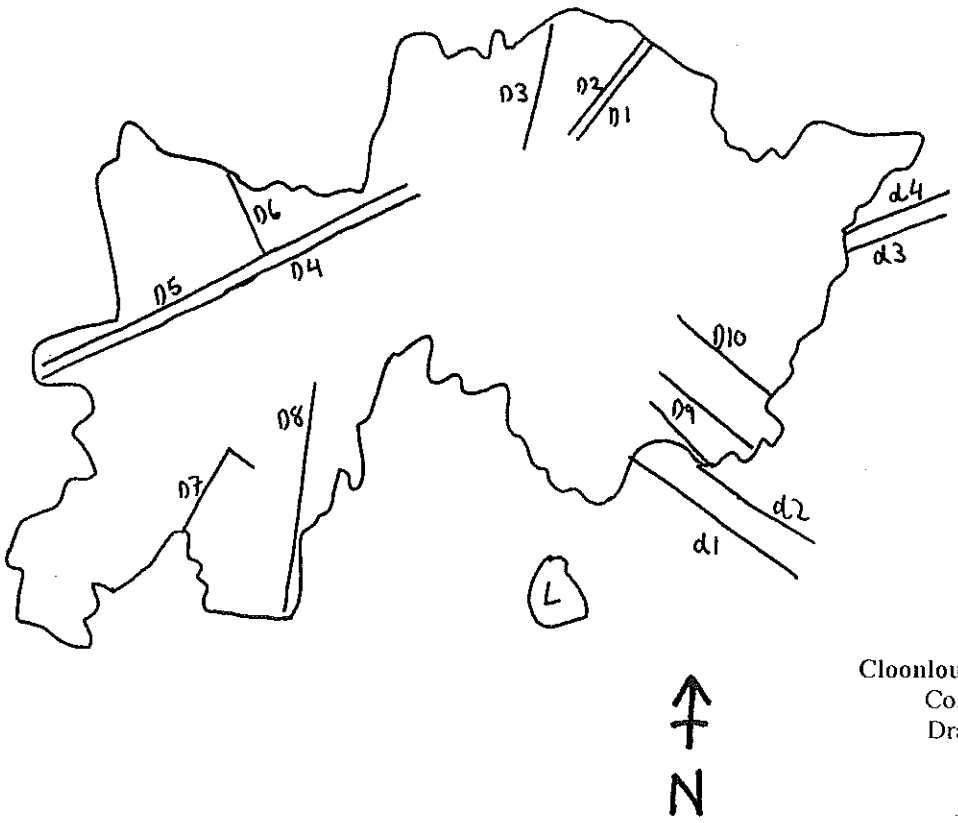
4. Most of the cutaway is abandoned but there is some active Difco peat-cutting on the high bog.

RECOMMENDATION

This bog is not a suitable candidate for SAC status but with the scarcity of this habitat in the region, we recommend that it be afforded NHA status.

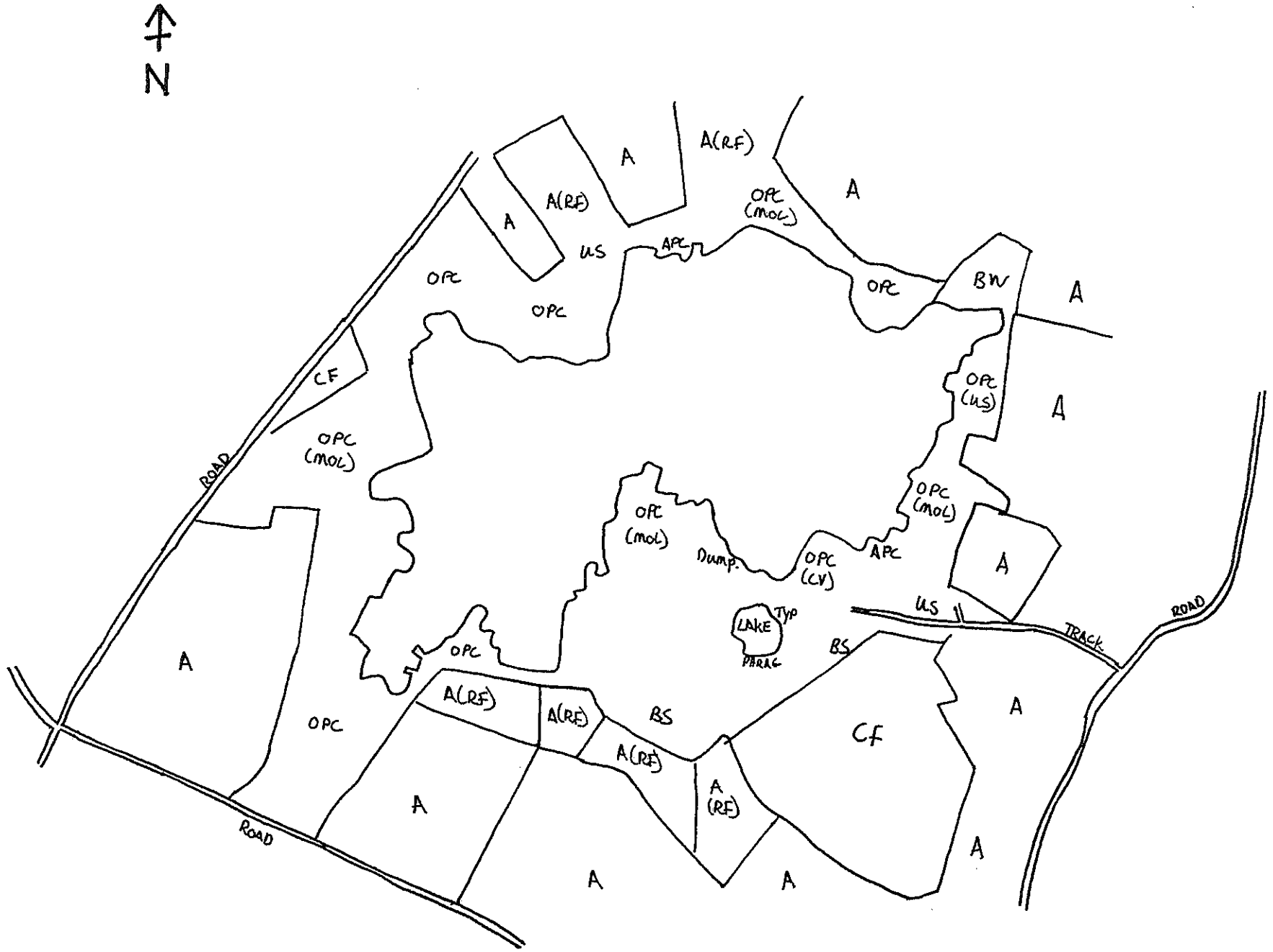


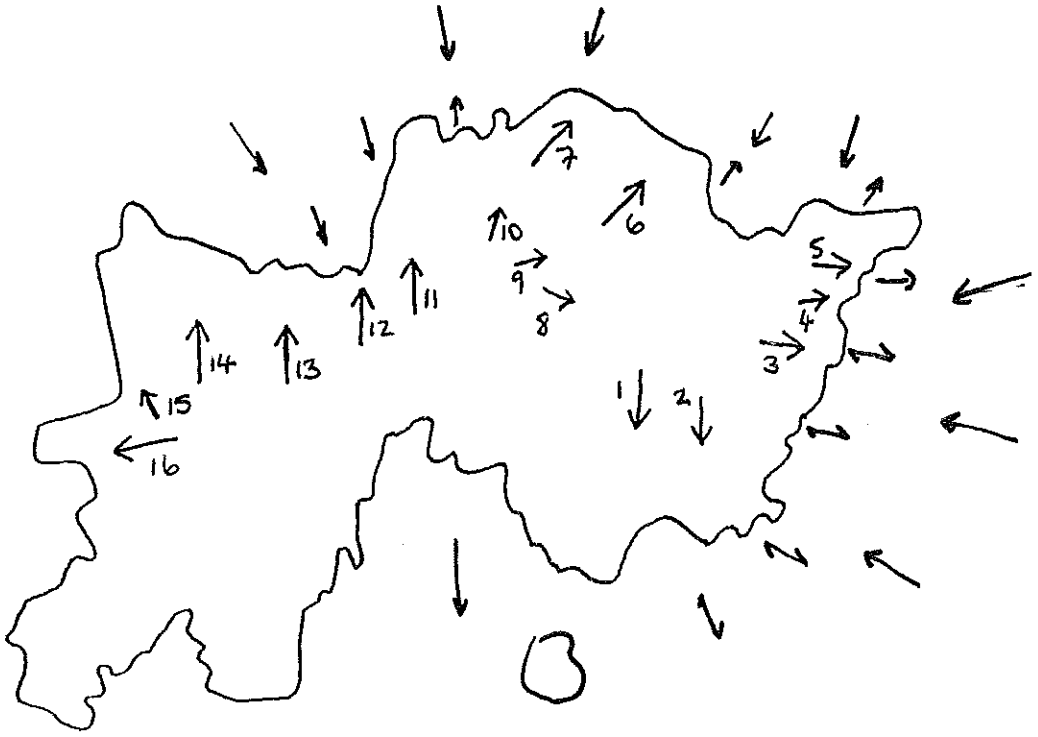
Cloonloummore bog
Co. Clare
Ecotopes



Cloonloummore bog
Co. Clare
Drainage

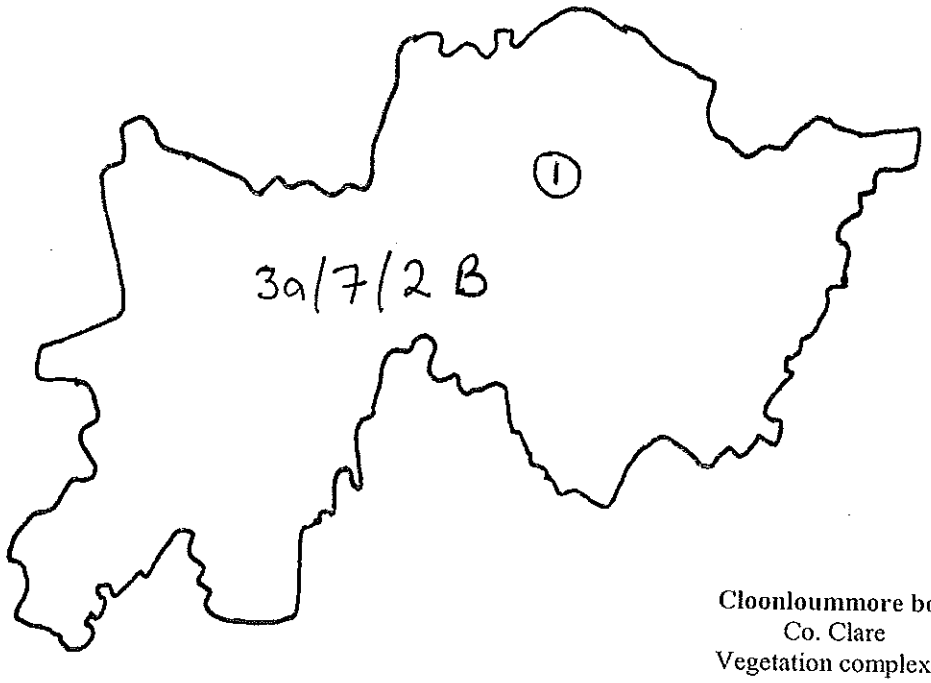
Cloonloummore bog
Co. Clare
Landuse





Cloonloummore bog
Co. Clare
Slopes

N



Cloonloummore bog
Co. Clare
Vegetation complexes

N

1 = 7/9 + AP B

CLOONMORE/CLOONFELLEY BOG, CO. GALWAY

1. SUMMARY OF SITE DETAILS

NHA no.:	247	6" Sheet:	GY17 & 18
Grid Ref.:	M560 630	1:126,000Sheet:	11
G.S.I. Aerial Photo:	33 (7999)	1:50,000 Sheet:	39
Other Photo:	M133	High bog area (ha):	176.4
Date(s) of Visit:	25/1/2000		

Townlands: Slieve, Woodfield, Carrowkeelanahglass and Cluid.

2. INTRODUCTION

2.1 BACKGROUND

This site was selected for a visit as it is a large site and has a semi-intact margin to the river in the south-east. From the aerial photograph this site appears to have been extensively drained, with the two flush systems being actively drained. It may be possible to block these drains and so this site was selected to examine the restoration possibilities.

The 1993 NHA survey, found pools and the frequent presence of *Sphagnum pulcrum*.

2.2 LOCATION AND ACCESS

A large bog located 7km west of Glenamaddy and 4km east of the village of Dunmore. It can be accessed off the local roads east of Dunmore around the townland of Cluid.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Dunmore weather station for the years 1960-91, indicates that the area recieves appproximately 1098mm of rainfall annually (R). The nearest synoptic station at Claremorris indicates that the site has up to 177 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

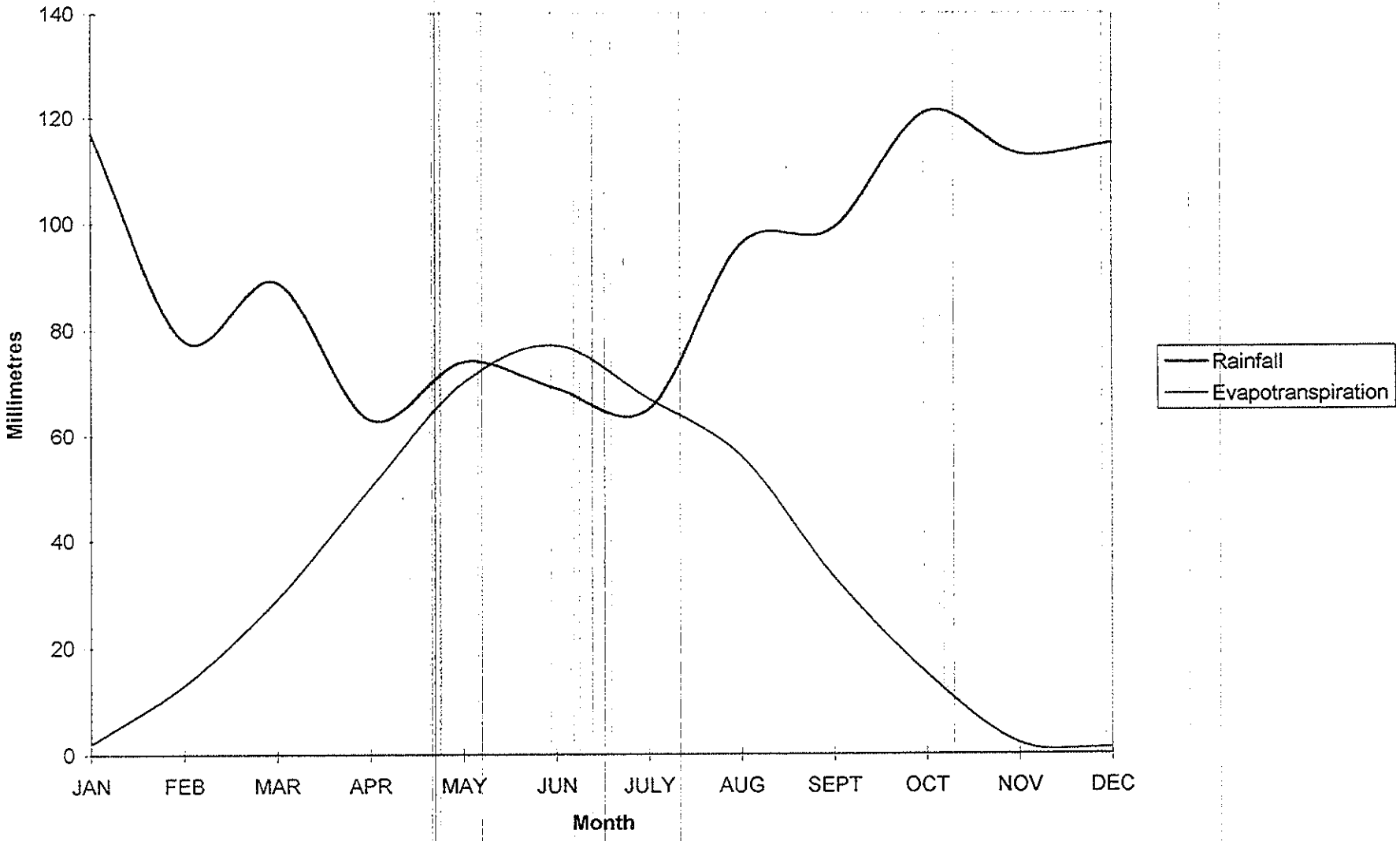
Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Claremorris of 415 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 1098 - 415 = 683mm.
(See Fig. 1)

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

This bog has steep internal slopes associated with the two flushes and the extensive drainage channels. There is also a slope towards the stream in the south-east with a natural margin between the bog and the stream.

CLOONMORE/CLONFELLY CLIMATE DATA



4.1.1 Slopes of the High Bog

Slope1 = A short, marginal slope towards active cutaway (1m/25m).

Slope 2 = An internal slope associated with the flush and old drainage systems (1m/50m).

Slope 3 = A marginal slope associated with tear pools and cutaway (1m/100m).

Slope 4 = An internal slope towards the stream in the south-east (50cm/100m).

Slope 5 = A marginal slope associated with cutaway (1m/50m).

Slope 6 = An internal slope towards the flush (1m/25m).

Slope 7 = An internal slope towards the southern cutaway and associated with drainage (1m/100m).

4.2 TOPOGRAPHY OF THE BOG MARGINS

There is a steeply sloping margin to the stream (2-3m/50m). The cutaway to the north-east is level and the cutaway to the north is gently sloping to the cut-face. These would be suitable for restoration work. The cutaway to the west slopes away and is unsuitable for restoration.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

Information from the 1840's map indicates that this bog is surrounded by limestone drift consisting of limestone and sandstone grit and cherty pebbles.

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peat

The peat at this site was classified by Hammond as a mix of Transitional and Man-Modified types.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

This bog is extensively drained by two large drain systems which drain two older flushes. These leave only the south-west section undrained.

Drains D1: A series of drains, 0.5m wide, 1m deep with some water at their bases. At the face bank these drains flow north into d1, but further into the bog due to internal slopes, these drains flow south into D2 and the water level is higher.

Drain D2: A 1.5m wide fast-flowing drain, which is flowing south-east. There are bare peat sides to this drain, topped by *Calluna vulgaris*. There are overgrown spoil heaps by the drain. It runs along the line of an old flush (F1) in the east.

Drain D3: A 1.5m wide and 1m deep drain with 20cm of water. There is no flow in this drain but it joins up with D2.

Drain D4: A 0.5m wide and 1m deep drain, with 10cm of water. This drain runs through an old flush (F2) and numerous smaller drains flow into it.

Drains D5: A series of drains running from D4 to cutaway. These are 10m apart, 0.5m wide and 0.5m deep. These have been excavated recently and there is a slight flow to the north-east and flush F2.

Drain D6: Part of the series of drains described as D5, but completely water-filled with some *Sphagnum cuspidatum*. Large mounds of *Calluna vulgaris* with *Phragmites australis* occur here and the drain is in-filling with *Eriophorum angustifolium*, *C. vulgaris* and *P. australis*. There is some flow south-west towards the cutaway.

Drain D7: An old 2m wide drain filled with *Sphagnum cuspidatum*, some *Molinia caerulea* and *Eriophorum angustifolium*. This drain has an outflow into the stream (d3) which has been in-filled with *M. caerulea*.

Drain D8: A *Sphagnum cuspidatum*-filled drain with *Molinia caerulea* and *Eriophorum angustifolium*. It occurs on top of the transitional slope to the stream.

Drain D9: 1m wide drain filled with *Sphagnum cuspidatum*, sloping down to the margin.

Drain D10: An old drain completely in-filled with *Eriophorum vaginatum* and *Sphagnum capillifolium*.

Drains D11: A series of drains along the bog margin in-filled with *Molinia caerulea* and some *Sphagnum cuspidatum*.

Drains D12: Two parallel drains, 1m wide with a slight flow southwards. In-filling with *Molinia caerulea* and *Rhynchospora alba* with *Calluna vulgaris* at margins. Some *Sphagnum cuspidatum* and *S. auriculatum* were also present.

Drain D13: An old, 0.5m wide drain in-filled with *Calluna vulgaris* and *Narthecium ossifragum*, with some *Sphagnum cuspidatum*.

Drain D14: A *Molinia caerulea*-filled drain, 0.5m wide, 1m deep with some water at base, but little flow.

Drains D15: A series of *Molinia caerulea*-lined drains running into D 14. Some iron staining in the water indicating some ground water influence.

Drain D16: Water-filled drain, 0.5m wide with some iron staining.

Drain D17: A deepened flush, 1m wide and 1.5m deep with tall *Calluna vulgaris* at the face-bank. There is water at the base of this drain flowing south back to D2.

Drains D18: A series0.5m wide drains lined with *Molinia caerulea*. They are 0.5m deep with 20cm of water, flowing south towards D2.

5.2.2 Bog Margin Hydrology

There is the usual drainage associated with cutaway to the north and there is a stream running to the south-east with a semi-natural margin to the bog.

Drains d1: A series of cutaway drains running from the face-bank to the bog-track. They are 1m wide and 2m deep with some water at the base. The peat is thin here, less than 2m with marl at the base of the drain.

Drain d2: A large drain in cutaway, 1.5m wide with a high water-level. There is little flow and it is filled with *Juncus effusus, Calluna vulgaris* and *Betula pubescens* scrub along banks.

Drain d3: A fast-flowing stream, 5m wide, flowing eastwards with natural margin down from the bog to the channelled banks. There is a conifer plantation on the opposite bank.

Drain d4: A 1m wide drain flowing by the road with *Juncus effusus* and *Ulex europaeus*.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This bog originally bordered the Sinking River along its southern boundary. A tributary to this river flowed by the eastern boundary and it was bounded by mineral soil to the north and west. Originally the drainage through the bog was to a river in the south-east.

Description of the present-day bog
This bog still has a semi-natural margin to the river in the south-east but a lot of the southern area is now cutaway. The natural drainage channels have been affected by man-made drains, with the outflow now directed along new drains. These drains have iron staining in the water, indicating a mineral influence on the drainage. There are areas of level cutaway in the north which have potential for restoration work and with the blocking of drains, the original natural drainage may be re-instated.

6. VEGETATION

6.1 VEGETATION SUMMARY

No central or sub-central ecotopes were found on this bog. Most of the bog vegetation was classified as marginal due to the effects of drainage.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex ER/2 + Cl
The vegetation at the north of the high bog, is dominated by *Eriophorum angustifolium* (60%) and *Cladonia portentosa* (40%). *Calluna vulgaris* (20%) is prominent but most of it appears dead. *Trichophorum caespitosum* (30%) is very prominent also - especially on the sloping edges. The ground is quite hard with no real acrotelm although there were some patches of *Sphagnum* (20%) (mostly *S. capillifolium*). *Narthecium ossifragum* is prominent, especially moving inwards and *Andromeda polifolia* occurs occasionally. *Carex panicea* (10%) is notable along with *Erica tetralix* (5%). There are patches of *Hypnum jutlandicum* (5%) and dead *Sphagnum*.

Complex 7/6 + Cl + tear pools
There is a change in the vegetation as the slope changes direction (Slope 1 to Slope 2). *Calluna vulgaris* (30%) seems healthier with just half of the population dead here. *Cladonia portentosa* (30%) is very prominent along with *Erica tetralix* (10%), *Carex panicea* (15%) and *Narthecium ossifragum* (15%). *Eriophorum vaginatum* (10%) and *Eriophorum angustifolium* (10%) are noticeable and *Trichophorum caespitosum* (5%) grows through the vegetation. Despite the ground being wet and damp underneath there is no acrotelm. There are some small patches of *Sphagnum capillifolium* but several patches of dead *Sphagnum* are also present. The small area of bare peat features patches of *Campylopus introflexus* (+), *Cladonia floerkeana* and *Cladonia pyxidata*. There are long and narrow, algal tear pools containing *Sphagnum cuspidatum* (+) and *Eriophorum angustifolium* with *Drosera anglica, Rhynchospora fusca* and *R. alba*. One pool contains a *Sphagnum papillosum* hummock. Many of the *Calluna vulgaris* plants featured lichen epiphytes. With the increasing slope, the tear pools were drying out and *Molinia caerulea* was associated with some pools. There are occasional occurrences of *Leucobryum glaucum* (+), *Hypnum jutlandicum* (+) and *Huperzia selago* (+).

Complex 7/9/6

A large complex occurring either side of the flushes. The vegetation is co-dominated by *Calluna vulgaris* (60%) and *Eriophorum vaginatum* (30%) with prominent *Narthecium ossifragum* (15%). *Carex panicea* (15%) and *Cladonia portentosa* (15%) were also notable. *Rhynchospora alba* (10%) is prominent in parts. The ground is wet and soft underfoot primarily due to dead moss. There are a few living mosses - *Hypnum jutlandicum* (+) and *Dicranum scoparium* (+) and the occasional patch of *Racomitrium lanuginosum* and *Leucobryum glaucum*. There is also a notable blanket of algae on the ground. The spoil alongside the drains in the area is largely colonized by *Campylopus introflexus* and algae.

Complex 2/3

A flat, marginal area at the north-east of the site, co-dominated by *Trichophorum caespitosum* and *Carex panicea*. This area runs from the cutaway margin back to Flush 1. The ground is hard and there is no acrotelm despite the presence of *Sphagnum capillifolium* (15%). This vegetation also occurs in the east and is co-dominated by *Trichophorum caespitosum/Carex panicea* and *Calluna vulgaris*. There is prominent *Cladonia portentosa* (25%) and *Narthecium ossifragum* (15%) cover. The area is cut off from the bog by several drains. *Pedicularis sylvatica* (+) is also present.

Complex 2/3 + Cl

This vegetation is similar to the complex described above but with an abundance of *Cladonia portentosa* (40%).

Complex 7 + *Eriophorum angustifolium*

The vegetation is dominated by dead *Calluna vulgaris* (50%) and *Eriophorum angustifolium* (40%). It seems to be the relict of a good hummock/hollow system. *Sphagnum* occurs in hummocks of *S. capillifolium* and occasional patches of *S. pulchrum, S. magellanicum* and *S. subnitens* but the hollows are poor with a lot of bare peat. Some *Narthecium ossifragum* and *Trichophorum caespitosum* tussocks are present and several patches of *Racomitrium lanuginosum* (5%) and *Cladonia portentosa* (10%) are prominent. The north-eastern part of this complex features slightly better vegetation. *Calluna vulgaris* and *Eriophorum angustifolium* co-dominate with prominent *Cladonia portentosa* (20%) and *Carex panicea* (15%). There are frequent tear pools featuring some *Sphagnum cuspidatum, Drosera anglica* and *Menyanthes trifoliata* but they are drying out. The ground here is very soft underfoot with good *Sphagnum* cover (20%) - *S. capillifolium, S. papillosum, S. fuscum* (+) and *S. pulchrum* (+). *Cladonia uncialis* (+), *Andromeda polifolia* (+), *Hypnum jutlandicum* (+), *Trichophorum caespitosum*(10%) and *Rhynchospora alba* (10%) are all noted present.

Complex 7/2

On the slope between Complexes 7 + ER and 3/7, the area is co-dominated by *Calluna vulgaris* and *Trichophorum caespitosum. Andromeda polifolia* (+) and *Campylopus atrovirens* (+) are also present here.

Complex 3/7

A marginal complex dominated by *Carex panicea* (50%) and dead *Calluna vulgaris* (30%). *Trichophorum caespitosum* (15%), *Narthecium ossifragum* (5%) and *Cladonia portentosa* (20%) are prominent. *Molinia caerulea* becomes notable right at the edge where short drains have been excavated. *Cladonia uncialis* (+) and *Erica tetralix* (5%) are present with *Eriophorum angustifolium* (10%) also strong, especially at the margins where there is cattle poaching damage.

Complex 9/6 + Cl + ER

The vegetation is co-dominated by *Eriophorum vaginatum* (60%) with *Eriophorum angustifolium* (40%) and *Narthecium ossifragum* (30%). There are small patches of *Sphagnum papillosum* (5%) and the ground underfoot is soft and wet with a lot of dead *Sphagnum*. Some sort of old track crosses the area and *Sphagnum pulchrum* is associated with it.

Complex 7/6 + Cl

The vegetation is similar to Complex 7/6 + Cl + TP described above. However, there are no tear pools due to a lack of slope. The ground is hard with no acrotelm and very little moss cover.

Complex 7/9/3 + Cl
The vegetation is co-dominated by *Calluna vulgaris* (40%)/ *Eriophorum vaginatum* (25%)/*Cladonia portentosa* (25%). *Carex panicea* (10%) and *Rhynchospora alba* (10%) are also prominent. There is a lot of bare ground with dead mosses. The area is divided by newly excavated drains with *Narthecium ossifragum* (5%) and *Campylopus introflexus* (10%) colonizing the bare peat of the spoil. *Trichophorum caespitosum* (10%) is prominent growing through the vegetation but not in tussocks. The whole area is pock marked with hollows - some containing standing water and small patches of *Sphagnum cuspidatum*.

Sub-Marginal Complexes

Complex 7a + Cl + TP
There are frequent tear pools in this area containing plenty of *Sphagnum cuspidatum, Drosera anglica, Eriophorum angustifolium* and *Rhynchospora alba*. A few also contain *Rhynchospora fusca*. The acrotelm is variable at 0-5cm and the *Sphagnum* cover is good with *S. papillosum, S. capillifolium, S. fuscum, S. tenellum* and *S. pulchrum*.

The microtopography of the area is varied with the vegetation in between the pools dominated by *Eriophorum angustifolium* (30%)/ *Cladonia portentosa* (30%)/ *Calluna vulgaris*(30%). *Narthecium ossifragum* (20%) is also prominent with *Carex panicea* (15%) and *Trichophorum caespitosum* (10%). *Vaccinium oxycoccus* (+) and *Andromeda polifolia* (+) are noted along with *Hypnum jutlandicum* (+), *Campylopus atrovirens* (+), *Cladonia uncialis* (+) and *Pleurozia purpurea* (+). *Huperzia selago* (+) is also quite notable.

Complex 7/9
The vegetation is similar to Complex 7/9/6 but there are a lot of bare hollows indicating that a good pool system occurred here before drainage. To the north of this small complex is a small area of large *Calluna vulgaris* plants interspersed with *Phragmites australis*. Bog moss cover is poor with just 5% cover of *Sphagnum capillifolium*.

Complex 9/2/7 + Cl
Just to the east of the drains, the vegetation is co-dominated by *Trichophorum caespitosum* (30%)/ *Eriophorum vaginatum* (60%) and *Calluna vulgaris*. All *C. vulgaris* plants are dead with some bearing lichen epiphytes. *Narthecium ossifragum* (15%) and *Cladonia portentosa* (20%) are also prominent. *Carex panicea* (5%), *Andromeda polifolia* and *Cladonia uncialis* (+) are notable. There are several isolated, large *Sphagnum imbricatum* hummocks featuring *Vaccinium oxycoccus* (+), *Hypnum jutlandicum* (+) and some *Racomitrium lanuginosum* (+).

Sub-Central Complexes

No sub-central ecotopes were found on this site.

Central Complexes

No central ecotopes were found on this site.

6.2.2 Flushes and Soaks

Flush 1: This long, sinuous flush runs from the northern cutaway towards drain D2 and it meets the drain at one point. The flush flows out towards the north-east margin. It is dominated by *Molinia caerulea* with prominent *Calluna vulgaris* with some *Trichophorum caespitosum* coming in. The ground is harder here than at Flush 2 but there are some *Sphagnum capillifolium* patches. Occasional *Betula pubescens* bushes with a lot of *Campylopus introflexus* and *Cladonia floerkeana* along the bare ground on the drain edges. Some *Carex panicea* is also present here. At the northern end, there is very tall *Calluna vulgaris* with *Phragmites australis* along the flush. The flush has been deepened here (D18). At the north-eastern end, the flush spreads out into a *Molinia caerulea* dominated area with *Myrica gale* and large *Calluna vulgaris* mounds. The natural flow of this flush to the north seems to have been reversed due to drainage.

Flush 2
This flush runs through the southern drainage system and consists of a series of swallow-holes. These swallow-holes have tall *Calluna vulgaris* (1m) with *Molinia caerulea* growing profusely through and along their banks. *Crataegus monogyna*, *Pteridium aquilinum* and *Rubus fruticosus* are also present in these swallow-holes.

6.3 DETAILED VEGETATION OF THE HIGH BOG MARGINS

The active cutaway is mainly bare peat with *Eriophorum angustifolium* and *Juncus effusus*. The old cutaway in the north-east is dominated by *Molinia caerulea*. Heathy *Calluna vulgaris* dominates the remaining old cutaway. To the south, by the stream there is a semi-natural margin to the high bog which is steeply sloping to the stream (2-3m/50m). There is a good transition from heathy grassland with *Molinia caerulea*, *Juncus effusus* and *Agrostis* species at the high bog margin grading through a sedge-rich area with *Carex rostrata*, *Carex lepidocarpa* and *Cirsium palustre*, to a *Juncus effusus*-dominated spoil-heap by the stream. This area is poached by cattle.

7. BOG TYPE
This is probably a Ridge-river bog type.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting
There is active peat cutting in the north and western margins.

8.1.2 Forestry
There is coniferous forestry on the southern bank of the stream.

8.1.3 Fire History
There is no evidence of burning activity on the bog.

8.1.4 Dumping
There is dumping associated with peat cutting in the northern cutaway.

8.1.5 Agriculture
There is some agricultural reclamation to the north on old cutaway. By the stream there is a transition from the high bog to the stream-bank. This is grazed and a small area by the stream-bank has been reclaimed.

8.2 NHA BOUNDARY CHANGES

No change is needed to be made to the current NHA boundary.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

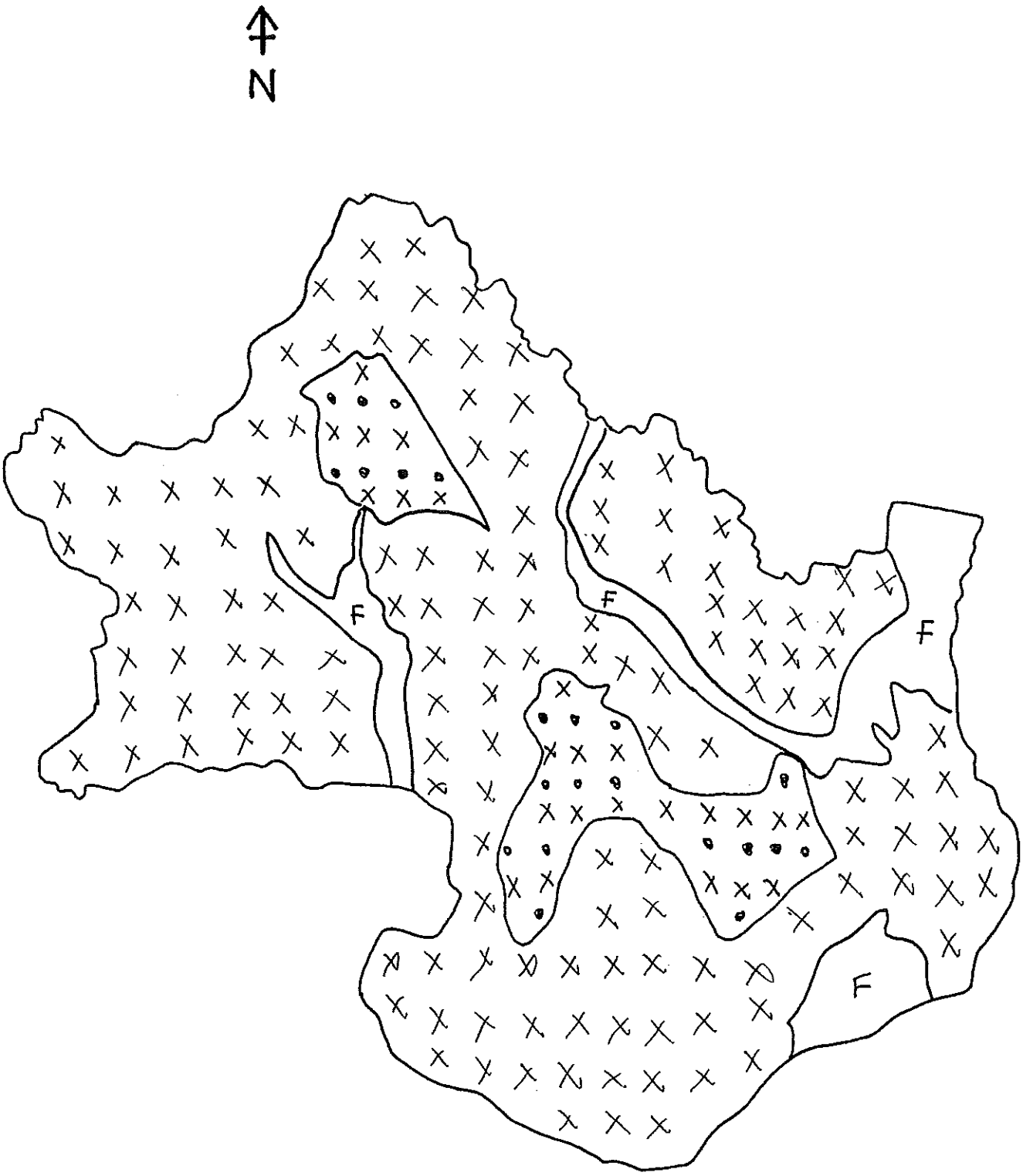
1. This site was surveyed because it is a large site which, although affected by drainage over two thirds of its surface, has an extensive area of intact bog. There is also a transition zone to the stream and two flushes on the bog.

2. The whole site has been damaged by these drains with both flushes within the drain systems. The survey found a semi-natural transition to the stream in the south-east and extensive areas of cutaway.

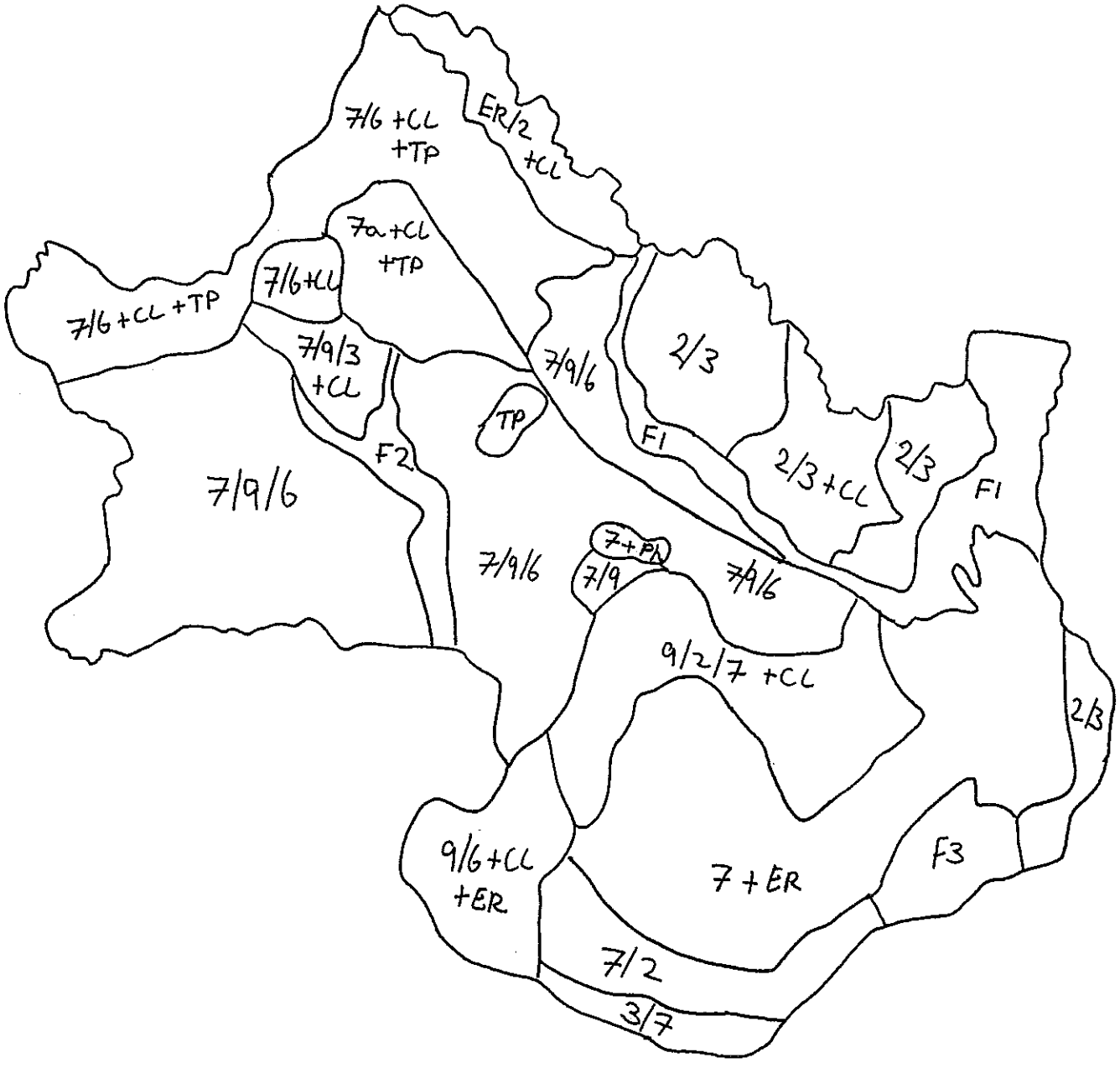
3. There are many internal slopes on this bog and the blocking of drains may lead to re-wetting of the surface in a number of areas, especially the extensively drained areas around D3 and D4. With the blockage of drains the natural flush systems may also be restored.

4. The cutaway to the north-east is level and the cutaway to the north is gently sloping to the cut-face. These would be suitable for restoration work. The cutaway to the west slopes away and is unsuitable for restoration.

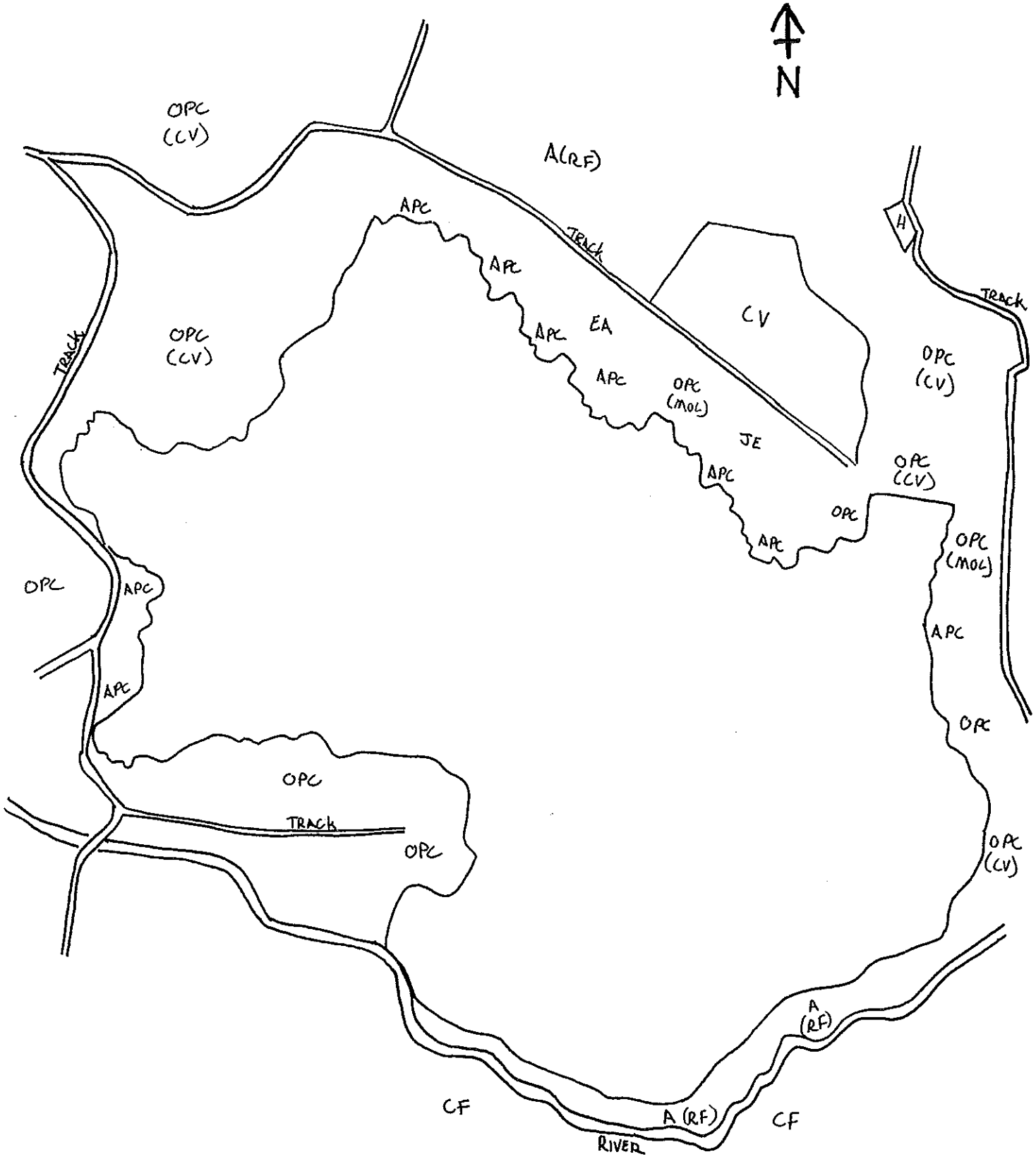
Cloonmore/Cloonfelley bog (247)
Co. Galway
Ecotopes



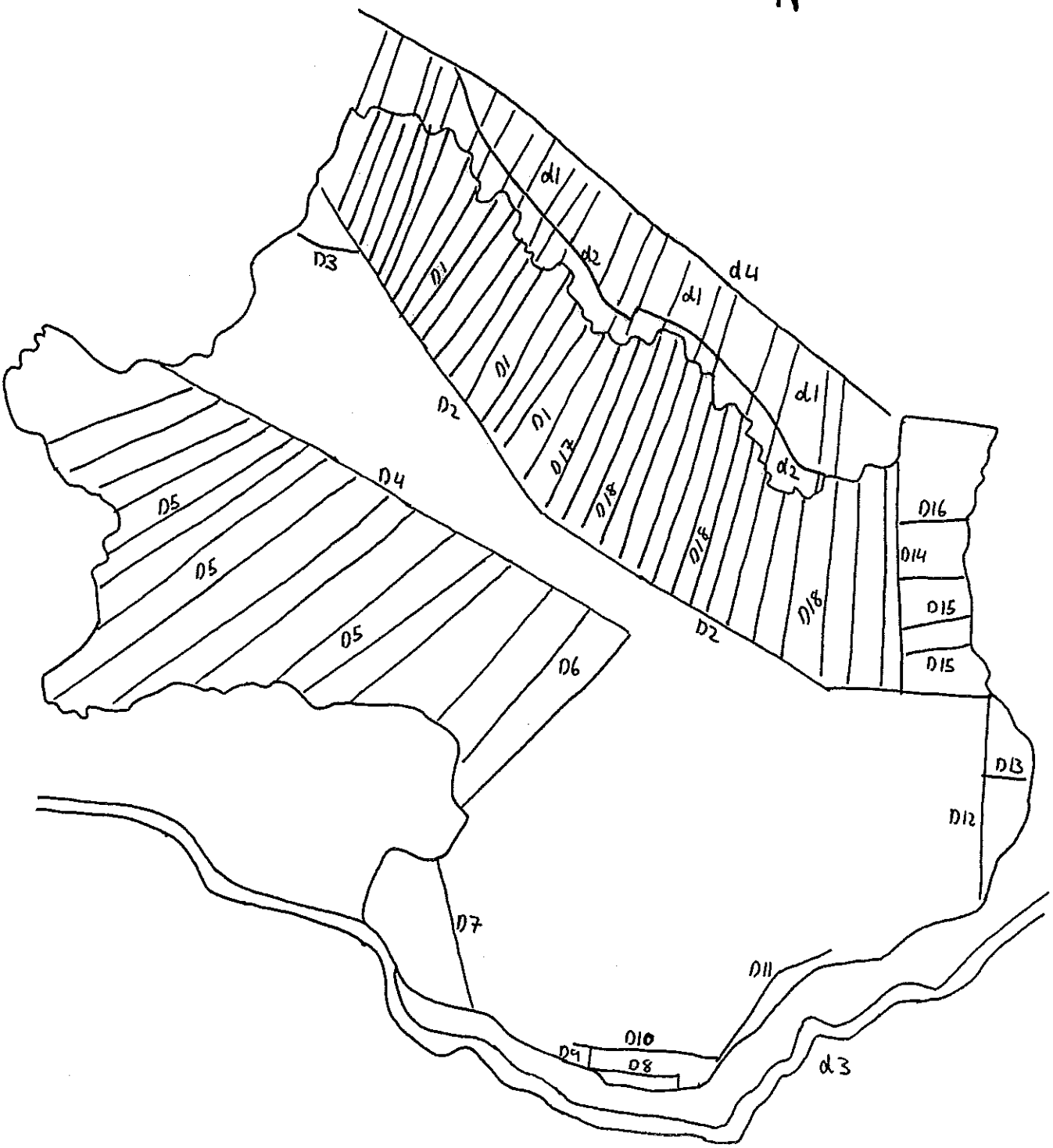
Cloonmore/Cloonfelley bog (247)
Co. Galway
Vegetation complexes



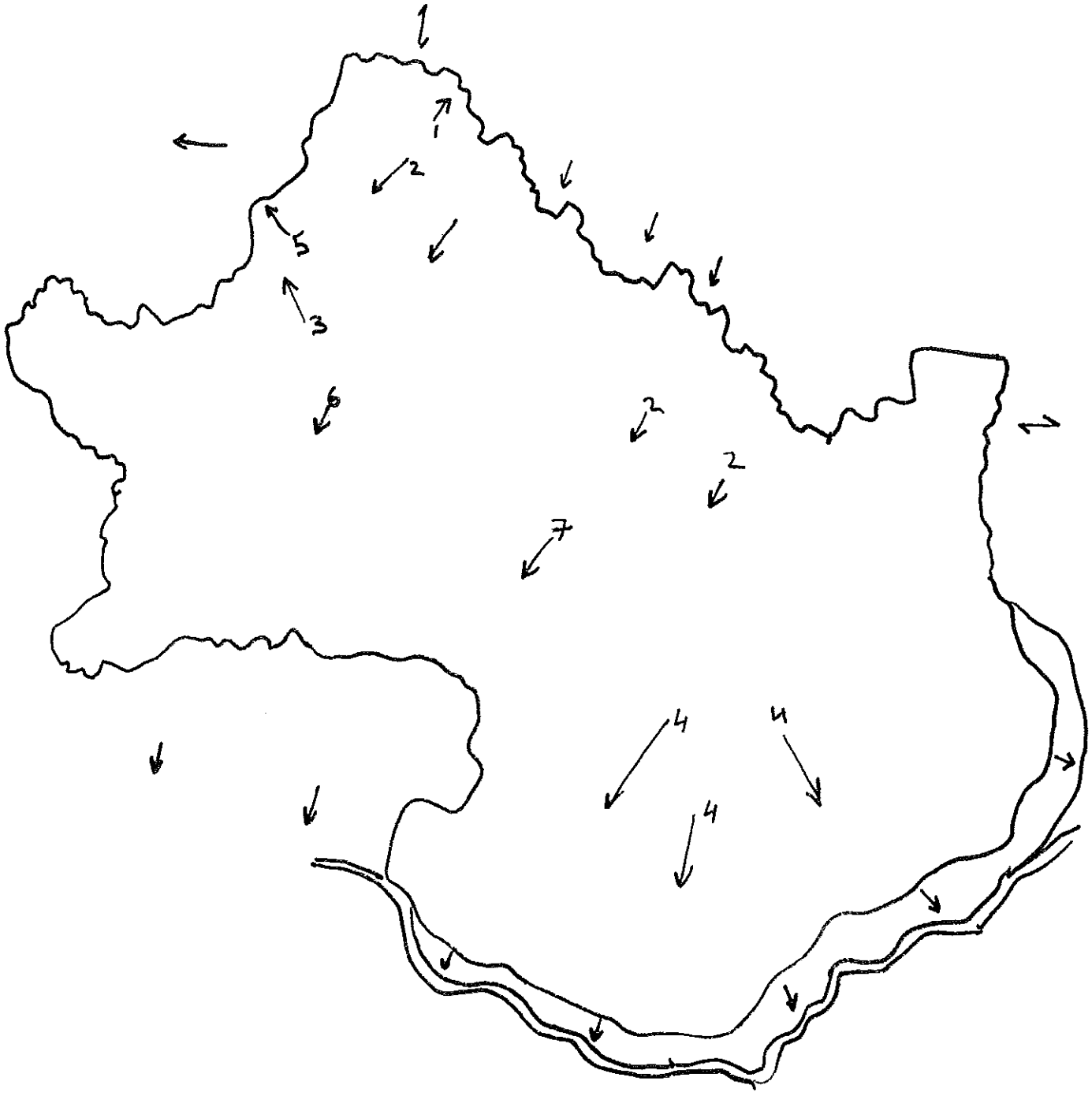
Cloonmore/Cloonfelley bog (247)
Co. Galway
Landuse



Cloonmore/Cloonfelley bog (247)
Co. Galway
Drainage



Cloonmore/Cloonfeney Bog (247)
Co. Galway
Slopes



CLOONSHANNAGH/ARDAGULLION BOG, CO. LONGFORD

1. SUMMARY OF SITE DETAILS

NHA no.:	2069	6" Sheet:	LD15
Grid Ref.:	N300 750	1:126,000 Sheet:	12
G.S.I. Aerial Photo:	32 (8096)	1:50,000 Sheet:	41
Other Photo:	N249	High bog area:	55.99ha
Date(s) of Visit:	8/12/1999		

Townlands: Cloonshannagh (Coolamber Manor Demesne), Lechurragh, Annagh.

2. INTRODUCTION

2.1 BACKGROUND

This bog is a small remnant of a much larger bog, which has been cutaway. It was selected for this survey as a pool system is present and there is little drainage on the high bog. There is a lot of forestry on the surrounding cutaway, but little active peat cutting is visible on the 1995 aerial photograph.

The 1994 NHA survey describes this site as a small raised bog with a range of typical raised bog habitats. A small soak with Sphagnum cuspidatum is noted and a good hummock/hollow system.

2.2 LOCATION AND ACCESS

A small bog 5km north-east of Edgeworthstown, Co. Longford. It is a remnant of a much larger bog which has now been cutaway and afforrested. The bog can be accessed off a local road between the N55 and the R396 (turning off the N55 at the Ardagullion Crossroads.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Edgeworthstown weather station for the years 1960-90, indicates that the area recieves appproximately 990mm of rainfall annually (R). The nearest synoptic station at Mullingar indicates that the site has up to 159 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Mullingar of 455 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 990 - 455 = 535mm. (See Fig. 1)

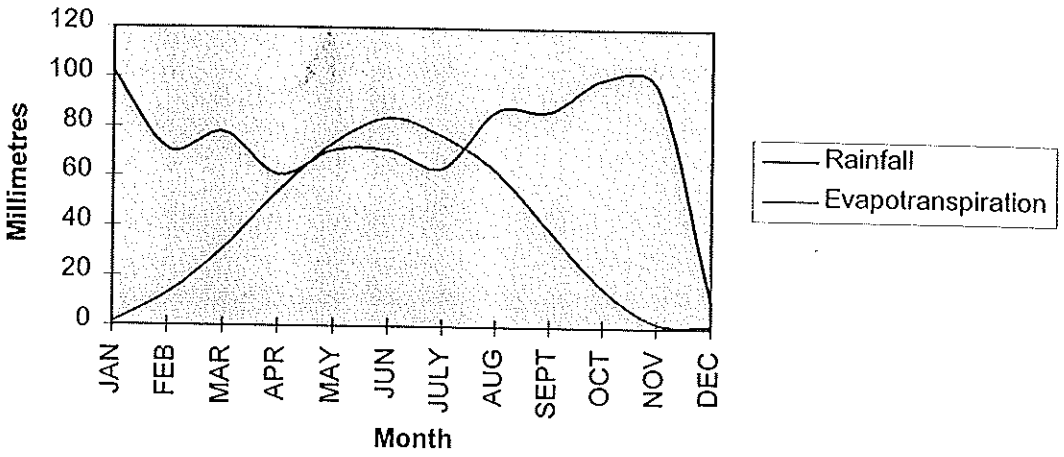


FIG. 1: Meteorology for Cloonshannagh

4. GEOMORPHOLOGY

4.1 TOPPGRAPHY OF THE HIGH BOG

The high bog was flat and the only slopes present were associated bog margins or drainage.

4.1.1 Slopes of the High Bog

Slope 1: A series of slopes on the bog margins sloping towards the northern cutaway (0.5m/100m).

Slope 2: A number of slopes towards the south-eastern cutaway (0.5m/100m).

Slope 3: A very localized slope on the cut-face margin obviously caused by subsidence with a marginal area sloping back into the main body of the bog (0.5m/50m).

Slope 4: A series of slopes from the high bog towards drain D5 (0.5m/100m).

Slope 5: A steep slope on the cutaway margin towards the eastern cutaway (0.5m/50m).

4.2 TOPOGRAPHY OF THE BOG MARGINS

The old cutaway in the east and south-east slopes away from agricultural land with a slight slope from the high bog and would be suitable for reflooding. The north-west cutaway is level but adjoins agricultural land with little change in slope. The western cutaway is afforested and adjoins level agricultural land.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

According to the resent geological maps by Hitzman (Chevron/GSI, 1993), this site is underlain by basinal limestones (CPU on Chevron series).

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peats

The peat at this site was classified by Hammond as Man-Modified.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

The drainage on this bog is mainly restricted to the margins, with only one drain system stretching into the bog. These drains for the most part are old and having little effect, apart from Drain D2 and D3 which are actively draining the eastern section of the bog.

Drains D1: Old dry drains, 25 cm wide. It is in-filled with *Calluna vulgaris* and *Cladonia portentosa*. There is some subsidence around the drain and the cutaway margin.

Drains D2: Two parallel drains running north-west to south-east in the eastern section of the bog. These are 1m wide and 0.5m deep with 10cm of flowing water. The inner drain flows into the outer drain, which flows out to the south-west of the bog.

Drains D3: Two parallel drains, 1m wide, in-filling with *Calluna vulgaris*, *Rhyncospora alba* and *Sphangum cuspidatum*. There is some flow out of these drains into D2.

Drain D4: Old drain running alongside forestry. A firebreak has been cleared between the drain and the forestry. It is 3m wide with a lot of *Cladonia portentosa* and dead ericoid shrubs. In some places where water is draining across the firebreak *Sphagnum capillifolium* and *S. magellanicum* are beginning to form hummocks.

Drain D5: This appears to be old drain which has been excavated further in the past few years. Water is flowing south-east towards the forestry. The drain is well vegetated with *Molinia caerulea* and occasional *Potentilla palustris*.

Drains D6: An old in-filled drain joining onto D5. This drain is surrounded on both sides by very tall *Calluna vulgaris*.

Drain D7: Another old in-filled drain, joining onto D5 and surrounded by tall *Calluna vulgaris* plants. At both ends, this drain also had *Betula pubescens* trees growing around it.

Drains D8 and D9: Two old in-filled drains with good *Sphagnum* cover. Drain D9 corresponds to townland boundaries.

Drain D10: This drain corresponds to Drain d2 on the north-western cutaway although it only extends a short distance into the high bog. The drain is in-filled with vegetation.

Drains D11: A series of old drains along old cutaway, 50cm wide in-filling with *Calluna vulgaris*.

5.2.2 Bog Margin Hydrology

There is quite extensive cutaway to the north-west and south-east of this bog. There is drainage associated with this cutaway. A series of old parallel drains occur running from the old cut-face with *Juncus effusus* growing in them and *Ulex europaeus* along margins. In the north there is a deep drain along trackway.

Drain d1: A deep, 1m wide, water-filled drain running along trackway in northern cutaway. There is *Betula pubescens* and *Ulex europaeus* growing along the drain and the cutaway drains join up with this.

Drain d2: One of a series of old drains in the cutaway which joins D10 on the high bog to d1 on the cutaway.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This was originally a large bog consisting of three lobes, surrounded by mineral soil. Mineral ridges separate the lobes from each other. The north-eastern lobe is almost completely isolated by a wooded mineral ridge.

Description of the present-day bog
There has been extensive cutaway with only the north-eastern lobe remaining intact. This is isolated from the rest of the original bog which has been cutaway and afforested. There is extensive forestry plantations to the west and south of the intact high bog. There is level cutaway to the north, but there is reclaimed fields between the cutaway and the mineral slope. To the east and south-east however, there is cutaway which slopes down from the surrounding mineral soil and also slopes away from the high bog. This area would collect run-off from the bog and mineral slope and a lagg zone could be created if drains were blocked. There are numerous drains associated with the face bank of this bog. Only one drain system cuts into the bog in the east. These drains have an out-flow in the south-east and blocking this would re-wet the high bog.

6. VEGETATION

6.1 VEGETATION SUMMARY

There is a relatively large central ecotope in this bog with frequent pools with a high *Sphagnum* cover. There is an extensive sub-central ecotope around the central area and extending to the southern region of the bog. The remainder of the bog was sub-marginal except for a dry marginal area to the west associated with forestry.

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes
Complex 1
This is a narrow band of vegetation dominated by robust *Calluna vulgaris* on the cut-face slopes on the bog margins.

Complex 7/2 + Cladonia
A slightly sloped area at the south-west end of the bog. The vegetation is dominated by *Calluna vulgaris* (60%) and *Trichophorum caespitosum* (40%). *Cladonia portentosa* (40%) is very prominent everywhere. There are lots of old *Calluna* stems with epiphytic lichens both denoting an absence of burning. This part of the bog slopes down to a margin of young planted *Betula pubescens* with an apparent fire-break in between. It seems that the cover of vegetation was stripped from the surface of this margin but it is now revegetated with *Calluna vulgaris*, *Cladonia portentosa* and *Sphagnum magellanicum* patches (R2, P19). Some *Sphagnum* species and *Hypnum jutlandicum* are present. There are occasional young *Pinus contorta* trees but none are thriving. Quite wet underfoot with *S. magellanicum* and *S. capillifolium*.

Complex 7 + Cladonia
This is an extensive area of marginal habitat to the south-west. This area is very dry due to drains associated with surrounding forestry. The *Calluna vulgaris* which dominated here is very robust and plants are an average of 80cm in height. There is abundant *Cladonia portentosa* between the bushes. A small section in the south-east of the bog also features this vegetation complex.

Complex 2/3 burnt
On a slope by the eastern cutaway margin, *Carex panicea* dominates with *Trichophorum caespitosum* and *Erica tetralix*. There is *Calluna vulgaris* present but it is small and young and together with bare peat indicates burning in this region.

Sub-Marginal Complexes

Complex 7/6/2 burnt
This area begins near the margins immediately after the area of face-bank *Calluna vulgaris* (Complex 1). The bog is sloped slightly towards the margins. The whole area appears to have been burnt in the past though not recently. There is no acrotelm and the ground is hard with standing water present after recent heavy rain. The vegetation is co-dominated by *Calluna vulgaris* (30%), *Narthecium ossifragum* (30%) and *Trichophorum caespitosum* (30%). *Rhynchospora alba*, *Carex panicea* and *Erica tetralix* are prominent. There are also several large hummocks of *Calluna vulgaris* which appear to have escaped burning. Associated with these are hummocks of *Sphagnum capillifolium* and *S. papillosum* with abundant *Vaccinium oxycoccus* growing over and through them. Clumps of *Cladonia portentosa* are also associated with these unburnt hummocks. The only *Cladonia* species on the low-lying, burnt areas are *Cladonia floerkeana* amongst other *Cladonia* species typical of bare peat. The hummock areas also feature *Drosera rotundifolia, Breutelia chrysocoma* and *Polytrichum* species.

Complex 4/7/2
An area dominated by *Rhynchospora alba* with *Calluna vulgaris* and *Trichophorum caespitosum*. *Sphagnum* cover is poor with the vegetation similar to Complex 7/6/2 but with more abundant *Rhynchospora alba*.

Complex 7/9/6 + Cladonia
The vegetation of this area is similar to 7/2/6 + pools although unburnt and not as biodiverse. The pools here are small and scattered containing *Sphagnum cuspidatum* and algae and are bordered by graminoid species. The vegetation is dominated by *Calluna vulgaris* (40%) with *Eriophorum vaginatum* (30%) and *Narthecium ossifragum* (20%) hollows. *Cladonia portentosa* is abundant with 20% cover recorded. There is good cover by *Sphagnum* species (20%). *Sphagnum papillosum*, *S. capillifolium* and *S. magellanicum* are all present although the acrotelm is variable between 0 and 5cm. *Eriophorum angustifolium* (10%) and *Erica tetralix* (10%) are prominent through the vegetation. *Cladonia uncialis* is present and *Trichophorum caespitosum* is prominent in some places.

Sub-Central Complexes

Complex 7/2/6 + pools
The vegetation in this area is quite similar in composition to Complex 7/6/2 but is notably more robust, perhaps due to the burn being less fierce in this area. The only sign of fire is some bare peat areas colonized by the typical lichens. This area also features scattered small pools. Some are very small with just algae but most are medium sized with associated *Sphagnum* species - *S. cuspidatum* in the pools and *S. imbricatum*, *S. papillosum* and *S. capillifolium* around the edges which form carpets and hummocks. There are many *Drosera anglica* plants associated with the pools. Overall the vegetation is dominated by *Calluna vulgaris* (40%) and *Trichophorum caespitosum* (40%) with *Narthecium ossifragum* (20%) in the hollows. *Eriophorum vaginatum* (10%), *Eriophorum angustifolium* (10%) and *Erica tetralix* (10%) are prominent with *Andromeda polifolia* (<5%) quite common. There are small patches of *Cladonia portentosa* (+) and *Rhynchospora alba* (+) is sparse.

Complex 7/9 + Cladonia (R2, P18)
The vegetation here is dominated by *Calluna vulgaris* (60%) and *Eriophorum vaginatum* (40%) with abundant *Cladonia portentosa* (40%). Many *Calluna vulgaris* bushes feature epiphytic lichens. The most prominent bryophytes are *Sphagnum capillifolium*, *S. magellanicum* and *Hypnum jutlandicum*. The area is quite wet underfoot and the moss and *Calluna vulgaris* hummocks create an undulating topography that is difficult to walk over. This area grades down into Complex 7/2 + *Cladonia* at the sloping margins. Drain D3 is very close to this ecotope and is probably impacting on it.

Complex 10/9
A very wet area with lots of standing water which made it difficult to distinguish permanent pools of which there may be a few. The vegetation is co-dominated by *Sphagnum* species (50%) and *Eriophorum vaginatum* (40%). Also *Narthecium ossifragum* (10%) and *Eriophorum angustifolium* (10%) are prominent. *Trichophorum caespitosum* (5%) occurs through the vegetation as occasional tussocks. *Sphagnum* cover is high (50%) with large carpets of *S. magellanicum*, *S. capillifolium* and *S. papillosum*. Both *Calluna vulgaris* and *Erica tetralix* have sparse coverage of 5% each and there are small patches of *Cladonia portentosa* (+) present.

Central Complexes

Complex 10/14
In the high bog centre, the summit is level and the habitat appears to be primary. The pools are frequent and well developed with *Sphagnum cuspidatum* (some have *S. magellanicum*). *Drosera anglica* is present in all with algae and *Menyanthes trifoliata* in some. All the pools are bordered in part by *Sphagnum* species. The inter-pool areas are dominated by *Sphagnum* species (80%) with robust *Calluna vulgaris*, *Eriophorum vaginatum*, *Rhynchospora alba* and *Narthecium ossifragum* also prominent. This area does not appear to have been seriously burnt although a few hummocks feature dead moss and *Cladonia floerkeana*.

The area is a classic pool/hummock system with frequent pools of different shapes (some are round and others are long and sinuous) interspersed with hummocks, flats and islands of vegetation. Many hummocks have good clumps of *Cladonia portentosa* and *C. uncialis*. The ground is wet and quaking. This is a good example of a central ecotope type. The acrotelm is good varying in depth from 5 to 10cm except on the burnt hummocks where it is absent.

6.2.2: Flushes and Soaks

A small very wet flush occurs to the east of the central ecotope. This area features extensive lawns of *Sphagnum cuspidatum* with *Eriophorum angustifolium* and some *Molinia caerulea*. There are some scattered small *Betula pubescens* occurring at the margins of this flushed area. The area is possibly an in-filled old artificial pond due to its regular shape which is clearly visible on the aerial photograph.

6.3: DETAILED VEGETATION OF THE BOG MARGINS

There is old cutaway in the north-west, east and south-east which is dominated by *Molinia caerulea*, *Juncus effusus* and *Eriophorum angustifolium*. There is some *Ulex europaeus* scrub in the east and extensive *Betula pubescens* scrub in the south-east. The cutaway in the west and south-west have been planted for forestry. Some of this coniferous forestry has been felled in the south and south-west

7. BOG TYPE
This is probably a basin bog.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting
There is some active peat cutting (hopper turf) in the north, east and south-east

8.1.2 Forestry
Forestry dominates the southern and western cutaway of this bog. Some of this forestry has been recently felled.

8.1.3 Fire History
There is evidence of burning on the bog although none of it appears to have been due to recent activity. This burning evidence is only found in the north of the bog as abundant *Cladonia portentosa* to the south indicated an absence of burning.

8.1.4 Dumping
No evidence of dumping at this site.

8.1.5 Agricultural reclamation
A section of cutaway in the north-east has been reclaimed for agriculture.

8.2 NHA BOUNDARY CHANGES

The NHA boundary needs to be extended to include the forestry on the cutaway in the south-east.

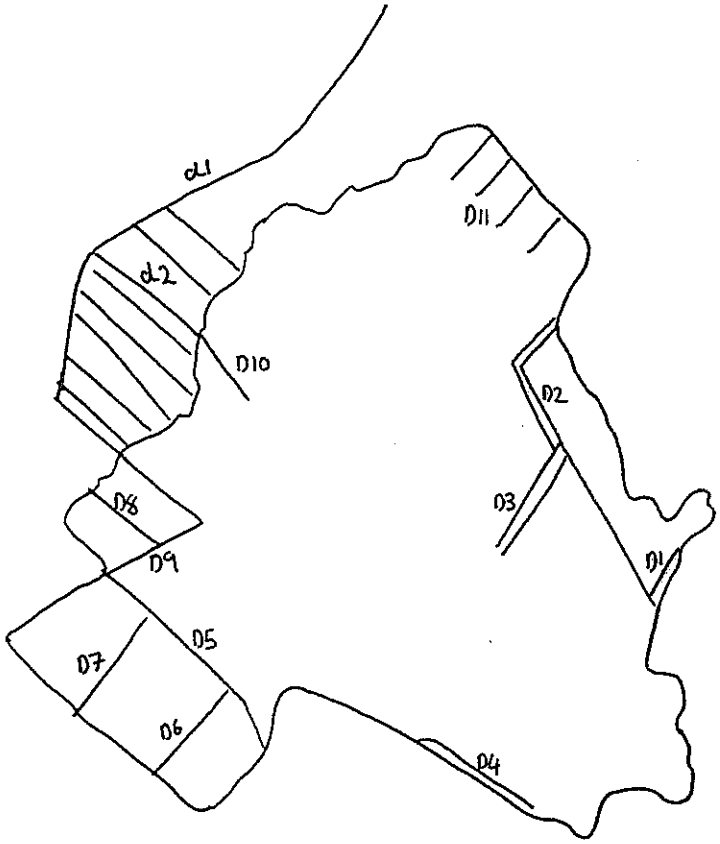
9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

1. Previous surveys of this bog had documented a good central ecotope vegetation.

2. The visit confirmed the previous reports and found an extensive pool system which is active despite the small size of the bog.

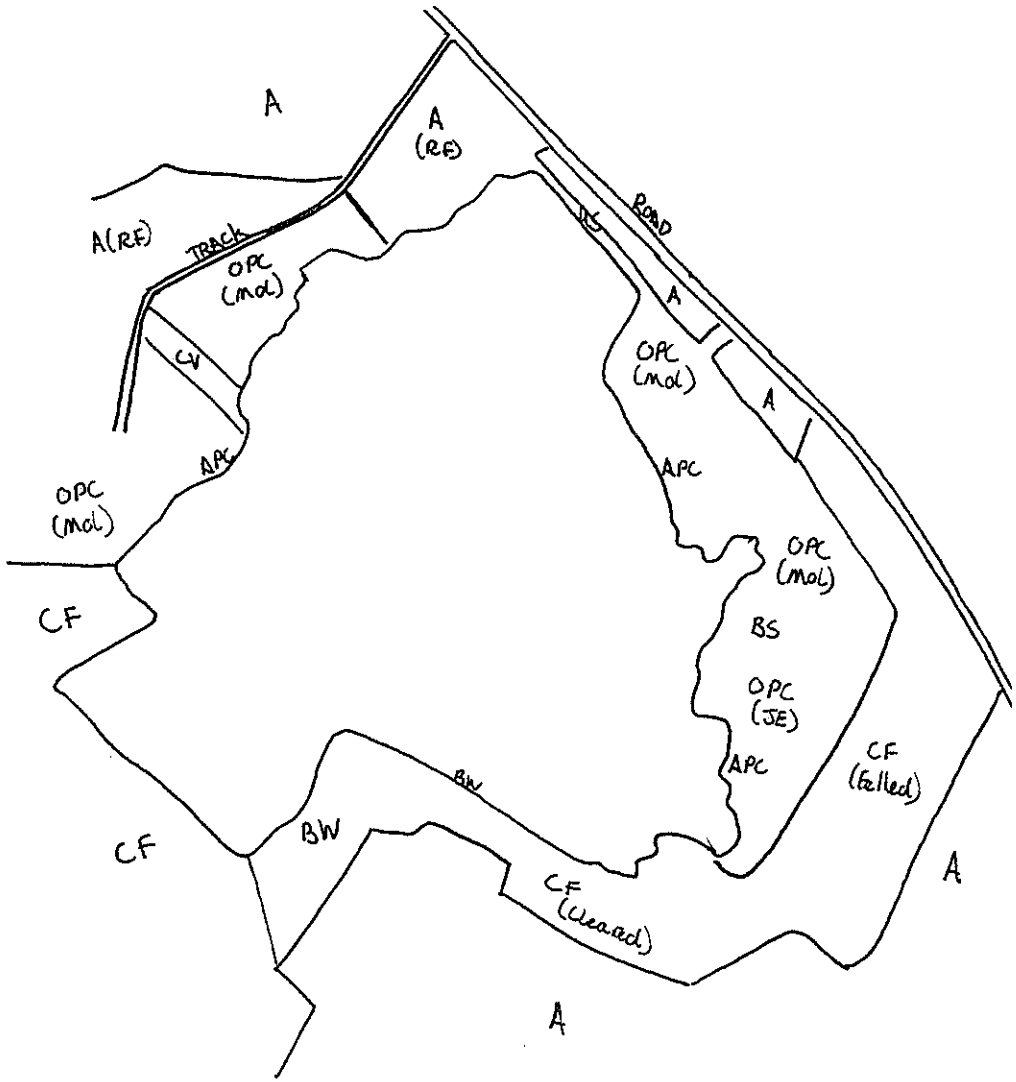
3. Drainage was restricted to the bog margins except for Drains D2 ad D3 which are actively draining into the centre of the bog. The blockage of these drains would be a necessary part of any restoration work on this site.

4. Most of the remaining cutaway has been abandoned. However due to the slopes of the surrounding agricultural land, the only cutaway suitable for rewetting on this bog is in the east and south-east where the slopes would prevent flooding of neighbouring land.



Cloonshannagh/Ardagullion bog (2069)
Co. Longford
Drainage

N

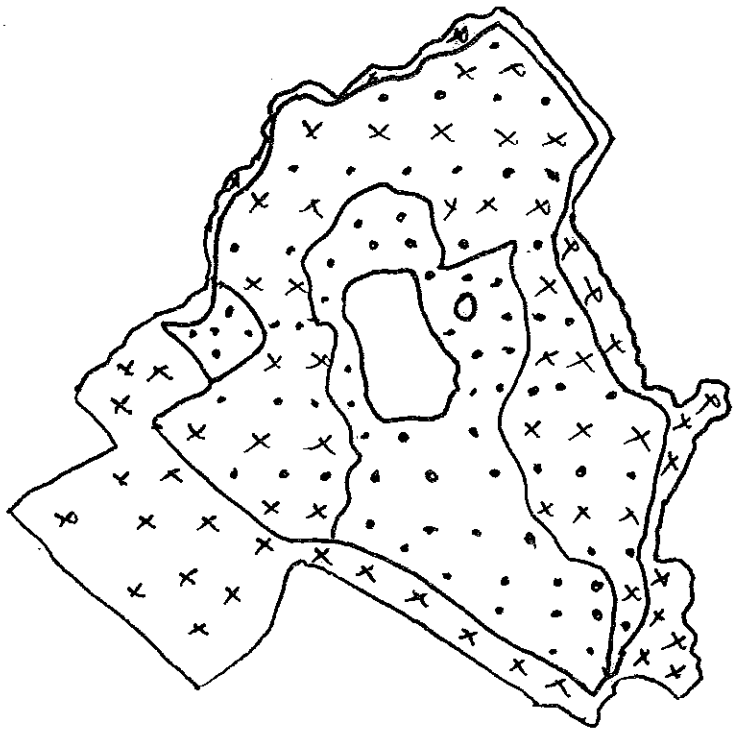


Cloonshannagh/Ardagullion bog (2069)
Co. Longford
Landuse

N

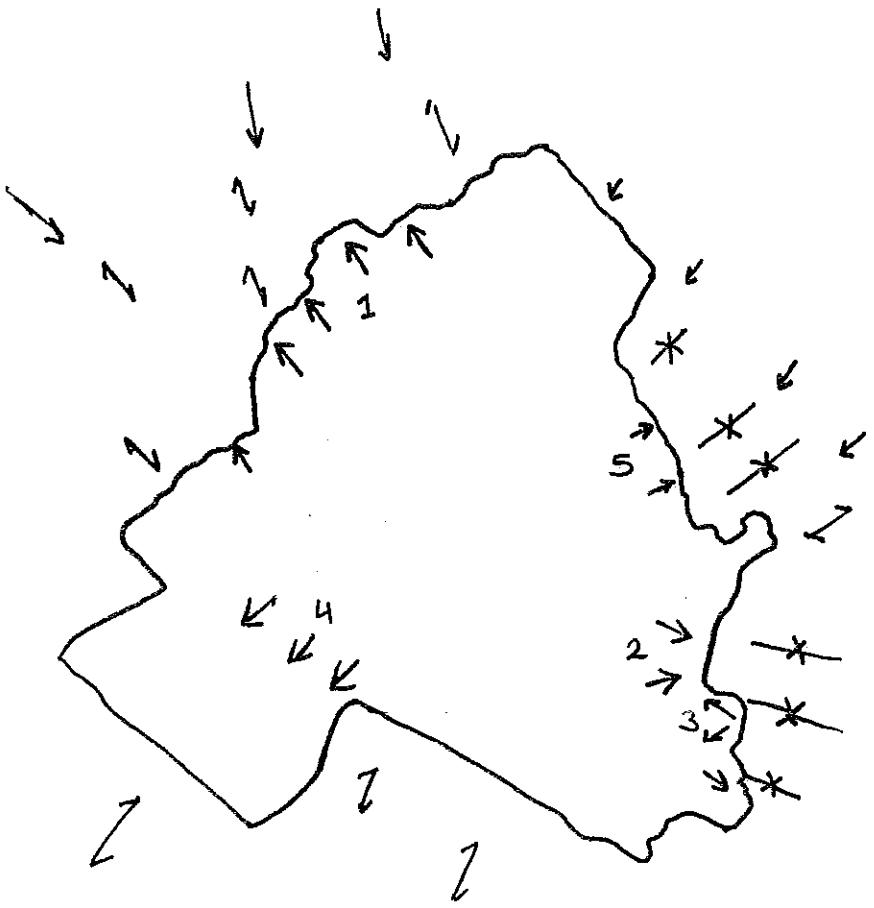
Cloonshannagh/Ardagullion bog (2069)
Co. Longford
Vegetation complexes

N



Cloonshannagh/Ardagullion bog (2069)
Co. Longford
Ecotopes

N



Cloonshannagh/Ardagullion bog (2069)
Co. Longford
Slopes

N

COOLRAIN BOG, CO. LAOIS

1. SUMMARY OF SITE DETAILS

NHA no.:	415	6" Sheet:	LS16
Grid Ref.:	S260 910	1:126,000 Sheet:	15
G.S.I. Aerial Photo:	45 (6420)	1:50,000 Sheet:	54
Other Photo:	S829	High bog area (ha):	60.09
Date(s) of Visit:	25/11/1999		

Townlands: Derries, Rossnaclonagh Outside, Coolrain, Cappaghnahoran.

2. INTRODUCTION

2.1 BACKGROUND

This small site was selected for survey as it had no surface drainage and there were numerous small wooded flushes on its surface. Also it is one of the most southern sites in this survey.

It was surveyed in 1984 and described as being threatened by drainage, cutting and burning. In 1990 Cross stated that it was unique in terms of geological location as the most southerly intact example of a true midland raised bog.

The 1994 NHA survey found the site to be regenerating well from fire damage with large thick *Sphagnum* carpets present.

2.2 LOCATION AND ACCESS

A small raised bog 4km north-east of Borris-in-Ossory. Access is from a forestry track off a local road leading south-west from the village of Coolrain.

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Borris in Ossory weather station for the years 1960-81, indicates that the area recieves appproximately 937mm of rainfall annually (R). The nearest synoptic station at Birr indicates that the site has up to 150 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Birr of 454 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 937 - 454 = 483mm.
(See Fig. 1)

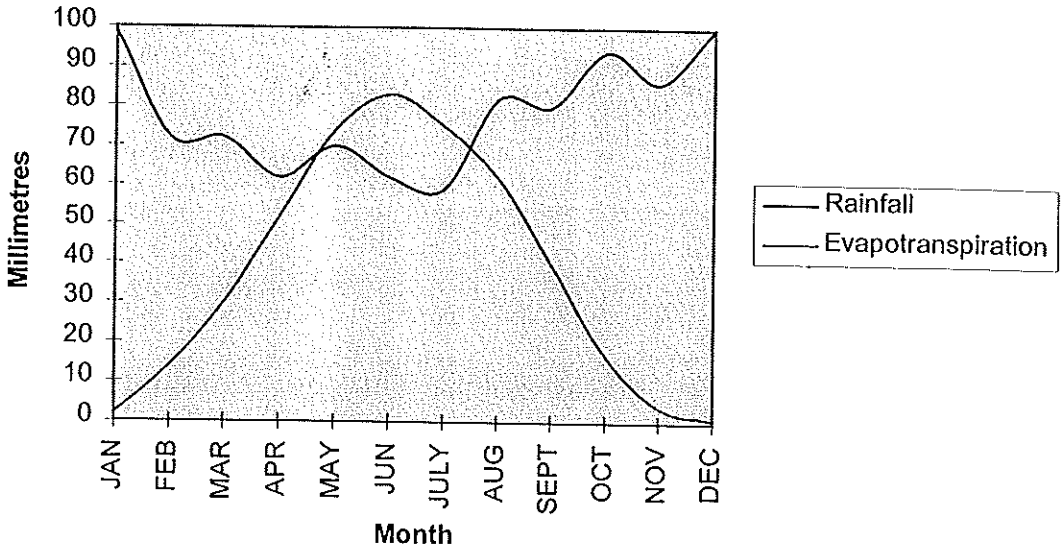


FIG. 1: Rainfall data for Coolrain.

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

Apart from marginal slopes associated with cutaway, the bog is relatively uniform. There is a slight depression associated with the main flush of Pines, probably due to subsidence.

4.1.1 Slopes of the High Bog

Active peat cutting has resulted in subsidence and sloping at the face-bank margins along the eastern margin of the bog. These are quite steep slopes restricted to the face-bank (2m/100m). Besides these marginal slopes there were six internal slopes on the bog possibly due to drainage associated with the forestry and cutaway activity at the bog margins. These are illustrated on the slope map.

Slope 1: A slight slope, east-south-east, from the high bog to the face-bank margin (0.25m/100m).

Slope 2: A slight slope, west, towards a Pine flush, possibly due to internal subsidence of the bog. (0.25m/100m).

Slope 3: A small slope from the central area of the bog, south-west, towards cutaway (0.5m/100m)

Slopes 4, 5 & 6: Gradual slopes from the bog centre out north-west towards the edges (0.25m/100m)

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

Recent geological maps by Hitzman (Chevron/GSI, 1993) indicate that this bog is underlain by Old Red Sandstone. This is the only bog in this survey underlain by this rocktype.

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peat

The peat at this site was classified by Hammond as a mix of true midland and man-modified types.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

There were no drains on the high bog.

5.2.2 Bog Margin Hydrology

The bog is bounded by active cutaway to the east and west with associated drainage systems.

Drains d1: A series of parallel drains associated with active cutaway at the south-east margin of the bog. These drains have young *Betula pubescens* growing in them and are drying out.

Drains d2: A series of drains associated with active cutaway in the south-west, these are similar to d1 with young *Betula pubescens*.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This bog was much larger than at present and was surrounded by mineral soil.

Description of the present-day bog
There has been extensive peat cutting in the west and east which has been afforested. To the north there is a young conifer plantation on old cutaway. At the south-east and south-west margins there is active peat cutting on sloping ground. This cutaway slopes away from the bog, but also slopes down from the surrounding land. This cutaway would be suitable for restoration work. Due to the presence of conifer flushes on the high bog surface, the mineral substrate must be close to the surface here with shallow peat probably caused by subsidence. There are no drains on the high bog and so the subsidence on this bog is caused by the extensive cutaway.

6. VEGETATION

6.1 VEGETATION SUMMARY

Overall the vegetation of the bog is quite uniform with plentiful *Sphagnum* cover. There are four prominent Pine flushes on the high bog and these are thought to be due to subsidence of the high bog, bringing the vegetation in contact with mineral input underneath. The distribution of the community complexes is shown on the vegetation map and although there are no central complexes, a high proportion of the bog is sub-central ecotope (53.1%). These community complexes are also divided into ecotope types (see Ecotope map).

6.2 DETAILED VEGETATION OF HIGH BOG

6.2.1 Complexes

Marginal Complexes

Complex 1

This is face-bank vegetation type dominated by tall *Calluna vulgaris*. Typically this vegetation type is found on face-bank slopes where the ground is dry and hard.

Complex 2

A marginal area dominated by *Trichophorum caespitosum* and *Calluna vulgaris* with some *Eriophorum angustifolium*. *Sphagnum* cover is very poor.

Sub-Marginal Complexes

Complex 7/6

Co-dominated by *Calluna vulgaris* (60%) clumps with *Narthecium ossifragum* (40%) hollows (R2, P2). *Eriophorum vaginatum* (15%), *Eriophorum angustifolium* (5%) and *Trichophorum caespitosum* (10%) are prominent. The acrotelm is variable (0-5cm) with some bare peat covered with an algal mat. There is good *Sphagnum* cover (40%) consisting of *S. magellanicum*, *S. papillosum* and *S. capillifolium*. Good cover of *Cladonia portentosa* (5%) and *Cladonia uncialis* (5%) with occasional clumps of *Racomitrium lanuginosum* (+). There is good *Erica tetralix* (10%) cover with occasional occurrences of *Andromeda polifolia* (+). Despite being only 50m from the edge, the area is quite wet.

Complex 6/4/7

Rhynchospora alba (30%) is co-dominating with *Calluna vulgaris* (30%) and *Narthecium ossifragum* (30%). *Erica tetralix* (20%) also has good cover. The area is very wet underfoot with strong *Sphagnum* (40%) growth - mostly *S. capillifolium* but some *S. magellanicum* and *S. papillosum* too. Some *Hypnum jutlandicum* (+), especially near *Calluna vulgaris* is notable. Small amounts of *Vaccinium oxycoccus* (+) and *Cladonia portentosa* (+) are present along with small patches of *Cladonia coccifera* (+) and *Cladonia floerkeana* (+). The acrotelm is variable with wide areas having no acrotelm - just *Narthecium ossifragum* and an algal mat covering the bare peat.

Sub-Central Complexes

Complex 10/7/9

Due to a lack of pools, this area was deemed to belong to the sub-central ecotope. The area in the bog centre is dominated by *Sphagnum* species (80%) -mostly *S. magellanicum* with some *S. capillifolium* and *S. papillosum*. The acrotelm is therefore good, varying between 5cm and 10cm. *Calluna vulgaris* (50%) and *Eriophorum vaginatum* (20%) are also strong with *Eriophorum angustifolium* (15%) growing through the vegetation. *Narthecium ossifragum* (10%) and *Andromeda polifolia* (+) are also present but there is very little *Erica tetralix* (+). There are occasional bare peat patches with some small *Cladonia floerkeana* (+) patches growing on bare peat.

Complex 7/9/10

The same species as those described above are dominant in this vegetation type. Their dominance, however, has changed with *Calluna vulgaris* (60%) and *Eriophorum vaginatum* (40%) more abundant than the *Sphagnum* species. The *Sphagnum* cover is down to 30% composed of *S. capillifolium* and *S. magellanicum*. *Trichophorum caespitosum* (15%) and *Narthecium ossifragum* (15%) have prominent coverage. *Erica tetralix* and *Cladonia portentosa* (5%) are obvious.

Central Complexes

There are no central complexes recorded on this bog.

6.2.2 Flushes and Soaks

Flush P

There are four Pine dominated flushes on this bog, their presence is thought to result from subsidence of the high bog bringing the vegetation in contact with the mineral layer under the bog. The area is covered in *Pinus contorta* trees varying in age from about 1-20 years. The understorey is dominated by *Calluna vulgaris* (60%) with very big robust bushes (80cm high). *Eriophorum vaginatum* (40%) is also dominant, occurring in big tussocks and growing through the vegetation. *Empetrum nigrum* (30%) is also doing very well as is *Vaccinium oxycoccus* (10%) with abundant berries. There are very large hummocks of *Sphagnum* (60%) featuring *S. magellanicum* and *S. capillifolium* with large patches of *Cladonia portentosa* (15%). *Andromeda polifolia* is also prominent. *Breutelia chrysocoma* is noted growing through some of the *Sphagnum* hummocks. Evidence for burning perhaps some 10 years ago with a few burnt tree stumps.

6.3 DETAILED VEGETATION OF THE HIGH BOG MARGIN

There is extensive forestry surrounding this bog, this accounts for the numerous Pines found encroaching on the bog surface. There is mature forestry (over 20 years old) to the east. This forestry is probably close to its felling time. There is a younger conifer plantation (<10 years), which is planted right up to the cut-face of the northern bog margin. Active peat cutting is extensive along the south-east and south-west of the bog. This is mainly the Hopper type peat harvesting. These cutaway areas would be suitable for restoration along with the conifer plantation areas following felling. This is due to the suitable slopes which occur in the cutaway, enabling restorative flooding. The cutaway slopes down from surrounding trackways and agricultural fields thus these areas would not be threatened by a flooding operation.

7. BOG TYPE

This is probably a basin bog.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting

There is active peat cutting on the south-east and south-west of the bog.

8.1.2 Forestry

There are coniferous plantations to the east and north of the bog on old cutaway with the northern plantation coming right up to the cut-face.

8.1.3 Fire History

There was no evidence of recent burning on the bog although there were signs of old burns from which the bog had recovered well.

8.1.4 Dumping

There was no evidence of dumping.

8.2 NHA BOUNDARY CHANGES

No change to the NHA boundaries is necessary for this site.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

1. This bog was surveyed because of its being the most southern Midland Raised Bog (Cross1990).

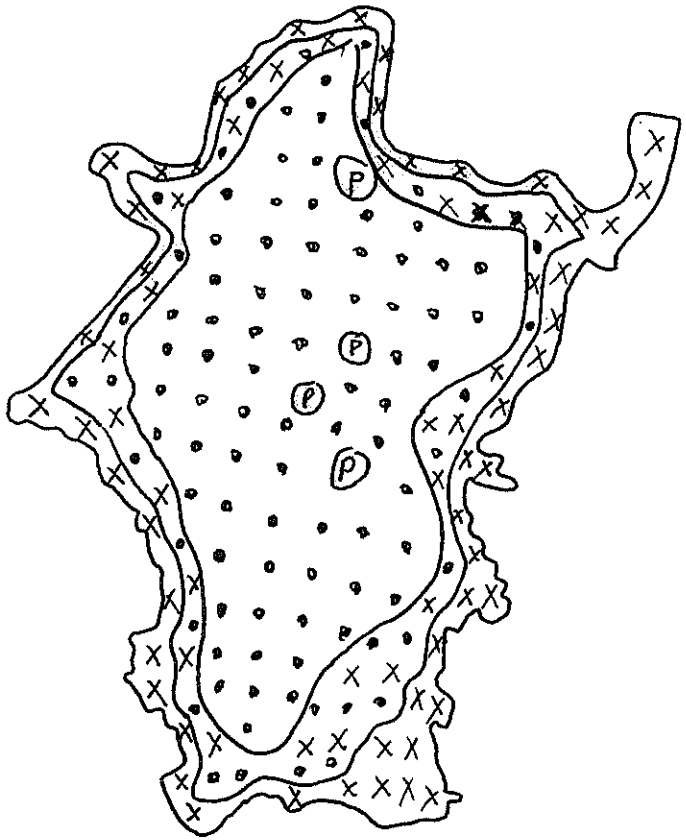
2. First impressions were disappointing as the bog is being encroached on all sides by *Pinus contorta*, These trees occur in dense groves in four different flushes on the bog centre. The bog, however, had extensive *Sphagnum* cover and although there was no permanent pools it had well developed *Sphagnum* hummocks and a good acrotelm.

3. There is drainage associated with cutaway but no drains across the high bog.

4. Some cutaway has been reclaimed for forestry but there are extensive areas remaining to the east and west which would be suitable for restoration work.

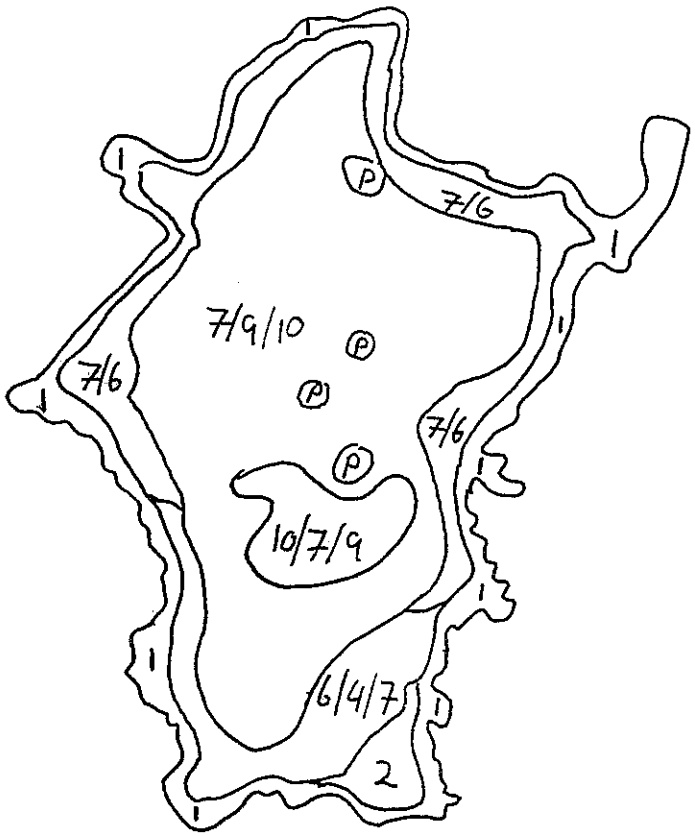
Coolrain bog (415)
Co. Laois
Ecotopes

N

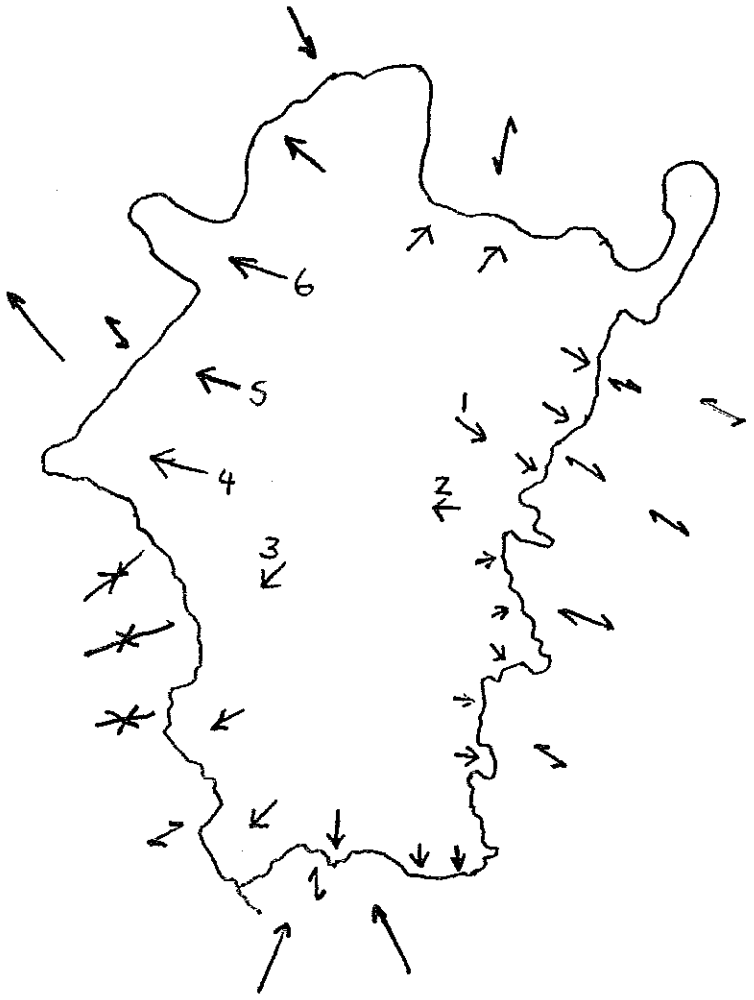


Coolrain bog (415)
Co. Laois
Vegetation complexes

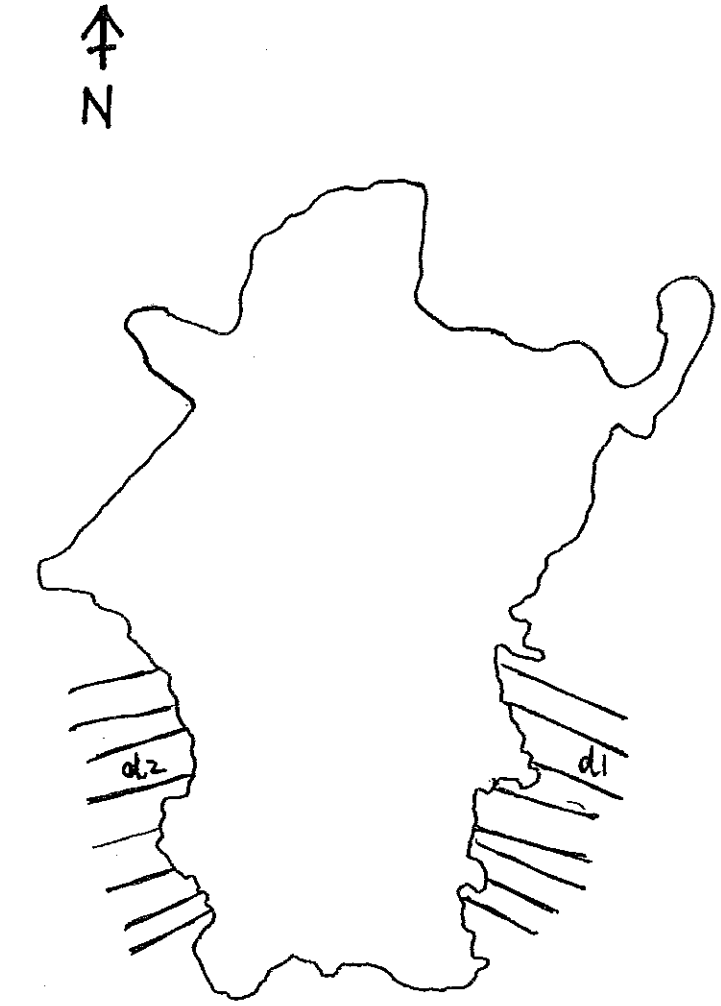
N



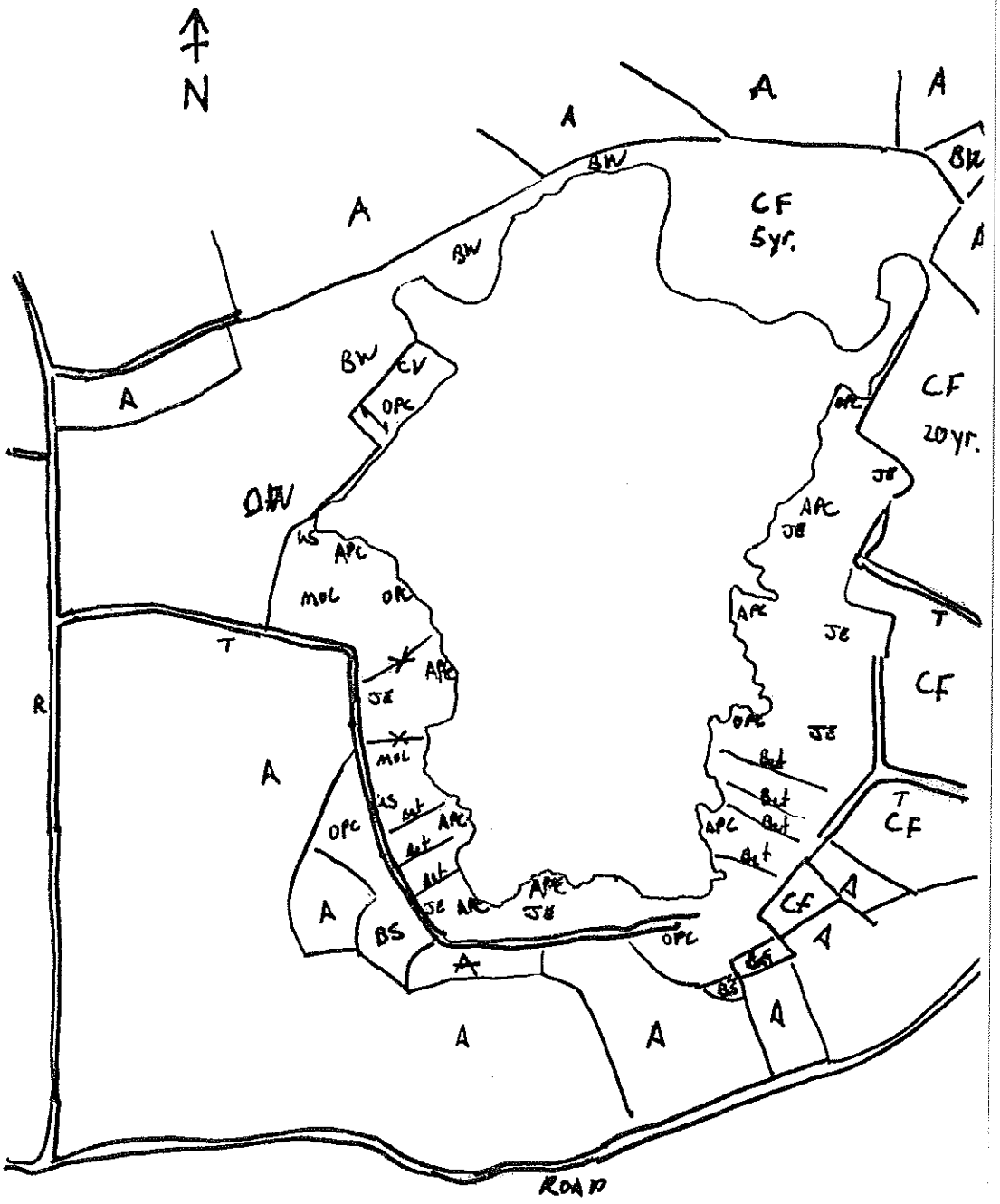
Coolrain bog (415)
Co. Laois
Slopes



Coolrain bog (415)
Co. Laois
Drainage



Coolrain bog (415)
Co. Laois
Landuse



DAINGEAN BOG, CO. OFFALY

1. SUMMARY OF SITE DETAILS

NHA no.:	2033	6" Sheet:	OY18
Grid Ref.:	N446 260	0.5" Sheet:	15
G.S.I. Aerial Photo:	39B (6679)	1:50,000 Sheet:	48
Other Photo:	N542	High bog area:	89.1 ha
Date(s) of Visit:	12/11/1999		

Townlands: Knockballyboy,

2. INTRODUCTION

2.1 BACKGROUND

This site is a low priority site which was visited as time allowed. From the aerial photograph, the site appears dry, but there is no active peat cutting. It isalso one of the most easterly raised bog sites remaining.

The 1994 NHA survey describes it as a dry bog with little standing water. The *Sphagnum* cover was low and patchy.

2.2 LOCATION AND ACCESS

A small raised bog situated 2km southwest of Daingean village in Co. Offaly. The site may be accessed from the main Daingean-Tullamore road, through agricultural land which borders the southern end of the site

3. METEOROLOGY

No meteorological measurements have been made on this bog. Rainfall data from the nearby Daingean weather station for the years 1960-92 , indicates that the area recieves appproximately 838mm of rainfall annually (R). The nearest synoptic station at Mullingar indicates that the site has up to 159 wet days annually. (Wet day is defined as a day when > 1mm of rainfall recieved).

Evapotranspiration measurements are only available for synoptic stations. With the large exposed areas on high bogs, actual evapotranspiration rates would probably be higher than at the nearest synoptic station. The effective rainfall (ER) rate for a site is the annual rainfall (R), less the actual evapotranspiration (AE). With only the potential evapotranspiration (PE) rate available for Mullingar of 455 the effective rainfall for the site is calculated as less than (R - PE) i.e. ER< 838 - 455 = 383mm. (See Fig. 1)

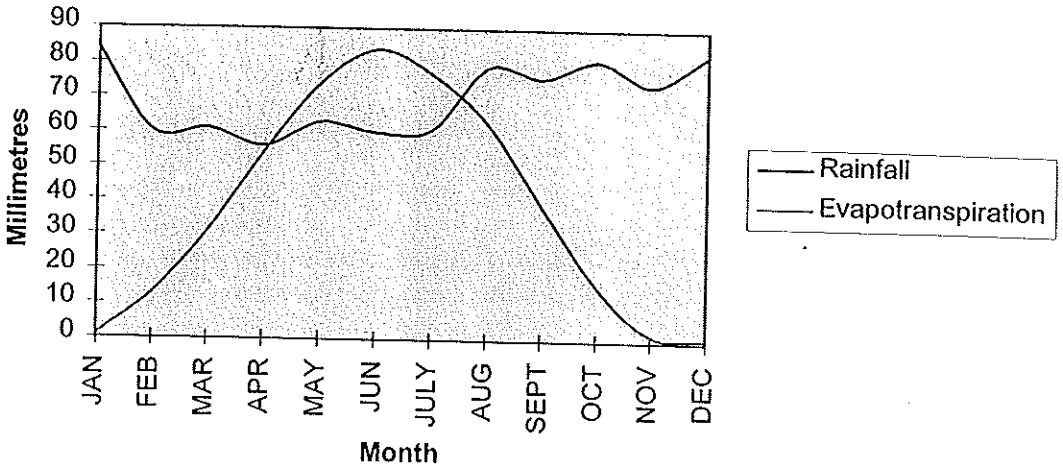


FIG. 1: Meteorology for Daingean

4. GEOMORPHOLOGY

4.1 TOPOGRAPHY OF THE HIGH BOG

This a very flat site with short marginal slopes associated with drainage.

5. HYDROLOGICAL SYSTEM

5.1 GEOLOGY/HYDROLOGY

5.1.1 Bedrock

This site is underlain by basinal limestones CPU and CPL from the Chevron series.

5.1.2 Subsoils

No data was available for sub-soils for this site.

5.1.3 Peat

The peat at this site was classified by Hammond as a mix of true midland and man-modified types.

5.2 HYDROLOGY

5.2.1 High Bog Hydrology (see Drains map)

Only one drain was found on the high bog.

Drain D1: An old drain runs south-easterly from the centre of the site. This drain is in-filled with *Calluna vulgaris*, *Eriophorum angustifolium*, *Sphagnum spp* and *Molinia caerulea*. This drain appears to be non-functional. The end of the drain in the centre of the bog is marked by several young *Pinus contorta* trees.

5.2.2 Bog Margin Hydrology

Several deep drains were noted at the margins of the high bog. At the southern end these had recently been deepened.

Drain d1: This drain has been recently deepened to a depth of 3m, thus exposing a layer of lake marl below 2m of peat (R1P8). Approximately 5cm of free flowing water at its base. The water is flowing back north-west towards d2.

Drain d2: A deep, wide drain with a high water level which is not free-flowing.

Drain d3: Recently excavated to a depth of 2m with water which is at a lower level than that of the adjacent d2.

Drain d4: A smaller, shorter drain running parallel to d3, which has also recently been excavated.

5.3 GEOHYDROLOGICAL OVERVIEW

Description of the bog in the 19th century
This bog originally consisted of two lobes, joined by a thin central margin. To the north it bordered onto the Grand Canal and it is bordered by mineral soil on all other margins.

Description of the present-day bog
The southern section has been cutaway and a road now divides this section from the northern section. A road also runs along the northern margin separating the site from the canal. There has been extensive cutaway on the east and south-eastern margin of the intact northern section. This has been reclaimed for agriculture. There is also reclaimed cutaway at the northern margin. There is very limited cutaway to the west with mineral soil coming close to the high bog. There is little potential for restoration on this bog.

There are large, recently excavated drains across the narrow middle section of the bog. Also a deep recently excavated drain runs along the eastern margin beside reclaimed fields. These have led to drying out of the high bog.

6. VEGETATION

6.1 VEGETATION SUMMARY

6.2 DETAILED VEGETATION OF HIGH BOG

The present vegetation cover of the bog is quite uniform, divided into two complexes described according to the community types which they contain which are in sub-marginal and marginal ecotopes. The distribution of the community complexes is shown on the vegetation map. These community complexes are also divided into ecotope types (see Ecotope map).

6.2.1 Complexes
Marginal Complexes

Complex 7
The edges have marginal vegetation with *Calluna vulgaris* dominating although no bushes are more than 30cm high with these bushes occurring in hummock-type clumps. Generally the heather is around 15-20cm high. Some bushes of *Myrica gale* are also present. This complex occurs around the margins of the high bog retreating inwards for about 10m. This vegetation type is also found in the southern outlying section of the bog, although here there is a higher moss cover consisting of *Sphagnum capillifolium* and *S. papillosum* with occasional clumps of *Hypnum jutlandicum*.

Sub-Marginal Complexes

Complex 4/7
As one moves onto the bog it becomes wetter with quite a bit of *Sphagnum* growth although this is nearly all *S. capillifolium* and *S. papillosum* with a small amount of *S. magellanicum* and *S. tenellum*. The acrotelm is very variable, at its deepest it was around 10cm in some hollows but one steps out of these onto low hummocks with no acrotelm - many having quite an amount of bare peat. Plenty of *Campylopus introflexus* and *Cladonia floerkeana* in the bog centre. Most of the bog is covered in a *Rhynchospora alba/ Calluna vulgaris* dominated vegetation with plenty of *Trichophorum caespitosum* tussocks and quite a bit of *Eriophorum vaginatum*. *Eriophorum angustifolium* and *Andromeda polifolia* occur occasionally. *Vaccinium oxycoccus* occurs infrequently. A significant plant of this bog is *Myrica gale,* this occurs in clumps throughout the bog. The only other significant plant on the bog is *Erica tetralix* which occurs throughout. *Narthecium ossifragum* also commonly occurs although not at a frequent level. The drain which cuts through the centre of the bog has mostly filled in but is identifiable by the clumps of *Molinia caerulea* it contains and in the centre of the bog by a small group of young Pine trees.

6.2.2 Flushes and Soaks

Flush F1: A flush occurs at the northern end (shows up white in the aerial photograph). Large *Myrica gale* bushes dominate the vegetation which otherwise appears similar to that around the flush. There are no other plants of note here where the *M. gale* reaches around 80cm in some clumps. The area where F1 occurs slope slightly north-easterly towards the margin (<0.5m/100m).

6.3. DETAILED VEGETATION OF THE HIGH BOG MARGINS

The bog appears to be naturally small, situated in a basin surrounded by higher ground on all but one side. On this latter side the bog spreads out to meet the Daingean-Tullamore road which is obviously originally built through this stretch of bog. The southerly outlying section of the bog is separated from the main areas of high bog by a drain (d2) and some old, abandoned cutaway is dominated by *Molinia caerulea* and *Betula pubescens*. The land skirting much of the bog is reclaimed and actively agricultural (see Landuse map). There is no active peat cutting on this bog.

7. BOG TYPE

This is probably a basin bog.

8. HUMAN IMPACT

8.1 RECENT HUMAN IMPACT (see Landuse map)

8.1.1 Peat Cutting
There is no active peat cutting on this bog with most of the old cutaway reclaimed for agriculture.

8.1.2 Forestry
A small coniferous plantation of *Picea sitchensis* is located at the bog's south-easterly margin.

8.1.3 Fire History
No signs of recent burning were found.

8.1.4 Dumping
No signs of dumping.

8.2 NHA BOUNDARY CHANGES
No change to the NHA boundary is needed.

9. INTER-RELATIONSHIPS OF VEGETATION, HYDROLOGY, TOPOGRAPHY AND LOCATION

1. This site was surveyed as it is one of the most easterly raised bog sites remaining although it was apparent from the existing information that the site was rather poor.

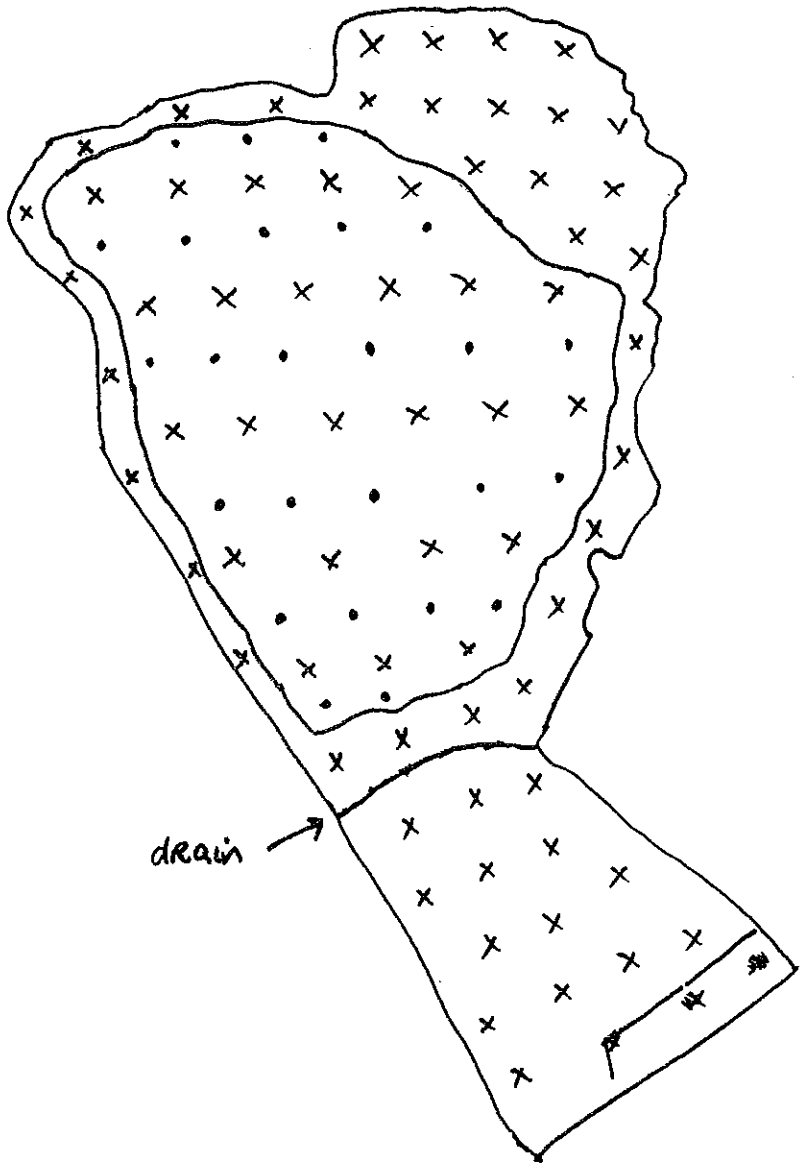
2. This visit confirmed that the site was very dry and that there were no typical central raised bog communities, with no permanent pools or well-developed *Sphagnum* hummocks.

3. The site is being actively drained at its margins and is drying out.

4. The margins of the bog have been reclaimed for agriculture with very little cutaway remaining. The bog is also in a basin with the surrounding land higher than the high bog thus making restoration procedures difficult.

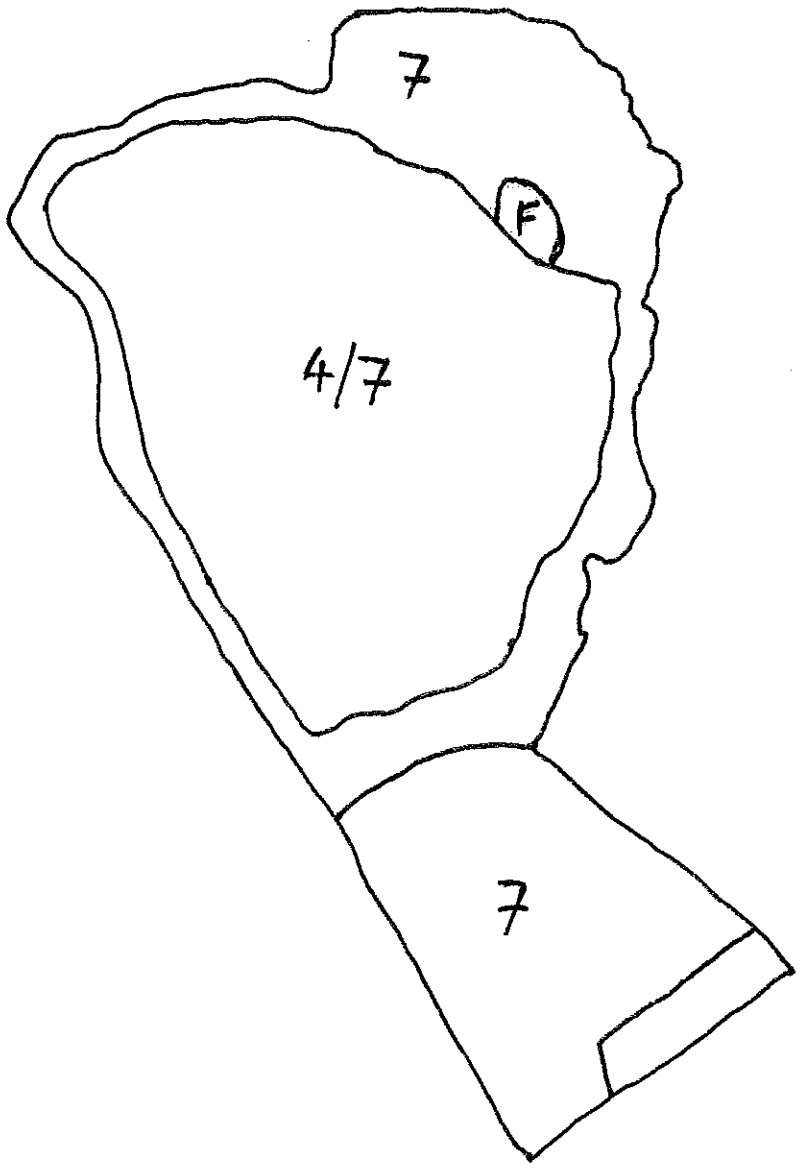
DAINGEAN BOG
Co. Offaly
ECOTOPE MAP

N



DAINGEAN BOG
Co. Offaly
VEGETATION MAP

N

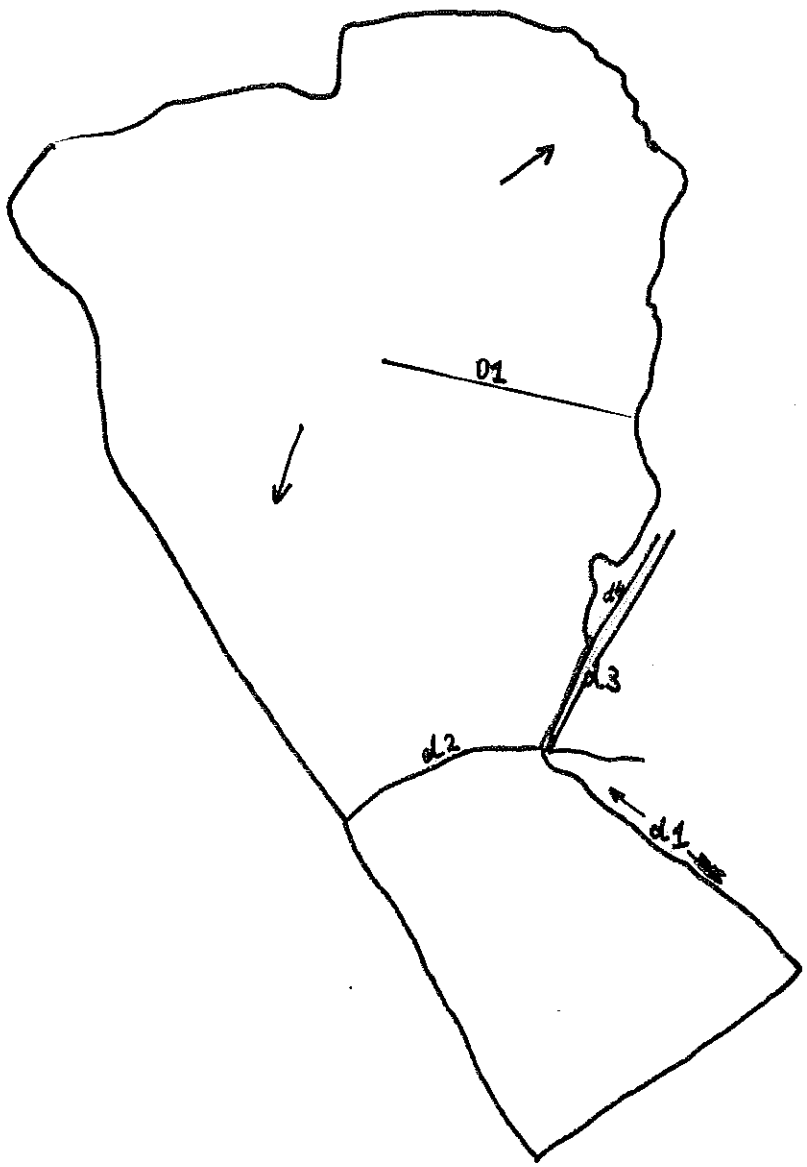


DAINGEAN BOG

Co. Offaly

Drains Map

N



Daingean Bog N↑
Co. Offaly
Land-use Map