RAISED BOG RESTORATION PROJECT

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

PART 1
SUMMARY REPORT

A REPORT TO THE NATIONAL PARKS AND WILDLIFE SERVICE, DUBLIN.

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TABLE OF CONTENTS

TABLE OF CONTENTS (CONT.)

SUMMARY OF THE CONTENTS OF ALL REPORTS

This report is divided into five sections:

Part 1 — This contains details on the aims of the project, methods used in the field survey and in site selection, summary results and recommendations for conservation and restoration.

Part 2 — This consists of the detailed reports of the 33 sites whose maps are in A4 format. These are arranged in alphabetical order according to site name. Paper copies of the maps prepared for each bog follow the relevant site report. Transparent copies of these maps are contained in Appendix I.

Part 3 — This consists of the detailed reports of the 12 sites whose maps are in A3 format. These are arranged in alphabetical order according to site name. Paper copies of the maps prepared for each bog follow the relevant site report. Transparent copies of these maps are contained in Appendix II.

Appendix I — This contains the transparent copies of the maps (1:10,5560) for the 33 sites in A4 format (arranged in alphabetical order according to site name). The maps are: Drains and Hydrochemistry Map (occasionally separate maps); Vegetation Map; Ecotope Map; Slopes Map; Landuse Map. Also contained in each envelope is the most recent vertical aerial photograph of the site blown up to 1:10,560 scale, a 6" map (1:10.5560) of the site boundary and a copy of the 6" 1840s geological map.

Appendix II — This contains the transparent copies of the maps (1:10,5560) for the 12 sites in A3 format (arranged in alphabetical order according to site name). The maps are: Drains and Hydrochemistry Map (occasionally separate maps); Vegetation Map; Ecotope Map; Slopes Map; Landuse Map. Also contained in each envelope is the most recent vertical aerial photograph of the site blown up to 1:10,560 scale, a 6" map (1:10.5560) of the site boundary and a copy of the 6" 1840s geological map.

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

Following the findings of the Survey to locate Raised Bogs of scientific interest in Ireland, carried out by The Forestry and Wildlife Service, between 1983 and 1987, a list of sites was drawn up to form a network of Raised Bog National Nature Reserves. This network was to include sites so that the range of raised bog types in the country was represented and that the diversity of raised bog habitats was conserved (Cross, 1990).

A joint Irish-Dutch project was undertaken at Clara and Raheenmore raised bogs. A detailed investigation of the hydrology, geohydrology, geology, ecology and geography was carried out with a view to the conservation and restoration of the two sites. Detailed restoration proposals were made and some experimental restoration work has been carried out. Information gathered during that project and the methods used form the basis of this current project.

The primary objective of this study is to identify raised bog sites which are suitable for declaration as National Nature Reserves taking into account their:
(a) intrinsic nature conservation value
(b) conservation problems (based on knowledge gained from the Irish/Dutch Bog Study)
(c) costs of restoration

In summary this is to include an ecological and hydrological investigation of a number of selected raised bog sites and to suggest ways in which habitat diversity and intactness of the site may be conserved and also to indicate measures which may be taken for restoration.

This project was funded by European Cohesion Funds and was carried out in the Wildlife Section of The National Parks and Wildlife Service division of the O.P.W. Three contract employees carried out the survey: L. Kelly (Botanist/Ecologist), M. Dromey (Ecologist) and M. Doak (Hydrogeologist). The project was supervised by J. Ryan with the involvement of J. Streefkerk and M. Schouten (Staatsbosbeheer, The Netherlands), C. Douglas (National Parks and Wildlife Service) and D. Daly (Geological Survey of Ireland).

The list of sites to be assessed by this study was drawn up by J. Ryan, C. Douglas and L. Kelly and was based on the following considerations.

A. The list of potential Raised Bog National Nature Reserves which were selected by Cross were included. Out of 141 sites which were visited during the Raised Bog Survey, 26 were selected as potential National Nature Reserves by Cross. These were:

SITE NAME	*COUNTY*
Killyconny	Cavan/Meath
Addergoole	Galway
Cloonmoylan	Galway
Corliskea	Galway/Roscommon
Lough Lurgeen	Galway
Monivea	Galway
Moanveanlagh	Kerry
Ballynafagh	Kildare
Knockacoller	Laois
Ballykenny/Fisherstown	Longford
Brown Bog	Longford
Clontymullen	Longford
All Saint's	Offaly
Blackcastle	Offaly
Clara	Offaly
Mongan	Offaly
Raheenmore	Offaly
Sharavogue	Offaly
Callow	Roscommon

Carrowbehy	Roscommon
Derrinea	Roscommon
Cloonshanville	Roscommon
Crosswood	Westmeath
Garriskil	Westmeath

B. In addition to the sites selected by Cross, sites which had been offered for sale to the National Parks and Wildlife Service by Bord na Mona were to be included in this investigation. This added the following sites to the list:

SITE NAME	*COUNTY*
Castlefrench East	Galway
Curraghlehanagh	Galway
Shankill West	Galway
Carrownagappul	Galway
Kilsallagh	Galway
Lisnageeragh	Galway
Ferbane	Offaly
Moyclare	Offaly
Corbo	Roscommon

C. Also included were sites which were not on the proposed NNR list but where sections of the site had been purchased by The National Parks and Wildlife Service.

SITE NAME	*COUNTY*
Camderry	Galway
Clooncullaun	Galway
Trien	Roscommon

D. Likewise sites of which part is owned by the Land Commission were also included.

SITE NAME	*COUNTY*
Cloonchambers	Roscommon
Kilcarren	Tipperary

E. Furthermore, it was decided that any A sites which were not included in the original NNR selection should be investigated and in counties where no A sites exist then all Bi sites should also be surveyed. This added the following sites to the list:

SITE NAME	*COUNTY*
Mouds (Bii)	Kildare
Ballina (Bii)	Kildare
Flughany (Bi)	Mayo
Derrynabrock (Bi)	Mayo
Firville (A)	Tipperary

F. At a later stage Sheheree Bog, Co. Kerry was added to the list and visited.

In total 47 sites were considered during this project. Raheenmore and Clara bogs were not visited as detailed research had already been carried out and the necessary information was available. They were included in the final assessment of sites.

2. METHODS

2.1 INITIAL RECONNAISSANCE

This involved collating existing information from the Raised Bog Surveys completed in 1987. These site data were contained in the reports of O'Connell and Mooney (1983); Douglas and Mooney (1984); Douglas and Grogan (1985, 1986 and 1987). Information was also derived from the Natural Heritage Area (NHA) Survey reports.

Aerial Photography
Black and white stereographic pair aerial photographs taken by the GSI in the 1970s were obtained for all of the sites. The sites were then assessed as to their present status with the use of more recent aerial photography. This was in several forms: oblique colour photographs taken during the NHA Survey (1992-1993); BKS black and white stereo pairs of the area around the Shannon callows; some recent colour and black and white stereo pairs taken by the Ordnance Survey. Where no recent aerial photography was available for a site, new aerial photographs were requested from the National Parks and Wildlife Service. Mr Alyn Walsh, Research Ranger took oblique colour aerial photographs of these bogs in 1994.

Recent afforestation and drainage could be easily seen on these photographs. One of the sites selected by Cross had been exploited since the time of selection (Clontymullen, Co. Longford). An alternative site was therefore chosen (Williamstown, Co. Longford). Williamstown was then discovered to have been mostly developed by Bord na Mona.

Castlefrench East was also considered to have a low conservation potential as it is only a remnant of a large bog complex. On further investigation it was decided that Mouds and Ballina bogs would not be considered in this study.

The 45 sites visited during this project are listed below (adjacent sites are combined in the list [NHA Nos. follow]). They may be divided into 10 groups depending on their location. This table also includes Clara and Raheenmore, Co. Offaly where research has already been carried out and restoration works are already taking place and Sheheree, Co. Kerry which was visited at the end of the project.

East Galway	NE Galway/NW Roscommon	SE Galway
Shankill West (326)	Corliskea/Trien (2110)	Cloonmoylan (248)
Lough Lurgeen (301)	Bellanagare (592)	Barroughter (231)
Curraghlehanagh (256)	Derrinea (604)	
Clooncullaun (245)	Cloonchambers (600)	W. Offaly
Camderry (240)	Carrowbehy (Caher) (597)	Blackcastle (570)
Carrownagappul (1242)	Cloonshanville (614)	(Raheenmore) (582)
Lisnageeragh (296)	Callow (595)	
Kilsallagh (285)		
North Offaly	**S. Offaly/N. Tipperary**	**Mid-West Galway**
Mongan (580)	All Saints (566)	Addergoole (223)
Ferbane (575)	Sharavogue (585)	Monivea (311)
Moyclare (581)	Ballyduff/Clonfinane (641)	
Crosswood (678)	Firville/Kilcarren (647)	
(Clara) (572)	Redwood (654)	
E. Mayo	**Longford/E. Roscommon**	**Situation or Isolated**
Derrynabrock (457)	Ballykenny/Fisherstown (441)	Moanveanlagh (374)
Tawnaghbeg (547)	Brown Bog (442)	Sheheree (382)
Flughany (497)	Corbo (602)	Killyconny (6)
		Knockacoller (419)
		Ballynafagh (391)
		Garriskil (679)

The location of each site is indicated in Fig. 2.1. the position is shown using the relevant NHA number.

2.2 FIELD VISITS

All sites, apart from Clara and Raheenmore, were visited by the ecological section during the field season of 1994 (between 9-3-1994 to 10-11-1994). Sheheree, Co Kerry was visited in May, 1995. Four sites were not visited by the hydrologist: Blackcastle, Co. Offaly and Corbo, Co. Roscommon as their conservation value was deemed to be low after the ecologist's survey; Clara and Raheenmore as their geohydrology had been investigated sufficiently in the past.

2.2.1 Geohydrology Section

2.2.1.1 Topography
Before any field visits aerial photograph interpretation was carried out to determine the general position of each bog within the landscape. Interesting topographic features noted around each bog at this stage were visited in the field, such as local quarries, eskers, swallow holes, etc..

2.2.1.2 Geology
Any bedrock outcrops in the immediate area around each bog were visited, but solid geology of each site was mostly determined from existing geology maps at the GSI, particularly the Chevron/GSI set of 1992.

For the subsoils geology the entire bog margin was walked and any subsoil sections were noted/logged in the cut-away drains. Importantly subsoil (till) texture was noted and depths-to-bedrock determined if possible. If time permitted a general reconnaissance walk-over was carried out in the mineral soil area outside the confines of the bog margins.

2.2.1.3 Geohydrology
The geohydrologist was more concerned with the hydrology of the bog margins. Hydrology of the high bog was mapped by the two ecologists. The bog margin was walked and all cut-away drains were inspected. The heights and condition of the face banks were noted as were the depth and width of the drains. The magnitude of flows in the drains and the direction of flow were noted.

2.2.1.4 Hydrochemistry
An Electrical Conductivity WTW hand-held meter was used at all times to measure EC and temperature of water at the face banks in the cut-away drains. ECs were also measured at the rivers and streams in the general area. The EC meter proved to be an important tool in this study since it helped in determining zones of groundwater upwelling and possible fen/lagg zone areas. Samples for a full hydrochemical analysis were collected and sent to the Coillte laboratory. Details appear in section 2.2.2.2.

2.2.2 Ecology Section

2.2.2.1 Vegetation
A field card was designed for the field visit (Fig. 2.2). This was compiled so that the information necessary for the division of the vegetation cover into vegetation complexes could be readily carried out. The methods used were based on those employed by Kelly (1993). Extra information was also gathered. The field card was used to record: the % of different vegetation communities within each vegetation complex, presence of indicator species, micro-topographical structure, presence of an acrotelm layer and the occurrence of epiphytic lichens on *Calluna*.

In addition detailed notes were taken on each community complex and on any flushed or soak areas seen. This included estimations of pool depth, size, shape and orientation and water table depths in pools at the time of the survey. Hummock height and diameter, species lists in flushes and other general points of interest were noted.

SITE NAME:	All Saints Bog		
COUNTY	Offaly		
GRID REF:	N 01 11 (National)	NHA No:	566
1:2" SHEET	15	6" SHEET:	OY 29
AREA (ha):	234 (High Bog)	GSI PHOTO	N163
NHA PHOTO:	Film No: 685 1-1N	OTHER PHOTO	34062/63 (Shannon Callows)
RECORDERS:	L. Kelly and M. Dromey		
TOWNLANDS:			
DATE(s) OF VISIT	14-6-94 and 15-6-94		
OWNERSHIP	Erin Peats 50ha; NPWS 112 ha		

	COMMUNITY COMPLEX (VEG. ZONE)						
COMMUNITY	6 RB	10/6	2/6/3	9/10	6/2+P	10/6/2	10/6+
Facebank							
S. capillifolium **Hummocks**	+	5	+	+	5	5	5
S. imbricatum **Hummocks**	+	10	+	5	+		5
Leucobryum glaucum **Hummocks**	10	+	+	+	+		+
Burnt disturbed **Flats**	5	5	10	+	5		± 5
Tricophorum **Hummocks/Flats**	+	+	20	10	20	25	+
S. papillosum **Hummoks/Hollows**	+	5	5	5	+	8	5
S. magellanicum S. capi **Hummocks**	5	10	5	5	+	10	+
Typical **Hummocks**		5	10	15	15	12	20
Burnt disturbed **Hummocks**							
Cladonia dominated **Hummocks**				5-10			30-60
Algal **Hollows**	10	10	20	+		10	15
S. cuspidatum E. angus. **Pools**		5 (dry)	+	10	10		+
R. fusca **Hollows**							
Narthecium **Hollows**	50	35	20	10	40	20	25
S. magellanicum **Hollows**				20			15
S.magellanicum S. cuspi **Pools**				+			
Rhynchospora alba **Hollows.**	5	10	+	5	5	+	+
Bare Peat							
S. subnitens	5		+			+	5
S. auriculatum	+	+	+				
S. fuscum		+				+	
TOTAL Sphagnum (algal) Cover	15	30	10	55	15	20	30
Hummocks Sphagnum (algal) Cover	12	25	8	25	5	15	10
Pool Lawn Sphagnum (algal) Cover	3	5	2	30	10	5	20
E. vaginatum				20		10	10
INDICATOR SPECIES							
Campylopus atrovirens							
Sphagnum imbricatum	✓	✓	✓	✓			✓
S. fuscum	✓	✓					✓
S. auriculatum	✓	✓	✓	✓	✓		
S. magellanicum	✓	✓	✓	✓			✓
S. cuspidatum	✓	✓	✓	✓			✓
Pleurozia purpurea							
Racomitrium lanuginosum							
Andromeda polifolia	✓	✓	✓	✓			✓
Pedicularis sylvatica							
Rhynchospora fusca							
Carex panicea	✓	✓	✓				✓
Huperzia selago							
Potentilla erecta							
Rhynchospora fusca		✓					
Dactylorhiza maculata		✓					✓
STRUCTURE							
Open Water	–	+	–	5	5	–	+
0-10 cm	90	70	65	30	50	90	85
10-20 cm	5	25	25	50	40	5	10
20-30 cm	5	5	10	10	5	5	5
30-40 cm		+	+	5			+
40-50 cm							
50-75 cm							
75-100 cm							
ACROTELM	Absent	Present	Absent	Present	Absent	Present	Present
CALLUNA (plus epiphytes)				3 (2)			1 (1)

Approximate boundaries for each of the vegetation complexes on a site were drawn onto aerial photographs in the field. Vertical aerial photographs were blown up to the 6" scale (1:10.560).

2.2.2.2 Hydrochemistry

Electrical conductivity (μS/cm) measurements were taken on a regular basis with a WTW Electrical Conductivity meter, particular attention being paid to flushes or other features of interest.

Samples for hydrochemical analyses were taken from flushes on a number of sites (surface samples). These were analysed in the Coillte laboratory in Newtownmountkennedy. The following parameters were measured: pH, H^+, Electrical Conductivity (EC) (μS/cm), Total hardness, Alkalinity, Ca^{2+}, Mg^{2+}, Na^+, K^+, Cl^-, S04-S, Al^{3+}, N03-N, NH4-N, Fe^{2-}, Zn^{2+}, $Mn^{2+}$and P04-P.

2.2.2.3 Human Impact

Peat cutting: Notes were taken on where it was occurring, what method was being used (hopper, Difco or hand), heights of the facebanks and if there was associated cracking and/or slumping of the high bog surface.

High bog drains: Notes were taken on the width, depth, direction of flow, depth of water, vegetation and in some cases electrical conductivity measurements. It is important to remember, when referring to water depth and significance of flow, the date of the site visit as seasonal variations will occur.

Forestry: Details of the approximate age of the plantation and the dominant species were taken. In some cases notes on the understorey vegetation were also made.

Poaching: In some places, where the high bog directly adjoins mineral soil or where the facebanks are low, cattle and other livestock can gain access. They usually do not venture far into the site but their activities damage the surface vegetation leading to increased surface water run-off. In addition eutrophication can occur.

Dumping of household and farm refuse: This is quite common and ranges from dead animals to cars and washing machines. Where it is a serious problem, attention is drawn to its occurrence.

2.2.2.5 Photography

Prints and slides were taken at each site, weather permitting. The ecological section of the project took both prints (M. Dromey) and slides (L. Kelly) at each site. The film and frame numbers are tabulated and a short description of the subject is given in the table detailing the slides. Slides of geological and hydrological features were taken by M. Doak. Tables 2.1, 2.2 and 2.3 present the information on photographic material available for each site.

TABLE 2.1 Photographs taken during Raised Bog Restoration Project 1994/95.

SITE NAME	COUNTY	NHA No.	Film No.	Date
Addergoole	Galway	223	PM19	Nov. '94
All Saint's Bog	Offaly	566	PM7+PM8	June '94
Ballyduff	Tipperary	641	PM12	July '94
Ballykenny	Longford	1439	PM3	April '94
Ballynafagh	Kildare	391		
Barroughter	Galway	231	PM4	May '94
Bellanagare	Roscommon	592	PM19	Oct. '94
Blackcastle	Offaly	570		
Brown Bog	Longford	442	PM3	April '94
Callow	Roscommon	595	PM18	Oct. '94
Camderry	Galway	240	PM6	May '94
Carrowbehy	Roscommon	597		
Carrownagappul	Galway	1242	PM16+PM17	Sept. '94
Clara	Offaly	572	PM2+PM3	April '94
Clonfinane	Tipperary	641	PM11+PM12	July '94
Clooncharnbers	Roscommon	600	PM18	Oct. '94
Clooncullaun	Galway	245	PM17	Sept. '94
Cloonfelliv	Rosc./Galway	217		
Cloonmoylan	Galway	248	PM4	May '94
Cloonshanville	Roscommon	614	PM18	Oct. '94
Corbo	Roscommon	602	PM2	April '94
Corliskea	Galway/Rosc.	219	PM15	Aug. '94
Crosswood	Westmeath	678		
Curraghlehanagh	Galway	256	PM6	May '94
Derrinea	Roscommon	604	PM1, PM2+PM19	Mar and Nov. '94
Derrynabrock	Mayo/Rosc.	457	PM13	July '94
Ferbane	Offaly	575	PM8	June '94
Firville	Tipperary	645	PM10+PM11	June '94
Fisherstown	Longford	1447	PM3	April '94
Flughany	Mayo/Sligo	497	PM13	July '94
Garriskil	Westmeath	679	PM16	Sept. '94
Kilcarren	Tipperary	647	PM10	June '94
Killsallagh	Galway	285	PM17	Sept. '94
Killyconny	Cavan/Meath	6	PM16	Aug. '94
Knockacoller	Laois	419		
Lisnagheeragh	Galway	296	PM17	Sept. '94
Lough Lurgeen	Galway	301	PM13, PM14+PM15	July '94
Moanveanlagh	Kerry	374	PM19	Nov. '94
Mongan	Offaly	580	PM1, PM2+PM4	Mar, April, May '94
Monivea	Galway	311	PM19	Nov. '94
Moyclare	Offaly	581	PM8	June '94
Raheenmore	Offaly	582	PM18	Oct. '94
Redwood	Tipperary	654		
Shankill West	Galway	326	PM7	June '94
Sharavogue	Offaly	585	PM16	Aug. '94
Sheheree	Kerry	382	PM21	May '95
Tawnaghbeg	Mayo	547	PM12	July '94
Trien	Roscommon	616	PM15	Aug. '94

Taken by Marie Dromey.

TABLE 2.2 List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
Addergoole, Co. Galway	9-11-1994	19 (Kodachrome)	15	Main Flush. Epiphytic lichens on Betula
			19	Main Flush. Epiphytic lichens on Betula
			20	Open water section of flush.
			21	Open water section of flush.
			22	Molinia in flush
			23	Open water section of flush
			24	Complex 6/9+Pools (S. side)
			25	Complex 6/9+Pools (S. side)
All Saints, Co. Offaly	15-16-6-1994	9 (Kodachrome)	13	6RB and quarry in background
			15	Flush Z. Phragmites and Calluna dominated mound
			16	Complex 2/6/15 Sphagnum papillosum invading pool
			17	Northern arm of the main soak
			18	Northern arm of the main soak
			19	D1. dense woodland on W side of main flush
			20	Polytrichum commune fruiting
			21	Partial clearing (C1) of main soak
			22	Partial clearing (C1) of main soak
			23	Partial clearing (C2) of main soak
			24	Partial clearing (C2) of main soak
			25	Clearing C3 of main soak partly drained
			26	Erin Peat moss peat production on NE corner
			27	Erin Peat moss peat production on NE corner
			28	Scattered Dactylorhiza maculata in Complex 10/6
			29	Large Pinus sylvestris surrounded by seedlings in Complex 10/6+
			30	Well developed Sphagnum imbricatum hummock in Complex 6
			31	General view to S and part of gravel ridge
			32	S arm of the main soak dominated by Pinus sylvestris
			33	C5 clearing in southern arm of soak
			34	Boundary between 10/6 and 6Rb
			35	Drosera anglica
			36	6RB with quarry in the background
Ballyduff, Co. Tipperary	6-7-1994	12 (Kodachrome)	23	Complex 7+ Cladonia with Pine and Betula encroaching
			24	Complex 7+ Cladonia with Pine and Betula encroaching
			25	Complex 6-
Ballykenny, Co. Longford	26-4-1994	6(Kodak Elite)	14	To NE. Drain bB
			15	Rhododendron alone W edge
			17	N towards Lough Forbes
			18	General view
			19	Tear Pool area
			20	Derreen wood on till mound
			21	Target on tree
			22	Oire on N side of site
			23	Signs of burning on N section
			24	Undulating E edge
Ballynafagh/Blackwood	11-3-1994	3 (Kodak Elite)	2	To E. Drain bA
			3	To N. Forestry, road and cut-away
			4	To S. Drain bA1
			5	To S. drain beside Lodgepole pine plantation
			6	Pool in central complex
			7	To N complex 15 with pools and Forestry/drains
			8	Small Pinus contorta plantations on high bog
			9	Small Pinus contorta plantations on high bog
			10	To SW leg of high bog
			11	Recently burnt vegetation to W
			12	To S. Sitka spruce planted on high bog
			13	To NNW. new drains on S side of bog
			14	Peat cutting on high bog
			15	To W. new deep drains at the NE edge
Barroughter, Co. Galway	12-5-1994	? (Ektachrome)	24	Cut-away area to the W of the site
			25	Sphagnum fuscum
			26	Complex 4/6
			27	Pool in Complex 4/6/15
			28	To E. towards Lough Derg
			29	W towards cut-away
			30	General view to N
			31	To the NE cut-away and Lough Derg

TABLE 2.2 List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
Addergoole, Co. Galway	8-11-1994	19 (Kodachrome)	15	Main Flush, Epiphytic lichens on Betula
			19	Main Flush, Epiphytic lichens on Betula
			20	Open water section of flush
			21	Open water section of flush
			22	Mollnia in flush
			23	Open water section of flush
			24	Complex 6/9+Pools (S. side)
			25	Complex 6/9+Pools (S. side)
All Saints, Co. Offaly	15/16-6-1994	9 (Kodachrome)	13	6RB and quarry in background
			15	Flush Z, Phragmites and Calluna dominated mound
			16	Complex 2/6/15 Sphagnum papillosum invading pool
			17	Northern arm of the main soak
			18	Northern arm of the main soak
			19	D1, dense woodland on W side of main flush
			20	Polytrichum commune fruiting
			21	Partial clearing (C1) of main soak
			22	Partial clearing (C1) of main soak
			23	Partial clearing (C2) of main soak
			24	Partial clearing (C2) of main soak
			25	Clearing C3 of main soak partly drained
			26	Erin Peat moss peat production on NE corner
			27	Erin Peat moss peat production on NE corner
			28	Scattered Dactylorhiza maculata in Complex 10/6
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			35	Drosera anglica
			36	6RB with quarry in the background
Ballyduff, Co. Tipperary	6-7-1994	12 (Kodachrome)	23	Complex 7+ Cladonia with Pine and Betula encroaching
			24	Complex 7+ Cladonia with Pine and Betula encroaching
			25	Complex 6-
Ballykenny, Co. Longford	26-4-1994	6(Kodak Elite)	14	To NE, Drain bB
			15	Rhododendron along W edge
			17	N towards Lough Forbes
			18	General view
			19	Tear Pool area
			20	Derreen wood on till mound
			21	Target on tree
			22	Pine on N side of site
			23	Signs of burning on N section
			24	Undulating E edge
Ballynafagh	11-3-1994	3 (Kodak Elite)	2	To E, Drain hA
			3	To N, Forestry, road and cut-away
			4	To S, Drain bA1
			5	To S, drain beside Lodgepole pine plantation
			6	Pool in central complex
			7	To N complex 15 with pools and Forestry/drains
			8	Small Pinus contorta plantations on high bog
			9	Small Pinus contorta plantations on high bog
			10	To SW leg of high bog
			11	Recently burnt vegetation to W
			12	To S, Sitka spruce planted on high bog
			13	To NNW, new drains on S side of bog
			14	Peat cutting on high bog
			15	To W, new deep drains at the NE edge
Barroughter, Co. Galway	12-5-1994	7 (Ektachrome)	24	Cut-away area to the W of the site
			25	Sphagnum fuscum
			26	Complex 4/6
			27	Pool in Complex 4/6/15
			28	To E, towards Lough Derg
			29	W towards cut-away
			30	General view to N
			31	To the SE cut-away and Lough Derg

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			32	Pools in central complex
			33	Pools in central complex
			34	Pools in central complex
Bellanagare, Co. Roscommon	24/27-10-1994	18 (Kodachrome)	10	Flush Y, N Lobe
			11	Flush Y, N Lobe
			12	Flush Y, N Lobe
			13	Complex 7/9, N Lobe
			14	Algal growth on the edge of Drain bC36
			15	To S, Drain bC36
			16	To N, Sitka Spruce on NW corner
			17	To NE, Sitka Spruce on NW corner
			18	Sphagnum pulchrum at pool edges in Complex 2/6/4+P
			19	Sphagnum pulchrum at pool edges in Complex 2/6/4+P
			20	To W, Flush Y2
			21	To SW, Flush X2
			22	To S, Complex 9/7 on W Lobe
			23	To SE, Complex 9/7
			24	To E, line of mounds S of Y3
			25	To N, swallowhole in Y3
			26	To NW, W side of Y3
			27	Pool inComplex 2/6/3+P
			28	Complex 6/3+P+cl on W Lobe
			29	Rainbow
			30	To N, Flush Y3
			31	To S, Flush W3
			32	Flush Z4 and Lodgepole forestry on bog edge.
			33	To NNE, Flush X3 E arm
			34	To S, Flush X3 E arm
			35	Complex 9/7 +En close to Flush Y4
			36	Access road on the SE Lobe and Forestry.
Blackcastle, Co. Offaly	9-3-1994	1 (Fuji)	27	To W on N side of site
			28	To W through recently burnt vegetation on the high bog
			29	N section of Drain bB in recently burnt area
			30	To E Pinus sylvestris encroaching onto high bog
			31	Central section shows hummocks
			32	To N S side of Drain bB
Brown Bog, Co. Longford	27-4-1994	6 (Ektachrome)	25	Burnt area at the S
			26	Tear pools at E edge
			27	Complex 2/3/6
			28	Slope 3 into cut-away colonised by Betula
			29	Complex 2/3/6
			30	Pine in Complex 2/3/6
			31	Pines encroaching on NE section
			32	Complex 6/3+Tear Pools
			33	Complex 15, slightly flushed
			34	Flush Z
			35	Erosion channels at N edge
Callow, Co. Roscommon	5-10-1994	17 (Kodachrome)	22	Lough Gara
			23	S. cuspidatum pools in Complex 9/6/4
			24	S. cuspidatum pools in Complex 9/6/4
Camderry, Co. Galway	25-5-1994	8 (Kodachrome)	30	Flush X
			31	Flush X
			33	To NW, shows Racomitrium hummocks
			34	To E, shows Complex 3/2/4
			35	To W, along N edge
			36	To N, along N edge
Carrowbehy, Co. Roscommon	22/23-3-1994	4 (Kodak elite)	5	Drain bA and Pinus contorta plantation
			6	To W, Drain mE at the S of the NW Lobe.
			7	Erosion channel associated with Drain bA
			9	Erosion channel associated with Drain bA
			15	To N, Lake Z
			16	To E, Calluna heath on mound
			17	Flush X
		5 (Fujichrome)	2	Flush W
			3	Schoenus nigricans
			4	Large tear pool at mid-E

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			5	Large tear pool at mid-E
			6	Flush W
Carrownaguppal, Co. Galway	6/7-9-1994	16 (Kodachrome)	18	Complex 3/2/6
			19	To N, along W edge, W of Flush X
			20	To E, along N edge of NW arm. APC and Calluna ridge at edge
			21	Flush W, course of underground stream
			22	To SE, partial cutaway on mineral ridge at S.
			23	Complex 3RB with Molinia encroaching onto S Lobe
			24	Peat cutting on S Lobe
Clonfinane, Co. Tipperary	5-7-1994	12 (Kodachrome)	1	To NE along NW edge
			2	To SSW peat production
			3	Active peat cutting on NE side
			4	To SSW between drains bA
			5	To SSW towards Flush Y
			6	Phragmites area along N edge
			7	Phragmites area along N edge
			8	N end of Drain bJ
			9	Difco slits at edge of Drain bJ
			10	To SW Drains bN and quarry behind. Note Narthecium and bare peat between drains
			11	Complex 6B
			12	Complex 6RB
			13	To N along E edge (dark)
			14	Complex 6+ pools
			15	Recently burnt area
			16	To SE E/W drain of Drain complex bN
			17	To N N/S drain of bN complex
			18	Circular patch of Betula to SE
			19	Drosera anglica
			20	Complex 15
			21	Complex 15
			22	Complex 15
Cloonchambers, Co. Roscommon	3/4-10-1994	17 (Kodachrome)	15	To E, junction of drains bC5 and bB
			16	To SW, depression at the junction of the three lobes
			17	Complex 2+Erosion gullies at N side of central flush
			18	To Sw, view into Flush X
			19	Wooded mound at E of site
			20	Complex 4/6+Pools
			21	NE side of wooded mound.
Clooncullaun, Co. Galway	8-9-1994	16 (Kodachrome)	25	To S, central road and Camderry in the distance
			26	Complex 3/2++ Cladonia
			27	Complex 6/3/2 + Pools
			28	To NE, along Flush Y
			29	To SE, through APC at the junction of the main lobe and NW Lobe
			30	To SE, Complex 2/3
			31	To NNW, Complex 2/3
Cloonmoylan, Co. Galway	9-5-1994	7 (Ektachrome)	1	To E, pines in Flush Z
			2	To W, into Flush Z
			3	To E, Flush Y Carex paniculata
			4	Frangula in Flush Y
			5	Frangula in Flush Y
			6	To E, Drain bB
			7	Recently burnt area
			8	Complex 2/3
			9	To N along Drain bK2
			10	Drain bI1
			11	Complex 15/6
			12	N end of Flush ZZ
			13	Drain bS2
			14	Towards S cut-away
			15	SE towards Lough Derg
			16	Flush Z
			17	Drain bA3
			18	Complex 4/15
			21	Racomitrium hummock in Complex 4/15
			22	Mounds to the N of Flush YY
Corbo, Co. Roscommon	24-3-1994	4 (Ektachrome)	18	To SE, Flush Z

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			19	Complex 3/2
			20	Flush Y
			23	8m Facebank on W side of N arm
Corliskea, Co. Galway	4/5-8-1994	15 (Kodachrome)	9	Frangula alnus in Flush Z
			10	Lodgepole pine plantation on NW, note Myrica.
			11	Lodgepole pine plantation on NW, note drain.
			12	Complex 3/2 with erosion channels on NW
			13	To SE, Flush X a series of swallow holes
			14	To NE, old peat cutting around River 2
			15	Active peat cutting close to slope 9
			16	To W, NW edge of forestry
			17	Lake at the head of River 1
			18	Layer of pine in peat face (3 m) at S side
			19	Partially cut peat adjoining mineral soil at S. Poached and grazed by cattle
			20	Partially cut peat adjoining mineral soil at S.
			21	Betula in Flush V
			24	Drain b2M
			25	Calluna and Phragmites mound at the SE of site
Crosswood, Co. Westmeath	15-3-1994	3 (Kodak Elite)	21	To E, Complex 15
			22	To NW, Complex 2
			23	Sphagnum pulchrum
			24	Sphagnum pulchrum
			25	Pool in Complex 15
			26	To NNW, Pinus sylvestris flush
			27	To SE, Pinus sylvestris flush
			28	To NNE, Complex 3
Curraghlehanagh, Co. Galway	23-5-1994	8 (Kodachrome)	10	Forestry to NW of site
			11	To S, along W edge
			12	To E, into Difco peat cutting
			15	Slump at mid east edge
			16	Slump at mid east edge
			17	Regeneration in cut-away at S
			18	Shows old cutting and shallow facebanks at the S
			19	Field at bog edge
			20	Forestry at S of site
			21	Forestry at S of site
			25	Pool on slope into bog burst
			26	Pool on slope into bog burst
			27	Erosion channels in bog burst
			28	Bog burst
			29	Bog burst
Derrinea, Co. Roscommon	21-3-1994	3 (Kodak Elite)	30	To NW Poole Z
			31	Complex 3 on the SE side
			32	Drain bB1 and Facebank complex
			33	Pool Y
			34	Pool Y
			35	Complex 2 on N side shows Molinia encroaching and slope to river
			36	Interconnecting pool system, Complex 35/14
			37	Pool in Complex 35/14
	10-11-1994	19 (Kodachome)	34	Mound at the south of the bog.
			35	N edge of bog and adjacent river.
Derrynabrock, Co. Mayo	14-7-1994	13 (Kodachrome)	7	Wet meadows beside SW of bog
			8	Wet meadows beside SW of bog
			9	Phragmites on the high bog at the W side of the site
			10	Complex 35 at the N of the N lobe with Carex limosa
			11	Complex 35 at the N of the N lobe with Carex limosa
Ferbane, Co. Offaly		4 (Ektachrome)	28	To NE, Pines encroaching
			29	To SW, Drain bC
			30	Slumping along E edge
			31	Central pool area
	22-6-1994	10 (Kodachrome)	11	To W, along Drain bB shows pines invading
			12	To N, Molinia at N end of Drain bE (note Betula and Pine at bog edge)
			13	To S, along E edge shows Rhododendron and facebank complex
			14	To S, along E edge shows Betula and pine encroaching
			15	To S, shows patchy nature of Complex 6/3+
			16	To E, old peat cutting and regenerating Sphagnum at SE of site

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			17	Old field at SE side of bog
			18	To W, along S edge
			19	To SW, shows regeneration in old peat cutting
			20	To N, west section of Drain complex bN
			21	To SW, Molinia in old peat cutting
			22	To S, abandonded difco peat between drains bN, S of Drain bM
			23	To W, shows occasional large hummocks in Complex 10/3
			24	To W, shows wettest area of bog
			25	Complex 14 or flush
			26	To S, complex 14
			27	To N, Complex 14
			28	Facebank, Betula, Trichophorum and pine on high bog, just N of Drain bR
Firville, Co. Tipperary	26-6-1994	11 (Kodachrome)	1	Melampyrum and Myrica on high bog
(Film damaged)			2	To NW Flush Y
			3	To W Flush X lichen epiphytes on Betula
			4	To NE Complex 6 + Calluna and Eriophorum vaginatum
			5	To N Phragmites on high bog
			6	Rhynchospora fusca hollows in Complex 10B
			7	Complex 10+ Cladonia Sphagnum cuspidatum interconnecting pool
			8	Drain mH west side of N Lobe with Menyanthes and Carex diandra
			9	Complex 2 along N edge of N Lobe
			10	To N old peat cutting on N side of N Lobe
			11	Rhynchospora fusca
			12	Narthecium
			13	Sphagnum cuspidatum pool with S. magellanicum at the edges
			14	To S Complex 6 RB and unburnt area
			15	To SW Complex 6 RB and unburnt area
			16	Dried out Sphagnum in Complex 6RB
			17	Poaching on SE edge of high bog
			18	Shows high bog and adjoing fields along SE edge
			19	To W Drain bA infilled with Sphagnum magellanicum
			20	To W Drain bA infilled with Sphagnum cuspidatum
			21	Complex 14
			22	Dried out Sphagnum cuspidatum pool in Complex 14
			23	To S Complex 14
			24	To E Complex 14
			25	Drosera intermedia?
			26	Listera ovata
			27	Listera ovata
			28	Listera ovata
			29	Easy access for cattle onto high bog at SW
			30	To E series of E/W ridges mark old difco at SW
Fisherstown, Co. Longford	25-4-1994	6 (Ektachrome)	1	Drains bA, moss peat area
			2	Drains bA, moss peat area
			3	NE end of Drain bC
			4	To the NE towads Camlin River
			5	Complex 10+Cl
			7	Complex 4/2
			8	Myrica area to the N of Drain bM
			9	General view
			10	Moss peat production area
Flughany, Co. Mayo	15-7-1994	13 (Kodachrome)	12	Complex 4/6 to the SE
			13	Complex 4/6 to the NE
			14	Complex 4/6/15
			15	Complex 4/6/15
			16	To the S, slope to area between high bog at S and site to S
			17	Phragmites in Complex 6/3/2
			18	Central section of Flush Z, large Sphagnum cuspidatum pool
			19	Swallow hole in Flush Z
			20	Swallow hole at E end of Flush Z with Typha and other mesotrophic species
			21	To the W along Flush Z
Garriskil, Co. Westmeath	31-8-1994	16 (Kodachrome)	1	Leakage around dam in Drain complex A
			2	High water table in a drain of Drain Complex A
			3	Complex 6/35
			4	Rhododendron bush and seedlings, S of Flush Z
			5	Flooded junction of Drain Complex bA, E. vaginatum very stiff growth form

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			6	Complex 6
			7	Old coring site
			8	Abandonded rain gauge
			9	Complex 2B
			10	To SE, general view along E of southern edge. Forestry in background
			11	Racomitrium hummock covered with Andromeda
			12	Complex 10/15, Sphagnum cuspidatum pool with low water table
			13	Central section of Flush Z1
			14	To NW, Complex 1 and 2 at W end of site.
			15	To SE, view along W edge of bog (dark)
			17	To E, along N edge, just E of old house.
Kilcarren, Co. Tipperary	26-9-1994	18 (Kodachrome)	7	Infiltration lagg at N edge
Kilsallagh, Co. Galway	15/16-9-1994	17 (Kodachrome)	8	To NNW, APC along mid SW edge
			9	Pinus contorta on high bog to N
			10	Flush Y
			11	Recent Pinus contorta plantation extending onto high bog at NW
			12	Recent Pinus contorta plantation extending onto high bog at NW
			13	Peat cutting machine
			14	Severe marginal cracking and slumping at NNE edge
Killyconny, Co. Cavan	9-8-1994	15 (Kodachrome)	26	To NW, along W edge
			27	To SW, along W edge
			28	To NW, Complex 2/7
			29	To SSW, southern leg with Complex 2 and partly burnt forestry
			30	To N, Slump into drain bE beside plantation (poor quality slide)
			31	Old peat cutting at the S of the southern leg
			32	To NW, ridge between two sections of bog
			33	To SW, along NE edge of N lobe
			34	To NE, rocky outcrops on adjacent high ground
Knockacoller, Co. Laois	19-4-1994	5 (Fujichrome)	20	To NNW Complex 6/2
			21	To S, Complex 6/2
			22	To SE, into central depression
			23	To S, burnt vegetation on high bog
			24	To NE, burnt vegetation on high bog
			25	To NW along western edge
			26	Peat crack on western edge
			27	General view towards Slieve Bloom mountains
			28	Abandonded Dico peat cutting on SE
			29	Polytrichum commune
Lisnageeragh, Co. Galway	9-9-1994	16 (Kodachrome)	32	To SW, Flush Z
			33	Pools in Complex 35
			34	Pools in Complex 35
			35	To SE, Flush X
			36	Rhynchospora fusca in inter-connecting pools in Complex 35
Lough Lurgeen, Co. Galway	25-7-1994	13 (Kodachrome)	24	ESB pole on SW of site
			25	Complex 6/3/2
			26	Flush Z1W
			27	Flush Z1W
			28	Flush Z1W swallow hole
			29	Complex 4/2
			30	Complex 35
			31	Line of swallow holes S of lake
			32	Line of swallow holes S of lake closer to lake)
			33	Complex 4/2 with erosion channels
			34	Lough Lurgeen
			35	Nymphaea alba in Lough Lurgeen
	26/28-7-94	15 (Kodachrome)	2	S edge of Lough Lurgeen with bare dense peat, old pine stump and Nuphar lutea
			3	Phragmites and Scirpus lacustris at the lake edge
			4	Dense peat at the lake edge
			5	Complex 4/6/35
			6	Flush W2 (dark)
			7	Flush W2
			8	Flush W4
			9	Complex 35+ Cladonia
			10	Complex 35+ Cladonia
			11	Complex 35+ Cladonia
			12	NW towards Glenammaddy Turlough

TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
			13	River 2, lower reaches
			14	River 2, lower reaches
			15	Salix dying on the banks of River 2
			17	Filipendula/Valerian area in River 2, close to exit from L. Lurgeen
			18	To S along W bank of River 2
			19	Bare erosion channels on the banks of River 2
			20	Lysamachia vulgaris
			21	Flood plain of River 3
			22	Flood plain of River 3
			23	Tussocks of Carex paniculata in flood plain of River 3
			24	Myosotis
			25	Bare peat exposed due to burning close to cut-away on the S side of the site
			26	Complex 3/2/6
Moanveanlagh, Co. Kerry	2-11-1994	19 (Kodachrome)	3	Carex limosa in Complex 6/4+TP+Myrica.
			4	Pool in Complex 6/4+TP+Myrica.
			5	Complex 4/6RB
			6	Complex 4/6RB+Myrica
			7	View of south leg
			8	View of south leg
			9	View of south leg
			10	Complex 6/2/4
			11	Complex 6/2/4 with much Saraceenia
			12	Saraceenia purpurea
			13	Complex 6/4RB
			14	General view of bog to N.
Mongan, Co. Offaly	14-3-1994	3 (Kodak Elite)	16	To NNE, Complex 3
			17	To SE, tear pools in Complex 3
			18	Huperzia selago
			19	To W, rotovation of high bog on NE corner of site
			20	S. magellanicum infilling pools in Complex 15
		8 (Kodachrome)	1	General view to N, esker visible in the background
			2	Epiphytic lichens on Calluna
			3	Caterpillar
			4	Carex panicea
			5	Partially reclaimed fields at the S
			6	Fields on high bog at S side
Monivea, Co. Galway	9-11-1994	19 (Kodachrome)	26	Facebank at the SE of the site (1m).
			27	Facebank at the SE of the site (3m).
			28	Cut-away to the SE of the bog.
			29	Channel of Flush X
			30	Molinia dominated section of Flush X.
			31	Complex 15
			32	Flush Y, Sphagnum lawns.
			33	Flush Y, open water area.
Moyclare, Co. Offaly	20-6-1994	10 (Kodachrome)	4	Roadway across bog to N
			6	Complex 15/10 interconnecting Sphagnum cuspidatum lawns
			7	Pine in complex 6/10 at S side of site surrounded by seedlings
			8	Pine in complex 6/10 at S side of site surrounded by seedlings
			9	Burnt area to S of site, 3Rb
Redwood, Co. Tipperary	20-4-1994	5 (Fujichrome)	30	To S. Flush Z
			31	To W. Flush Z
			32	Complex 15
			33	To NE showing Little Brosna callows (Slope 2)
			34	To E into complex 10- on NW Lobe
			35	To SE, Flush Y
			36	Pinus sylvestris on high bog to S (N part of Flush Z)
Shankill West, Co. Galway	26-5-1994	9 (Kodachrome)	1	Fe staining from macropore at N edge of site
			2	Complex 15
			3	Complex 15
			4	Northwards along Drain bJ
			5	View of the E edge of Drain complex bJ
			6	Drain complex bJ
			7	Complex 9
			8	Complex 9
			9	Lough and peat cutting to the N of the site
			10	Western old peat cutting, with some regeneration

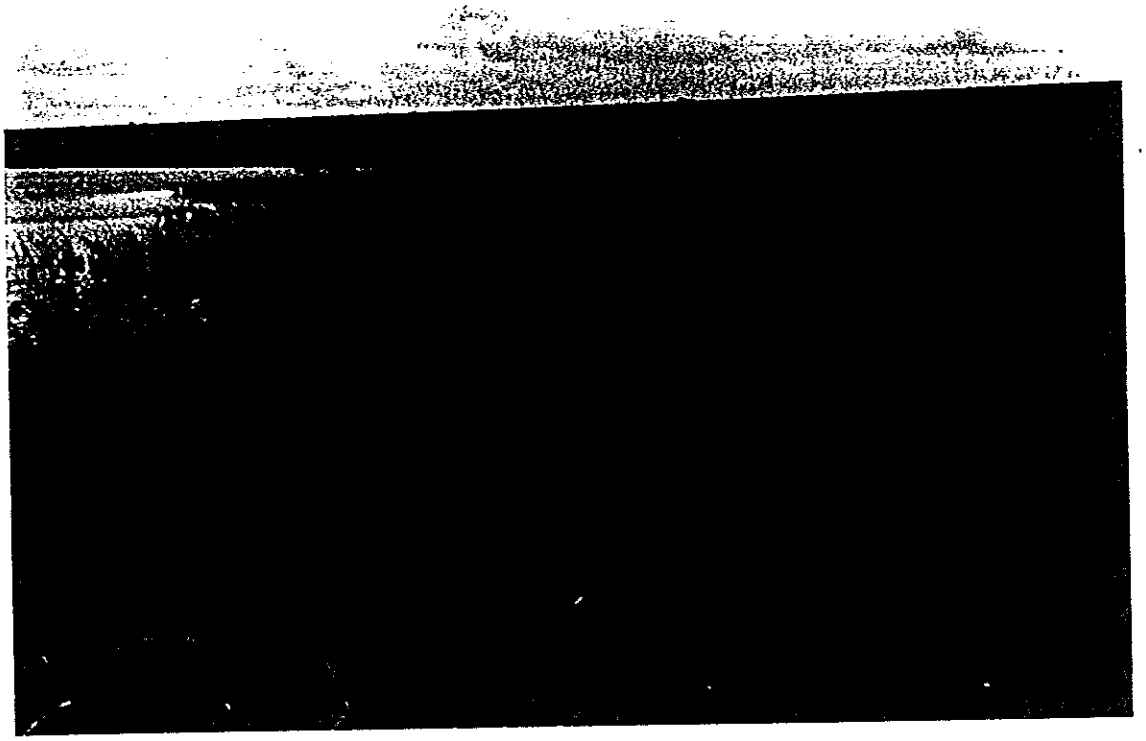
TABLE 2.2 (cont.) List of slides taken at each site during field survey in 1994 by L. Kelly

SITE NAME	DATE	FILM No.	FRAME NO.	DESCRIPTION
		18 (Kodachrome)	8	New drains in the field at the NE corner
			9	New drains in the field at the NE corner
Cloonshanville, Co. Roscommon	6-10-1994	17 (Kodachrome)	26	Row of shooting huts at Sw of site
			27	Lodgepole pine plantation at S
			28	Complex 9/6/2
			29	Sphagnum pulchrum
			31	To N, S channel of Flush Y
			32	To N, Flush Y and northern forestry
			33	To E, Molinia area at SE side of Flush Y
			34	To NW, Phragmites on SE Lobe
			35	To N, eastern forestry
			36	To E, active peat cutting
			37	To SE, active peat cutting
Sharavogue, Co. Offaly	11-8-1994	15 (Kodachrome)	35	Fen area on the E side of the site
			36	Complex 4/6 at the centre of the southern section of the site
			37	Complex 4/6 at the centre of the southern section of the site
			38	Complex 4/9 to the S of the site
Tawnaghbeg, Co. Mayo	13-7-1994	12 (Kodachrome)	26	Sphagnum cuspidatum pools in Complex 6/3/10
			27	Sphagnum cuspidatum pools in Complex 6/3/10
			28	To the NW slope of bog into NW lobe
			29	To the NW along Flush Z (Molinia, Myrica and Phragmites)
			30	Complex 35
			31	Complex 35
			32	Linear Menyanthes feature at the S of the site, may be internal drainage pattern
			33	To the SE into the SE corner (Slope 9)
			34	Complex 6/3 with pools, contrast with Complex 35 with tall Calluna
			35	Cow coming onto the S edge of the bog
			36	To the W, Complex 2/6/3 on the S side of the site
		13 (Kodachrome)	2	Stika spruce plantation on the W of the site
			3	Hand peat cutting bank at the western edge
			4	Drain bO close to Flush Y (swallow hole)
			5	Pteridium at the W end of Flush Y (swallow hole)
Trien, Co. Roscommon	2-8-1994	14 (Kodachrome)	28	Pool drained by Drain Complex bA on S Lobe
			29	Old difco cutting at the E edge of the S Lobe
			32	Dolmides spider
			34	Complex 2 around old peat cutting on S. Lobe
			35	Complex 2 around old peat cutting on S. Lobe
			36	Flush Y, S. Lobe
	3-8-1994	15 (Kodachrome)	4	Flush X
			5	Flush X
			6	To N, high ground to N of APC with cattle on rough grazing
			7	To SW, open area of Flush X between X2 and X3
			8	Flush X

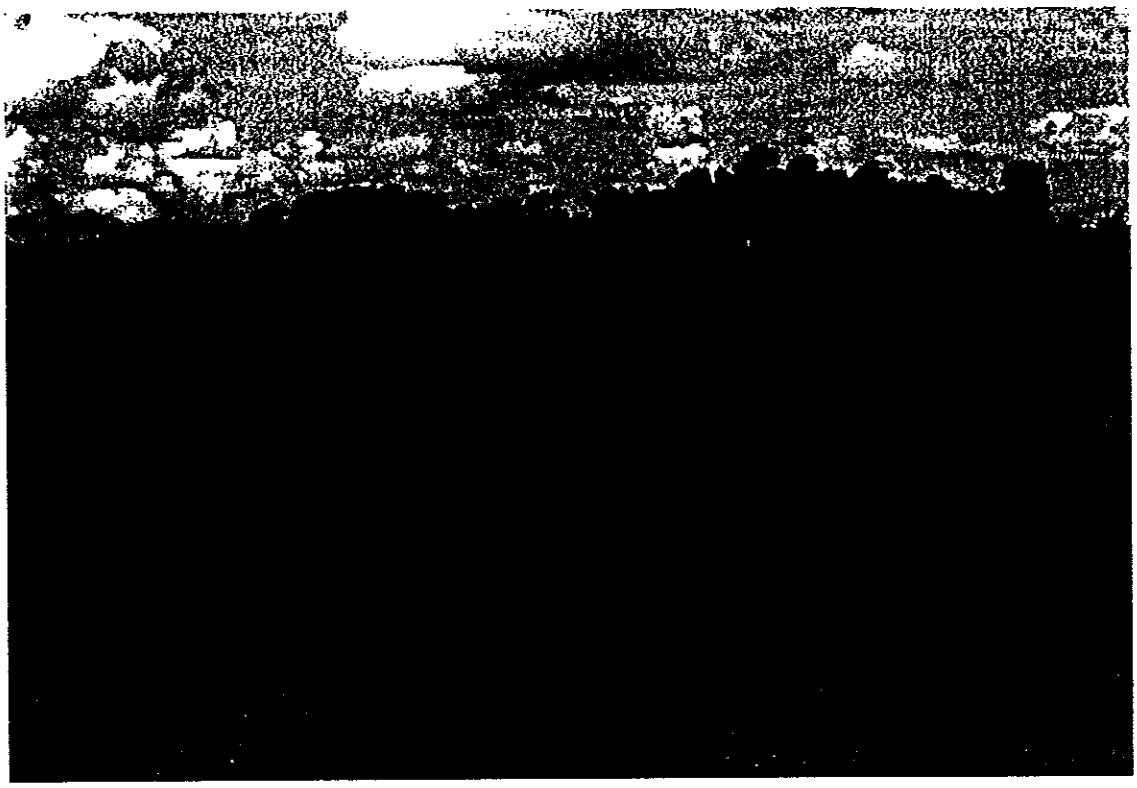
Flughany Bog, Co. Mayo (NHA 497). Film No: PM13, No. 16 by Dromey 15/7/94. Complex 4/6/35 (Central Ecotope) at the SE of the site is dominated by *Rhynchospora alba, Narthecium*, pools and *Sphagnum* lawns.

Garriskil Bog, Co. Westmeath (NHA 679). Film No: PM16, No. 4A by Dromey 31/8/94. NNE edge of bog showing gradation to former peat extent area now dominated by *Molinia, Ulex* and *Salix*.

Lisnageeragh Bog, Co. Galway (NHA 296). Film No: PM17, No. 23 by Dromey 14/9/94. Complex 6/3/2+ Pools at the centre of the site (Sub-central Ecotope). The vegetation is dominated by *Narthecium, Carex panicea* and *Trichophorum.*



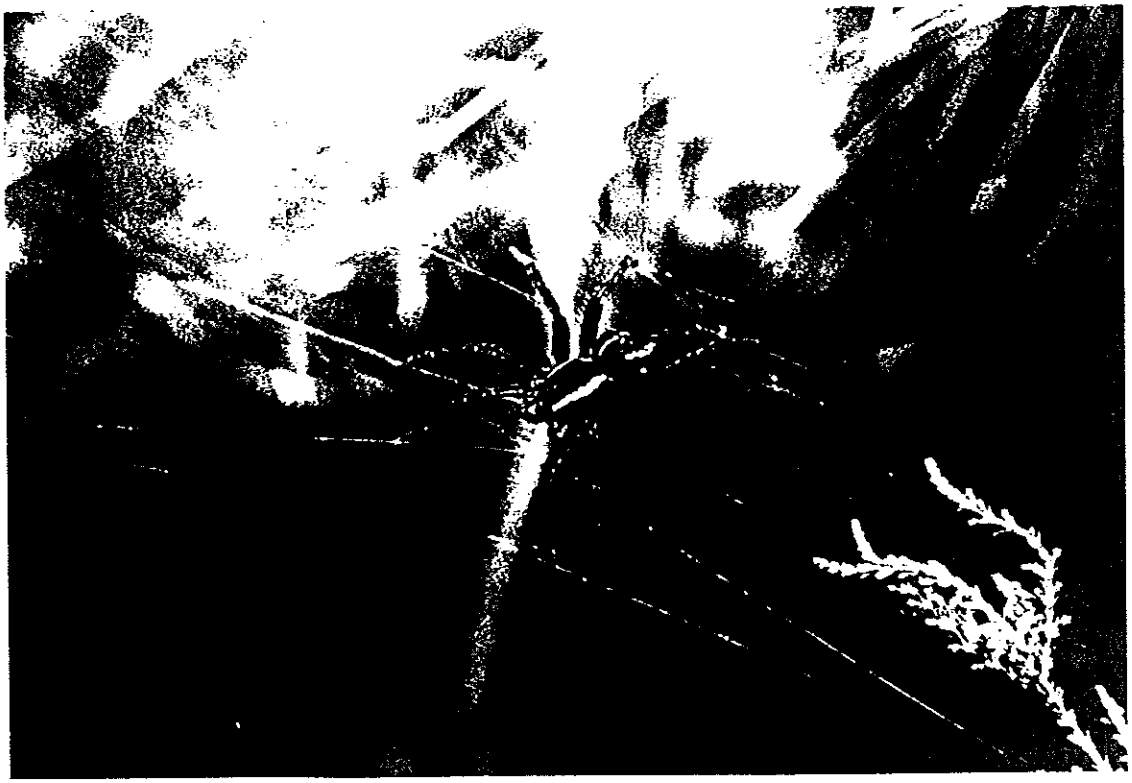
Lough Lurgeen Bog, Co. Galway (NHA 301). Film No: PM14, No. 14 by Dromey 26/7/94. *Cladium mariscus* at the lake edge of Lough Lurgeen which is situated on the high bog section of this site. There is a patch of *Carex rostrata* in the background.



Corliskea Bog, Cos. Roscommon and Galway (NHA 2110 (219)). Film No: PM15, No. 20 by Dromey 31/8/94.
Large *Betula* Woodland (Flush V) close to the mid north of the site. The *Molinia* dominated area in the foreground is part of Flush W.

Firville Bog, Co. Tipperary (NHA 647). Film No: PM11, No. 18 by Dromey 29/6/94.
Flush Y at the centre of the site. The wet area in the foreground is part of Complex 14 (Central Ecotope).

Killyconny Bog, Cos. Cavan and Meath (NHA 6). Film No: PM15 No. 27 by Dromey 9/8/94. Caterpillar of the Emperor Moth.



Trien Bog, Co. Roscommon (NHA 616). Film No: PM15, No. 8 by Dromey 2/8/94. *Dolmides* spider.

TABLE 2.3

NPWS Geohydrology Set of Slides for the Raised Bog Restoration Project, 1994. Malcolm Doak.

BOX 1: Crosswood. Carrowbehy. Ballynafagh. Cloonmoylan.

BOX 2: Curraghlehanagh. Camderry. Shankill West

BOX 3: All Saints. Moyclare.

BOX 4: Moyclare. Ferbane. Kilcarren.

BOX 5: Firville. Clonfinane. Ballyduff.

BOX 6: Tawnaghbeg. Derrynabrock.

BOX 7: Lough Lurgeen.

BOX 8: Trien. Corliskea.

BOX 9: Corliskea.

BOX 10: Carrownaggappul. Clooncullaun.

BOX 11: Lisnageeragh. Kilsallagh.

BOX 12: Cloonchambers. Callow. Cloonshanville.

BOX 13: Raheenmore. Bellanagare. Moanveanlagh. Addergoole.

BOX 14: Monivea. Derrinea. Garriskil.

BOX 15: Killyconny. Brown Bog. Fisherstown.

BOX 16: Ballykenny. Knockacoller. Sharravogue.

3. REPORTS, MAPS AND LEVELLING

3.1 REPORTS

A comprehensive report was written for each site based on the notes taken in the field and any other information available about the site. The following are the main headings in each report with an outline of what information is contained within a particular section.

- 1. Summary of Site Details
  This contains information on the following:
  NHA No. This corresponds to the number assigned to sites during the Natural Heritage Area survey.

  Grid Ref: Positions the site using the National Grid reference.

  Map numbers: Gives the relevant numbers of the 1/2" (1:126.720), 6" (1:10,560) and 1:25,000 Sheets which cover the site.

  Area (ha): This gives the area of high bog at each site which was measured used a digital planimeter.

  Aerial Photo Nos: This gives details of the aerial photograph numbers which cover the site.

  Date(s) of Visit: This is important when referring to water table levels.

  Townlands: This gives the townland names for the site which are indicated on the 6" sheet.

  Table 3.1 summarises most of this information for each site.

- 2. Introduction
  This section includes a summary of any information that was already available for the site. It also includes a description of the site location and details of access points.

- 3. Meteorology
  This section contains information on the following meteorological parameters for each site with graphs:
  Rainfall (P)
  Actual Evapotranspiration. (AE)
  Potential recharge. (PR)
  Raindays > 0.2 mm (annual {1951-1980})
  Wetdays > 1mm (annual {1960-1984})

  Rainfall data was taken from Climatological Note No.7 (Fitzgerald, 1984). The nearest two to three rainfall stations were investigated in each bog area. Often only one of the stations was utilised since several were within 7km distance of the bog and at about the same height. In other instances. where stations were some distance from the bog. three or more stations were used to form Theissen polygons.

  Evapotranspiration from a wetland is most difficult to determine in practice. On a large exposed Midland bog such as Clara. wind fetches are long. and evaporation may occur at near open water rates when levels are close to surface and evapotranspiration occurs from the vegetation itself (Daly and Johnston. 1994). The recent Irish and Dutch work at Clara and Raheenmore suggests that actual evapotranspiration losses from the bog surface were found to be significantly more than estimated using potential evapotranspiration data from a regional. conventionally sited Meteorological Service station (Daly and Johnston. *op. cit.*).

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA Recent (ha)	AREA 1840s (ha)	AREA Area (km^2) : Perimeter (km)	ALTITUDE (m. OD) on the bog (i) Min. (ii) Max. (iii) Mean	CLIMATE (a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	GEOLOGY Macro Scale Bedrock Meso Scale Subsoils	GEOMORPHOLOGY Macro Scale Meso Scale Type of Bog	GEOHYDROLOGY Macro Meso Local	HYDROLOGY Macro Scale Meso Scale Local Scale
Carrownagappul [M 67 50]	Bii	GY	320.0 (1993)	636	4.0	(i) 66 (ii) 76 (iii) 71	(a) 1077mm (b) 428mm (c) 649mm (d) 234 days	*Macro Scale* *Bedrock* Pure SHL Limestone, karstified, since there is a swallow hole to the east. Outcrop to west. *Meso Scale* *Subsoils* Silty limestone till is dominant, particularly in the SW. Clayey till is found at the deeper cut-away drains in the east. Some very low relief eskers run NE/SW under the bog. A till island lies in the NE of the bog, where it stands proud at 76m.O.D. The 'island' has always been clear of peat, since it was not covered in the 1840s. Overall subsoils are calcareous.	*Macro Scale* Situated in a wide drumlin filled valley. *Meso Scale* Flat low lying plateau, absence of drumlins. 2 rivers lie alongside the bog in the N and SW. *Type* RIDGE BASIN. The bog probably initiated in minor depressions.	• *Macro* Recharge zone for regional groundwater. • *Meso* As a whole the plateau is a recharge zone to the surrounding rivers. • Subsoils in general are low to moderate permeability (k). Low k. clayey subsoils in the east. • *Local Scale* At the stream in the SW, regional groundwater is discharging. Immediately adjacent,is a recharge area between the stream and the bog, coincident with mesotrophic wet meadows. Here the peat is very thin and overlies permeable gravelly subsoils. Recharge occurs at the till mound and groundwater discharges around this 'island' where there is heavy peat cutting. Springs occur mid-way along the two NW bog tracks.	*Macro Scale* The degree of drainage modification to the river system is unknown. *Meso Scale* There has been a major change to the surface drainage in the northern half of the bog caused by new ditches, and around the till 'island' caused by peat cutting. Flow is now dominantly NE/E to the Shiven River. *Local Scale* Potential lagg zone to the SW connected to local recharge to the stream. Flow to the E side of the bog sinks at a karstic swallow hole 200m away.

CARROWNAGAPPUL, CO. GALWAY - Intermediate/Western Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 2 2RB 2/7 2/3 3/2 3/2+Cl 2/3/7+Cl 2/3/6 4/2/3 3 3RB 3/6/2 3/2/6 3/2/6B 3/2/6RB 3/2/6+Cl 3/2/6+AP+Cl 3/2/6+Pine 3/2/6+My 3/6/4 3/2/9 3/2/9+Cl	3/7/9 3/7/9+Cl 3/2/6+P 6/3/2 6/3/2+P 7/9 7/9+Cl 9/7 9/7+Cl 3/9+Cl 6+Cv 6/2/3-7+P	6/2/3 6/2/3+Cl 6/2/3+P 6+P 6/2/10	6/15
Total ha 163.3 **% of Site 51.1** **HI (51.1%)** **P (0%)**	**Total ha 51.6** **% of Site 16.1** **HI (16.1%)** **P (0%)**	**Total ha 85.9** **% of Site 26.8** **HI (26.8%)** **P (0%)**	**Total ha 4.1** **% of Site 1.3** **HI (0%)** **P (1.3%)**

FLUSHES

WOODED	OPEN WATER	UNDERGROUND STREAMS/SWALLOW HOLES	MOLINIA	OTHER
		Two *Molinia* dominated swallow hole features; one with minerotrophic vegetation close to the bog edge; the other with underground river.	Patches of dry *Molinia* are seen in places close to the bog edge.	Two *Molinia* and *Phragmites* flushes occur on the high bog.

TOTAL ha 15.1; % OF SITE 4.7

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (++)
Pleurozia (++)
Andromeda (++)
Vaccinium oxycoccus (++)
S. magellanicum (++)
S. imbricatum (++)
S. fuscum (+)
Campylopus atrovirens (++)

DISTURBANCE INDICATORS

Huperzia (+)
Campylopus introflexus (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
50.0	38.6 (4.96km)

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
94.0	26.4km (82.4m/ha)		Sub-Central and Central (new)

INVASIVE SPECIES AND FORESTRY

A *Rhododendron* bush was noted at the W of the site between Flush Y and the small plantation.

Pinus sylvestris and *Pinus contorta* are encroaching at the SE and N of the NE Lobe.

OWNERSHIP

A large section is owned by BnM (on offer to NPWS); remainder is under multiple private ownership.

SPECIAL FEATURES

- Adjacent Habitats - Mixed woodland (old)
- Natural internal slopes existed but are now man-modified.
- Sub-central complexes extend close to bog margin (close to original peat boundary).

CLARA BOG, CO. OFFALY - Midland Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 2 4 6/3 5	3 6 3B 6+My	10 9 8 7/9 7 12 13	14 15 11 16
Total ha 100.4 % of Site 24.1 HI (24.1%) P (0%)	Total ha 152.0 % of Site 36.7 HI (36.7%) P (0%)	Total ha 102.7 % of Site 24.8 HI (24.8%) P (0%)	Total ha 34.9 % of Site 8.4 HI (8.4%) P (0%)

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER

TOTAL ha 24.7; % OF SITE 6.0

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (+)
Pedicularis stylvatica (+)
S. imbricatum (++)
S. fuscum (++)
S. magellanicum (++)
S. auriculatum (+)
Campylopus atrovirens (+)
Vaccinium oxycoccus (++)
Andromeda (++)

Disturbance Indicators
Campylopus introflexus (++)
Cladonia floerkeana (++)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1849) Cut-away	Approx. % of Margin actively cut

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains

INVASIVE SPECIES AND FORESTRY

OWNERSHIP

SPECIAL FEATURES

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Clonfinane **[M 990 040]**	A	TY	150.5	222	4.5	(i) 61 (ii) 63 (iii) 62.5	(a) 816mm (b) 466.5mm (c) 350mm (d) 207days	*Macro Scale* *Bedrock* Waulsortian limestone *Meso Scale* *Subsoils* Section in the NE clearly shows that stoney till overlies laminated lake clays. Sands and gravels lie to the westrn margins of the bog. They mark that the bog was once a former glacio-lacustrine basin with sediment input from the west.	*Macro Scale* The bog is situated in an upland are of >60m OD. *Type* RIDGE BASIN	*Macro* The bog lies in a recharge zone for regional ground-water. *Meso* Most of the marginal drains are deep and intercept the regional water-table. The clayey subsoils (lake clays) have a low permeability.	*Macro Scale* The bog is situated at the top of a catchment divide, at the headwaters of the Little Brosna river. *Meso Scale* The N part of the catchment is particularly affected by cutting. Lagg potential is zero.

CLONFINANE BOG, CO. TIPPERARY - Midland Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 1/2 2 2/6 3 7+Cl+ My Phrag- mites complex (P)	10/9 6 6+Cl	6/10 10/6 6/15	15 (P)
Total ha 18.6	Total ha 65.2	Total ha 11.3	Total ha 8.9
% of Site 12.4	% of Site 43.3	% of Site 7.5	% of Site 5.9
HI (9.7%) P (2.7%)	HI (43.3%) P (0%)	HI (7.5%) P (0%)	HI (0%) P (5.9%)

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER
				Betula Woodland 0.3ha Pine flush with *Phragmites*

TOTAL ha 1.9; % OF SITE 1.3

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (+)
S. imbricatum (++)
S. fuscum (++)
S. magellanicum (++)
S. auriculatum (+)
Vaccinium oxycoccus (++)
Andromeda (++)
Pleurozia purpurea (+)

Disturbance Indicators
Campylopus introflexus (+)
Huperzia (+)
R. fusca (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
32.2	2279.6m 33.4%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
87.1	33216m 221m/ha Excluding the peat moss area drain density is 2601m or 23.9m/ha		SC and C new

INVASIVE SPECIES AND FORESTRY

OWNERSHIP

Private Premier Peats own at least 40ha of the high bog.

SPECIAL FEATURES

- Intact edges 10.8%. WNW edge very close to original peat extent.
- Area of natural surface pattern.
- Linked to Ballyduff NHA.
- 67.8% of dome remains (+ moss peat area).
- *Sphagnum fimbriatum*.
- Ancient circular *Betula* copse and remnant of ancient Lumcloon wood to the NE.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA Recent (ha)	AREA 1840s (ha)	AREA Area (km^2) : Perimeter (km)	ALTITUDE (m. OD) on the bog (i) Min. (ii) Max. (iii) Mean	CLIMATE (a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	GEOLOGY Macro Scale Bedrock Meso Scale Subsoils	GEOMORPHOLOGY Macro Scale Meso Scale Type of Bog	GEOHYDROLOGY Macro Meso Local	HYDROLOGY Macro Scale Meso Scale Local Scale
Clooncbambers [M630 805]	Bi	RN	193.5	521	6.3	(i) 87.5 (ii) 91.4 (iii) 89	(a) 1090mm (b) 428mm (c) 662mm (d) 234days	*Macro Scale* *Bedrock* Yellow sandstone lies to the SE of the bog. Limestone lies to to north at the River Suck. *Meso Scale* *Subsoils* Sandy stoney till lies under parts of the bog. Clayey till lies to the north.	*Macro Scale* This bog is situated in a drumlin filled valley. *Meso Scale* The bog initiates in inter-drumlin depressions. A drumlin ridge separates two basins. *Type* RIDGE BASIN	*Macro* The bog lies in a discharge zone for regional groundwater. *Meso* Recharge occurs at the drumlins. Regional groundwater artificially upwells at the centre drain since ECs are~ 290µS/cm. *Local* There is local natural upwelling of groundwater in the west at the flush.	*Macro Scale* The degree of drainage modification is unknown although there has been some deeepening of the Island River which runs south of the bog. *Meso Scale* There has been intensification of drainage to the east of the northern lobe and in the centre at the flush. *Local Scale* There is lag zone potential in the middle of the flush.

CLOONCHAMBERS BOG, CO. ROSCOMMON - Western/Intermediate Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL		SUB-MARGINAL	SUB-CENTRAL
1 1+ER(P) 1+My 2+My 2/3 2/3RB 2/3+EG (P) 2/3+ER 2/6 2/7+My +EG (P) 2/3/6 2/3/6+ My 2/6/3 2/6/3+ My 3RB 3/2 3/2+EC 3/2+My 3/2RB 3/4/2 3/2/7(P) 3/2/6 3/2/9	3/2/9+ My 3/6 3/6+My 3/6RB 3/9/6RB+ My 6/3/2(P&S) 6/3/2+ My 7/9/2 7/9/3+Cl 7/9/3+ My 9/7	4/6 4/6+P 6/2RB 6/2/7 6/3 6/3+My (P) 6/3+P 6/3B 6/3RB 6+My 6 6RB 6/3/9 9(P) 9RB	6/4/10+P Total ha 1.6 % of Site 0.8 HI (0.8%) P (0%) CENTRAL 15
	Total ha 71.1 % of Site 36.7 HI (29.7%) P (7%)	**Total ha 85.8 % of Site 44.4 HI (44.1%) P (0.3%)**	**Total ha 1.6 % of Site 0.8 HI (0.8%) P (0%)**

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER
				Mounds ranging in size from <1m to >3m. Mostly *Calluna* dominated with *Phrag-mites* and in two cases *Quercus*. Fen area runs through centre of site.

TOTAL ha 24.5; % OF SITE 12.7

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (++)
S. imbricatum (+)
Campylopus atrovirens (+)

Disturbance Indicators
Campylopus introflexus (++)
Cladonia floerkeana (+)
Huperzia (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
63.0	3165m 26%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
81	3969m 20.5m/ha	SC old	

INVASIVE SPECIES AND FORESTRY

OWNERSHIP

Land Commi-ssion ?

Private

SPECIAL FEATURES

- Bog margin at the centre of the S edge close to original peat extent and also at the N and S of the SW Lobe.
- River Suck to the NW.
- Wooded till mound to the E of the site.
- *Vaccinium vitis-idaea* on wooded mound.
- Natural internal slopes.

Area of natural surface patterns.

TABLE 3.1 **Information on Area, Maps and Aerial Photographs of Sites Visited during the Raised Bog Restoration Project.**

SITE NAME	COUNTY	NHA No.	Area high Bog (ha)	Status	1/2 " Map	6 " Map	Surveyed	GSI AP	OS b/w 1993	OS Col. 1993	SC 1993	% Enl	NHA Obliques
												298	
Addergoole	Galway	223	171	A (W)	14	GY 69	1985	*M 277					
All Saint's Bog	Offaly	566	234	A	15	OY 29	1985	N 163			34062/63	198/194	685:1-11
Ballyduff	Tipperary	641	95	A	15	TY 5	1983	M 447			34058/59	194	
Ballykenny	Longford	1439	177	Bi	12	LD 8	1986	N 48	OS 1189/90/20	*6266		94	
Ballynafagh	Kildare	391	67	Bii	16	KE 13	1983	*N 463				289	
Barroughter	Galway	231	91.5	A (TM)	15	GY 126	1983	*M 454				305	658:24-35
Bellanagare	Roscommon	592	741	A (W)	12	RN 15/21	1984	M 544 etc.	OS 8152/53/72			185x2	667:1-24 668:5-17
Blackcastle	Offaly	570	97.5	Bi	16	OY 4	1985	N 482		*5883 & 5837		92	
Brown Bog	Longford	442	51	A	12	LD 13	1986	N 23	*OS 1177			188	
Callow	Roscommon	595	163	Bi (W)	12	RN 8	1984	*M 676				295	869: 1-36
Camderry	Galway	240	197	Bii (W)	12	GY 19/32	1985	*M 161				283	649:28-36
Carrowbehy	Roscommon	597	189.5	A (W)	11	RN 19	1985	M 549	*OS 8180			184	655:1-28
Carrownagappul	Galway	1242	320	Bii (W)	12	GY 45/46	1984	M 479	*OS 1233/1259			185/183	
Clara	Offaly	572	414.5	A	15	OY 7/8	1983			*0531/32		190/192	
Clonfinane	Tipperary	641	150.5	A	15	TY 5	1983	M 447			34058/59	194	
Cloonchambers	Roscommon	600	193.5	Bi (W)	11/12	RN 26	1984	M 88	*OS 8182/83			177/185	664:12-23 665:1-7
Clooncullaun	Galway	245	130	Bii (W)	12	GY 18/19/31	1985	*M 161				290	649:17-24 649: 32-33
Cloonfelliv	Rosc./Galway	217	50	Bi	12	GY 1/RN 26/33	1984	M 62	*OS 8221			182	
Cloonmoylan	Galway	248	440	A (TM)	15	GY 126/132	1983	*R 206 /M 454				300	657:9-34
Cloonshanville	Roscommon	614	152	A (W)	12	RN 15	1984	M 655	*OS 8143			182	668:18-23
Corbo	Roscommon	602	121	Bi (TM)	12	RN 36/40	1984	*M 3				288	663:0-6 663:24-35
Corliskea	Galway/Rosc.	219	284	A (W)	12	GY 1/2 & RN 26/33	1985	M 63	*OS 8219/8220			185x2	652:26-36A 653:1-5
Crosswood	Westmeath	678	110	Bi	15	WH 29	1986	N 572		*3375		112	
Curraghlehanagh	Galway	256	155	A (W)	12	GY 32	1984	M 212	*OS 1233			185	646:17-31
Derrinea	Roscommon	604	60	Bi (W)	11	RN 13	1986	M 646				290	656:21-25
Derrynabrock	Mayo/Rosc.	457	107	Bi	7	MO 63/64	1986	*G 137				290	672:15-18
Ferbane	Offaly	575	117	Bi	15	OY 14	1983	N 528		*5123		95	
Firville	Tipperary	645	188	A	15	TY 4/7	1983	M 448			*34030	195	
Fisherstown	Longford	1447	105	Bi	12	LD18	1986	N 48	OS 1189/90	*6327		97	
Flughany	Mayo/Sligo	497	101	Bi	7	MO 52 & SO 44	1986	*G 170				292	673:16-23
Garriskil	Westmeath	679	169	A	12	WH 6	1986	*N 7				281	871: 1- 36
Kilcarren	Tipperary	647	185	Bi	15	TY 4/7	1983	M 448			*34031	193	
Kilsallagh	Galway	285	189	Bii	12	GY 7	1985	M 12	*OS 8249			182	651: 22-23
Killyconny	Cavan/Meath	6	85	Bii	13	CN 44 & MH 10	1986	*N691				285	872: 1-36
Knockacoller	Laois	419	54	Bi	15	LS 16	1983	S 528	*OS 1007	7642 & 7658		182	
Lisnageeragh	Galway	296	283	Bii	12	GY 6,7,18 & 19	1985	M 137	*OS 8263			182	650:30-34 651:1-17
Lough Lurgeen	Galway	301	490	A (W)	12	GY 18/19/32	1985	*M 163				284	649:1-16 648:25-34
Moanveanlagh	Kerry	374	130	Bii	17	KY 11	1987	*R 563				294	
Mongan	Offaly	580	125	A	15	OY5/6	1983	N 526			34075/95	195	689:6-12
Monivea	Galway	311	156	Bi (W)	14	GY 71	1984	*M 285				295	650:1-4
Moyclare	Offaly	581	79	Bii	15	OY 14	1983	*N 522				292	1165: 9-36
Raheenmore	Offaly	582	135	Bi	15	OY 10	1982			*0541/0552		182x2	
Redwood	Tipperary	654	182	Bi	15	TY 1	1983	M 443/445			*38025	190	684:1-15
Shankill West	Galway	326	70.5	Bi (W)	12	GY 31	1984	M 210	*OS 1235			185	645:13-21
Sharavogue	Offaly	585	137	Bi	15	OY 38	1983	*S 557				293	1175: 22-29
Sheheree	Kerry	382	9	None	20	KY 66/67			*OS 2578			193	
Tawnaghbeg	Mayo	547	78	Bi	7	MO 52/64	1986	*G 170				287	673:6-11
Trien	Roscommon	616	126	Bi (W)	12	RN 26	1985	M 61	*OS 8221			182	652:16-25
		TOTAL	8155.5										

* Location about correct, which it was enforced

A further complication in determining evapotranspiration for a bog is that it is dependant on the water level in the peat, the increasing resistance of *Sphagnum* to water loss and the water saving abilities of dwarf shrubs such as *Calluna*. In late spring and summer at a bog evaporative demand may exceed rainfall. This can cause the top layer of the acrotelm to have a moisture deficit. Water level in the acrotelm may fall and *Sphagnum* and *Calluna* may initiate water saving mechanisms. Therefore dry spells may cause the actual rate of evapotranspiration to fall below the potential rate of evapotranspiration.

Of the five meteorological parameters in the summary tables, the only useful one was rainfall since it could be taken from a large number of rainfall stations which were often near the bog of interest. The other four parameters AE, PR, raindays, and wetdays had to be based on data from the nearest synoptic station of which there are only three of relevance; Birr, Mullingar, and Claremorris. Several contacts with Mr T. Keane of the Met. Office confirmed this situation. Mr Keane advised this project to use potential evapotranspiration from the three synoptic stations above, and the conclusions of Daly and Johnston (1994).

In summary rainfall was the only independent variable that could be used in order to classify the bogs under study.

- 4. Geomorphology
  This section describes the topography of both the bog and surrounding area at both the macro and meso scale.

- 5. Hydrological System
  This is a detailed section on all aspects of the physical system of the bog. Information and data collected in the field on following may be found in this section:

  Subsoils
  Depth to bedrock
  Geology
  Bog and marginal hydrology
  Hydrochemistry

  The final subsection (5.4) aims to consider the position and evolution of the bog within the landscape, noting any inter-relationships between the bog and the geohydrological system.

- 6. Vegetation
  Here a summary of the vegetation cover is given, followed by a more detailed description of the high bog vegetation on a community complex level. The community complexes are also divided into ecotope types.

- 7. Bog type
  This section defines the type of the bog as is discussed in a later section of this introductory report.

- 8. Human Impact
  This outlines the occurrence of peat cutting, forestry and any other human impacts on the site.

- 9. Inter-relationships
  Within this section information is given on the main relationships between the biotic and abiotic systems.

A report for each site visited during the survey is contained in Parts 2 and 3 of the report.

3.2 MAPS

A series of maps were prepared for each site. The 6" 1910 Ordnance Survey map was used as a base (scale 1:10,560). Each map was drawn on tracing film so that it could be overlaid on other maps. The maps drawn were as follows.

1. Vegetation complex map which illustrates the vegetation cover of each site on a community complex level.

2. Drains map which shows all the drains on the high bog and those in the cut-away present at the time of the survey. Arrows indicate direction of water flow and flow direction is also indicated in flush systems, where applicable. Adjacent rivers, streams or lakes are also indicated.

3. Hydrochemistry. Electrical conductivity values are noted around the bog margins and shows of iron are also noted. The EC values mostly appear on the drains map but they appear as a separate sheet for some sites due to space problems.

4. Slopes map which shows the direction of slope on the bog surface at certain points. Estimations of the slope value are detailed in the site report.

5. Landuse map which shows details on active peat cutting, old peat cutting, agriculture, vegetation of the cut-away areas and other relevant information.

These maps are contained in Appendices I and II. Paper copies follow the detailed report for each site in Parts 2 and 3 of the report.

3.3 LEVELLING

This was carried out so that the relationship between vegetation and slope could be examined. From work carried out at Clara and Raheenmore raised bogs, it was discovered that a slope of >30cm over 100m or 0.3cm/m was related to poor development of an acrotelm layer (Van der Cruijsen *et al.*, 1993). The relationship between vegetation cover and acrotelm depth, thus slope, was investigated further by Kelly (1993).

All the sites could not be levelled due to the constraints of time. 28 sites were chosen so that a spread of bogs across the country was obtained. Levelling during this project was undertaken by the Engineering Section of the O.P.W.

3.3.1 Levelling Methods

Transects required were indicated on 1:10,560 O.S. maps and aerial photographs blown up to the same scale. The field survey was carried out using a total station and data logger (Sokkisha SET 3 TS and a Huskey Hunter DL. Data was backed up onto floppy disk using a Huskey Oracle GT portable disk unit. A ground model and cross-sections of the survey are produced using Survey Control Centre map processing software and transferred into Autocad, where the final drawings are produced. The drawings consist of a site plan (Scale 1:10,560) and sections (scales: horizontal:10,560 and vertical exaggeration x 50).

The information shown on the drawings is:

Sections: Chainage of each point surveyed along the transection (m).
Level at each point (not O.D.).
Slope of bog surface at each point.

Site Plan: Transects requested.
Transects surveyed.

The vegetation complex map was overlain on the site plan and points on the site plan within particular complexes were determined so that the slopes within the complex could be read from the transect information.

On a midland raised bog all slopes >30cm/100m are probably due to human impact, most notably the effect of drainage causing subsidence.

It was thought that the relationship between vegetation cover and slope would change in a westwards direction due to changes in climate with the increasing precipitation allowing peat to develop on increasingly steep slopes.

4. SITE DESCRIPTIONS

4.1. PHYSICAL SYSTEM

The comprehensive reports for each bog discussed in Section 3.1 formed the basis for site assessment.

4.1.1 Summary Tables

A summary table was prepared for each site so that the information gathered from field work and the comprehensive reports were readily available. The physical details of each bog were entered into a table devised initially by the hydrogeologist but updated following input from J. Streefkerk, J. Ryan, and D. Daly.

The following was the information summarised:

Site Name

Status (after Cross)

Area of High Bog
1. Recent
2. 1840s
3. Area : Perimeter

Altitude (m OD)

Climate
1. Precipitation
2. Actual Evapotranspiration
3. Effective Rainfall
4. Raindays

Geology
1. Bedrock
2. Subsoils

Geomorphology
1. Macro Scale
2. Meso Scale
3. Type of Bog

Geohydrology
1. Macro Scale
2. Meso Scale
3. Local Scale

Hydrology
1. Macro Scale
2. Meso Scale
3. Local Scale

A table for each site appears in the Section 5 Results (Summary Tables).

4.2. VEGETATION

4.2.1 Ecotopes

Using the vegetation complex maps as a base the vegetation cover of each of the bogs was divided into four ecotopes. An ecotope being the abiotic environment or habitat of a particular biotic system (Kulcher, 1967; Whittaker et al., 1973). The division into the four groups was based on the work carried out by Kelly (1993) on Clara and Raheenmore raised bogs. The system used there was simplified to apply to these sites as the survey was much restricted. The four divisions used were marginal, sub-marginal, sub-central and central. These are described in general terms below.

Marginal Ecotope

This includes community complexes where the communities are dominated by *Trichophorum cespitosum, Carex panicea, Rhynchospora alba* and *Narthecium ossifragum*. Very often indications of disturbance are evident. The water table is generally below surface level throughout the year. On some sites tear pools can occur in the complexes of this ecotope, due to the stresses caused by drainage. These may contain some aquatic species but are generally depauperate. *Rhynchospora fusca* is sometimes seen in these pools.

This section also includes facebank edges which are dominated by *Calluna*. These could not be mapped separately so were not divided from the marginal areas. The water table is always very low within the face bank (mean recorded on Clara and Raheenmore bogs -30.4cm).

Sphagnum cover is low within the communities which make up this ecotope though localised patches can occur. For this reason there is generally no acrotelm layer associated with this marginal ecotope. Excess water therefore runs off over the bog surface relatively quickly causing the development of erosion channels, particularly where slopes are steep.

Sub-marginal Ecotope

The complexes of this ecotope are often dominated by *Narthecium*. They are intermediate between the marginal and sub-central ecotopes in their water table depth. Water table levels are generally below surface but very occasionally some permanent pools can occur. Tear pools can be frequent and can contain *S. cuspidatum* but many dry out during the summer period. Patches of *Sphagnum* cover occur. Some indications of disturbance are evident but some communities of less disturbed conditions also occur.

Sub-central Ecotope

This ecotope is made up of mostly transitional complexes which are possibly dried out versions of central complexes. *Sphagnum* cover is usually moderate to high but permanent pools are infrequent. The *Sphagnum* cover can be very variable in its distribution. As there is a moderate *Sphagnum* cover an acrotelm layer is usually present. On the midland sites, *S. magellanicum* is often the dominant *Sphagnum* species present although *S. papillosum* is frequent also. These species tend to form lawns (sometimes appearing to infill former pools) or very low hummocks. Other hummock forming Sphagna are also abundant. *Calluna, Narthecium, E. tetralix, Eriophorum vaginatum* and *E. angustifolium* often occur at high abundances in these complexes.

Central Ecotope

This includes the wettest vegetation complexes of the high bog apart from some soak areas. They are areas with well developed permanent pools (at least 10% cover). Two main types occur depending on the site location. In the midlands the pools of the central complex are usually colonised by *S. cuspidatum* with little open water (there are two exceptions, Mongan and Redwood). Other species which tend to occur in the pools are *Eriophorum angustifolium* and *R. alba* with *Drosera anglica* also occurring quite frequently. In between the pools on the midland sites *Sphagnum* lawns and hummocks are frequent. The lawn species are usually *S. magellanicum* and *S. papillosum* while the humnock species are mainly *S. magellanicum, S. capillifolium, S. subnitens, S. imbricatum* and *S. fuscum*. *Leucobryum glaucum* hummocks can also occur. *Narthecium* hollows with *S. tenellum* are frequent also. *Calluna*

and *Erica tetralix* occur in abundance, the latter growing well on hummocks. The bog surface is wet and soft and the acrotelm layer is well developed.

On the more westerly sites pools tend to be more elongate and interconnecting with each other in places. More open water is seen and although *S. cuspidatum* is still important, *S. auriculatum* is more frequent. *Campylopus atrovirens* occurs around many of the pools edges and islands dominated by *Racomitrium* are quite common. *Sphagnum* lawns can occur between the pools but in general the inter-pool *Sphagnum* cover is lower than on the more easterly sites. *Narthecium* is frequent and *Carex panicea* can also reach high abundances. Hummocks of *S. imbricatum* and *S. fuscum* and various other *Sphagnum* and bryophyte species occur. The bog surface can be wet and soft but in comparison to the midlands central ecotope the acrotelm layer is not as well developed. It is thought that the hydrology of these western central pool complexes is somewhat different to the midland sites as excess water may flow through pools rather than through the inter-pool *Sphagnum* layer. However more research is required on the relationships between hydrology, hydrochemistry and vegetation on western raised bogs.

For each ecotope the ha and % in relation to the total area of high bog was calculated .

4.2.2 Primary and Secondary Vegetation Complexes

The vegetation cover was also divided into primary and secondary types. If one assumes that an undisturbed raised bog had a high *Sphagnum* cover over most of its surface and that much of the surface was quaking underfoot then the central vegetation complexes are taken to represent the primary vegetation cover of a raised bog. However, in many cases, central wet vegetation complexes are found in subsidence hollows which have resulted from drainage and human interference. These can be said to be secondary central complexes and although important for habitat diversity are not of as high quality in conservation terms as primary central complexes. This is because a secondary central complex will have gone through a period of drying out and may therefore have lost some of its original microfloral and invertebrate assemblages.

However, as one moves westwards across Ireland, many of the western or intermediate raised bogs have natural internal slopes. Peat can develop on these due to the change in climate. On these slopes one would not expect to see primary central complexes as the slopes are too acute to allow the development of pools. Therefore the sub-central, sub-marginal or marginal complexes which occur on these slopes can be said to be primary. Apart from these all other complexes on the high bog could be said to be secondary, that is, degraded forms of the central complex.

Likewise on a midland raised bog the rand of an undisturbed bog would be naturally somewhat drier and may therefore not have supported central vegetation complexes. But, as no sites with totally intact margins remain today all marginal and sub-marginal complexes on the midland raised bogs are taken to be secondary.

Similarly sub-central complexes are secondary on the midland raised bogs. In some cases they may still be drying out or degrading or if situated close to or in a subsidence area they may be re-wetting.

4.2.3 Summary Tables

A summary table was prepared for each site so that the information gathered from field work and other investigations was readily available. The following was the information summarised:

Ecology

1. Ecotopes (divided into four sections). Total ha and % of site calculated.
a. Marginal
b. Sub-marginal
c. Sub-central
d. Central

2. Flushes. Types and total ha and % of site.

3. Indicator species. Listed with an indication of frequency.

Human Impact

1. Peat cutting

a. % of original dome cut-away (calculated from 1840s maps).

b. Approximate % of the margin actively cut. This is calculated in m and then as a % of the perimeter of the site.

2. Drainage effects

a. % of area affected by drains. This excludes any primary ecotopes including flushes. The remainder is said to have been influenced by drainage.

b. Length of functioning drains, measured in m. A total value is given and a value of m/ha.

c. Threat to central or sub-central by marginal drainage.

d. Threat to central or sub-central by surface drainage.

3. Invasive species. This details any forestry plantations on the high bog giving ha and % of site. The occurrence of pine, *Rhododendron* or other invasive species such as *Saraccenia purpurea* is also noted.

Ownership

This gives summary details on ownership of the site. For example is it private (sometimes with an indication of the number of individuals), Bord na Mona, Land Commission, NPWS etc.. If management agreements exist these are also noted. Further details on ownership are given in Table 4.1.

Special Features

This highlights any particular points of interest about the site. Some of these points were obtained from the Guide-lines for Selection of Biological SSSIs: bogs (Joint Nature Conservation Committee, 1994). It includes things such as:

a. Adjacent habitats, is the site part of a larger NHA complex. Does it act as support system for any other habitat?
b. If any intact or semi-intact edges occur.
c. Occurrence of rare species such as *Frangula alnus* (Red Data Book species) or uncommon bryophytes.
d. Natural surface pattering.
e. Absence of scrub invasion.
f. Primary Central/sub-central complexes occurring close to the bog edge.
g. High % of the original dome remaining (> 60%).
h. Natural internal slopes (see Section 3.3).
i. Low frequency of drains.
j. Low frequency of active peat cutting.

TABLE 4.1 Ownership of Sites Visited during the Raised Bog Restoration Project 1995.

Site Name	County	NHA No.	Ownership (ha) of High Bog and Adjacent Areas
Addergoole	Galway	223	
Monivea	Galway	311	
Cloonmoylan	Galway	248	Coillte 50.1 ha land acquired by NPWS. Approx. 46ha in NHA
Barroughter	Galway	231	Private (no specific info. but multiple owners).
Lough Lurgeen	Galway	301	75 ha freehold NPWS
Lisnageeragh	Galway	296	NPWS own 166.7 ha NHA freehold and 30.17 fee simple (some of the latter outside NHA)
Kilsallagh	Galway	285	BnM own large portion (map not available, on offer).
Corliskea	Galway	219	Private. 13 owners detailed by NHA.
Camderry	Galway	240	122 BnM, process of being bought (NPWS). Coillte plantation 23ha.
Clooncullaun	Galway	245	55ha BnM in the process of being purchased by NPWS. BnM info. on other owners.
Curraghlehanagh	Galway	256	160 BnM on offer to NPWS. Some of this is outside NHA boundary.
Shankill West	Galway	326	81ha BnM on offer to NPWS. 61 ha freehold within NHA. Two other owners known.
Carrownageappul	Galway	1242	200 BnM on offer to NPWS. Vast number of other owners.
Brown Bog	Longford	442	Private (one owner known).
Ballykenny	Longford	1439	Private (no details).
Fisherstown	Longford	1447	95 NPWS freehold (Proposed NNR).
Tawnaghbeg	Mayo	547	16.5ha NPWS. One other owner known (not willing to conserve).
Flughany	Mayo	497	Private
Derrynabrock	Mayo	457	Private
Mongan	Offaly	580	126 or 119 ha owned by AnTaisce NNR. Some high bog still privately owned.
All Saint's Bog	Offaly	566	112 NPWS (Proposed NNR?). 50ha owned by Erin Peats.
Sharavogue	Offaly	585	Management agreement. Agreement. Purchase in progress.
Ferbane	Offaly	575	? BnM (On offer).
Moyclare	Offaly	581	76 BnM (On offer).
Blackcastle	Offaly	570	Private (at least 75 owners).
Clara	Offaly	582	NNR. 460ha owned by NPWS
Raheenmore	Offaly	572	NNR. 162 ha owned by NPWS
Bellanagare	Roscommon	592	588 NPWS (NNR) - 490ha freehold and 98ha fee simple
Cloonshanville	Roscommon	614	
Callow	Roscommon	595	
Cloonfelliv	Roscommon	217	
Trien	Roscommon	616	57ha of freehold/ fee simple on offer by BnM. 41.2ha freehold (33.5 in NHA), 15.28ha fee simple
Corbo	Roscommon	602	222 BnM (On offer).
Cloonchambers	Roscommon	600	Private. 5 owners detailed by NHA team. Possibly some Land Commission.
Carrowbehy	Roscommon	597	191.34 freehold owned by NPWS + 41.6ha fee simple. Another owner known
Derrinea	Roscommon	604	Some on offer
Ballyduff	Tipperary	641	
Clonfinane	Tipperary	641	Premier peats own part. Remainder also privately owned
Redwood	Tipperary	654	NNR owned by NPWS. Inch Turf Development Co.own much of the remainder
Firville	Tipperary	645	Owner willing to sell. NPWS now own 11.1ha to S.
Kilcarren	Tipperary	647	40 ha Land Commission.
Garriskil	Westmeath	679	112ha. Management agreement (47ha 20 yrs) + 40ha Maguire. 131ha NPWS freehold in NHA
Ballynafagh	Kildare	391	
Crosswood	Westmeath	678	33 BnM (On offer). Some outside NHA boundary
Moanveanlagh	Kerry	374	Private (approx. 60 owners).
Sheheree	Kerry	382	NNR Schedule 2. None owned by NPWS.
Knockacoller	Laois	419	? BnM (no ownership map available). Not on offer.
Killyconny	Cavan	6	

5. RESULTS

5.1 SUMMARY TABLES

A summary table is available for most sites. They are listed alphabetically following this page. A summary table was not prepared for Sheheree Bog as it was not comparable to other sites. A geological summary table was not prepared for Clara and Raheenmore bogs.

5.2 DISTRIBUTION OF ECOTOPES

The information on ha and % of the four ecotopes at each site has been graphed for ease of inter-site comparison. The % figures are the more useful. The graphed values have not been divided into primary and secondary types.

5.2.1 Central Ecotope

Figs. 5.1 and 5.2 show the information for the central ecotope distribution. In general the % of central ecotope is higher on the more easterly sites but is absent from an equal proportion of east (5) and west (6) sites. The eastern sites with the highest percentage of central ecotope are Mongan, Raheenmore and Crosswood while the western sites with the highest % cover by central ecotope are Garriskil, Derrinea and Carrowbehy.

From levelling information and field observations the central ecotope on the western bogs is mostly confined to the flatter areas which possibly represent the initiation basins where peat depth is probably greatest. On the easterly sites the central ecotope is generally centrally located, apart from the secondary areas (due to subsidence or tearing) which can occur close to the bog edge.

5.2.2 Sub-Central Ecotope

Figs. 5.3 and 5.4 show the information for the sub-central ecotope distribution. It is absent from two sites, Carrowbehy and Monivea. This is probably related to wide-scale disturbance at the latter and the narrow nature of the former. The site with the highest % cover is Ballykenny while Addergoole, All Saint's Bog, Cloonmoylan, Cloonshanville, Ferbane, Fisherstown, Killyconny and Moyclare all have >25% of their surface covered by sub-central ecotope. The common denominator between these sites is that they are all relatively flat, particularly Ballykenny, Addergoole, All Saint's Bog, Cloonmoylan and Fisherstown.

5.2.3 Sub-Marginal Ecotope

Figs. 5.5 and 5.6 show the information for the sub-marginal ecotope distribution. This is absent from three sites Mongan, Ferbane and Corbo. These three sites have all suffered considerable drying out with a subsequent re-wetting of sections of the site, due either to tearing of the bog surface or subsidence.

5.2.4 Marginal Ecotope

Figs. 5.7 and 5.8 show the information for the marginal ecotope distribution. It is seen on all sites and covers the greatest % on the more westerly sites (particularly those with significant internal slopes) or on sites which have suffered wide-scale disturbance, due either to drainage, peat cutting or a combination of both.

Graphs combining marginal and sub-marginal (poor quality raised bog) and sub-central and central ecotopes (high quality raised bog) were all prepared (Figs. 5.9 and 5.10). Twenty one sites have greater than 25% of the surface covered by a combination of the central and sub-central ecotopes. These are:

Addergoole	Carrownagappul	Garriskil
All Saint's Bog	Clara	Kilcarren
Ballykenny	Cloonmoylan	Killyconny
Ballynafagh	Cloonshanville	Knockacoller
Barroughter	Derrinea	Mongan
Brown Bog	Ferbane	Moyclare
Carrowbehy	Fisherstown	Raheenmore

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Addergoole [M 310 330]	A	GY	171	1083	5.8	(i) 10 (ii) 11.5 (iii) 11	(a) 1056mm (b) 500mm (c) 556mm (d) - days	*Macro Scale* *Bedrock* Pure limestone. *Meso Scale* *Subsoils* Little exposure, some clays (lake). Shell marl in some parts. Peat only 1m thick in certain areas.	*Macro Scale* Situated on a low lying plateau immediately beside Lough Corrib, and in a former floodplain. *Meso Scale* The bog slopes to the lake. *Type* FLOODPLAIN	*Macro* Situated in a groundwater discharge zone. *Meso* All drains have relatively high ECs so in a discharge zone. Fen to north where confining clays are thin and allow upwelling groundwater.	*Macro Scale* Unknown. *Meso Scale* There is widespread cutting on all sides with new drainage activity at fen area in N.

ADDERGOOLE BOG, CO. GALWAY - Intermediate/Western Raised Bog

ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.: ha covered; % of site) HI = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB MARGINAL	SUB CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++ = FREQUENT	% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub Central by Marginal Drains	Threat to Central/Sub Central by Surface Drains			
/6/9A 'A/2/3 /4 'A/3 -/3RB /7 + Ph + My 'A/6 + My 'A/6 'A/6/3 'A/2/3 /6/3 + My	6/9A/3 6/9A + TP 6/9A/3 + My 6/9A + My + Ph 6/9A + My 6/9A 6/9A + TP RB 9A/6/2 6/9A + Ph	6/9A + P + My 6/9A + P 6/9A + P RB 4/9A/6 + TP 6/4/10 + P 7/9 + My 9/7 + My 9A/10	NONE	11.2 ha of *Betula* dominated flush with a well developed *Sphagnum* layer.	2 open water occur as part of the main flush.			A transition to fen is seen along the N edge of the site.	West/East Indicators *Racomitrium* (++) *Pedicularis sylvatica* (+) *S. imbricatum* (++) *S. fuscum* (+) *S. magellanicum* (++) *S. auriculatum* (++) *Campylopus atrovirens* (+) *Vaccinium oxycoccus* (+) in flush *Pleurozia purpurea* (+) Disturbance Indicators *R. fusca* (+) *Campylopus introflexus* (+) *Cladonia floerkeana* (+)	84.2	5279m 53.6%	100	3406m 20m/ha Mostly at the edges				Private	♦Adjacent to: fen, Lough Corrib, Clare River and River Cregg. ♦Natural surface pattern ♦GWF Goose site.
Total ha 47.9 **% of Site 28.0** **HI (28%) P (0%)**	**Total ha 37.5** **% of Site 22.0** **HI (22%) P (0%)**	**Total ha 62.8** **% of Site 36.7** **HI (36.7%) P (0%)**																
				TOTAL ha 22.8; % OF SITE 13.3														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
All Saints **[N 015 110]**	A	OY	234	476	3.5	(i) - (ii) 42 (iii) -	(a) 844mm (b) 466.5mm (c) 377.5mm (d) 207days	*Macro Scale* *Bedrock* Calcareous Shales *Meso Scale* *Subsoils* Lake clay underlies the bog. Gravels and glaciofluvial foresets move under the bog and clays. Shell marl lies to the N of the bog along the rapemills river.	*Macro Scale* The bog is situated in a broad valley of the River Shannon. *Meso Scale* High sand and gravel fluvioglacial ridges lie to the south and east of the bog. A bedrock cored ridge lies to the west. The bog slopes strongly towards the Rapemills River. *Type* RIDGE RIVER A	*Macro* Situated in a groundwater recharge zone. *Meso* ECs are low except where deep drains intercept the water-table in the NW and at Erin Peats. Subsoils are of low permeability at peat margins. *Local* Local groundwater upwells at an undisturbed old cut-away to the very SE of the bog. There is iron on the water with ECs of 385µS/cm. Its origin is probably from the sand and gravel ridge to the S.	*Macro Scale* The degree of drainage modification is unknown in this area. *Meso Scale* Cutting in the west and Erin peats in the NW may have lowered water-levels on the bog. *Local Scale* Potential lag zone in SE.

ALL SAINT'S BOG, CO. OFFALY - Midland Raised Bog

ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.; ha covered; % of site) HI Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWALLOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++ = FREQUENT	% of Original Dome (1838) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
1 2 2+Mo 2/3 2/6/3 5/2RB)	6/3+Cl 6 6RB 6RB+TP 6/10 6/2+P	10/6/2 10/6 10/6- 10/6+ 10/9	NONE	Large *Betula* domiated flush with some pine. Well developed *Sphagnum* layer and some meso-trophic species.					WEST/EAST INDICATORS *S. imbricatum* (++) *S. fuscum* (+) *S. magellanicum* (++) *S. auriculatum* (+) *Vaccinium oxycoccus* (++) *Andromeda* (++) Disturbance Indicators *R. fusca* (+) *Campylopus introflexus* (+) *Huperzia* (++)	50.8	2923m 36.0%	87.6	29,930m 128m/ha 623.3m/ha in 19.7% of the site (Erin Peats)		SC New		Erin peats own 50ha of high bog and NPWS own 112ha of high bog.	♦Flush. ♦Close to: Esker, River Brosna NHA, Rapemills River. ♦Bog still close to original margin at the S, SE and N ♦Natural surface pattern. ♦Sub-central close to bog edge at N and SE. ♦*Sphagnum fimbriatum.* ♦GWF Goose site.
Total ha 38.1 % of Site 16.3 HI (16.3%) P (0%)	Total ha 15.2 % of Site 6.5 HI (6.5%) P (0%)	Total ha 105.7 % of Site 45.1 HI (45.1%) P (0%)																
				TOTAL ha 29; % OF SITE 12.4														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Ballyduff **[N 005 040]**	A	TY	95	128	4.5	(i) 61 (ii) 64 (iii) 62.5	(a) 816mm (b) 466.5mm (c) 350mm (d) 207days	*Macro Scale* *Bedrock* Waulsortian limestone *Meso Scale* *Subsoils* Section in the NE clearly shows that stoney till overlies laminated lake clays. Sands and gravels lie to the westrn margins of the bog. They mark that the bog was once a former glacio-lacustrine basin with sediment input from the west.	*Macro Scale* The bog is at the top of a valley > 60m OD. *Type* RIDGE BASIN	*Macro* The bog lies in a recharge zone for regional ground-water. *Meso* Most of the marginal drains are deep and intercept the regional water-table. The clayey subsoils (lake clays) have a low permeability.	*Macro Scale* The bog is situated at the top of a catchment divide, at the headwaters of the Little Brosna river. *Meso Scale* The bog is semi-intact more so than Cloonfinane. Heavy drainage in 'join' and east. *Local Scale* Local groundwater discharges in drains along the SW faces from high ground nearby. *Phragmities* and *Typha* on bog at cut-away where there is lagg zone potential.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Ballykenny **[N 085 790]**	Bi	LD	177 (1993)	265.3	4.2	(i) 41 (ii) 48 (iii) 45	(a) 923mm (b) 442mm (c) 481mm (d) 218 days	*Macro Scale* *Bedrock* Pure Limestone *Meso Scale* *Subsoils* In general there is little exposure. Clayey limestone till in cut-away areas. Overall the subsoils are calcareous.	*Macro Scale* This bog is situated at the bottom of a wide valley of the R. Shannon. *Meso Scale* This bog is situated entirely within the floodplain of the R. Shannon. *Type* FLOODPLAIN The bog probably initiated in marsh/fen areas within the floodplain.	*Macro* Discharge zone for regional groundwater. *Meso* As a whole the bog and surrounding mineral soils recharge groundwater and the surrounding rivers. There is artificial discharge of groundwater in the extreme N, coincident with cutting. Subsoils in general are of low permeability (k). *Local Scale* Local groundwater artificially discharges via a drain from the on bog till ridge (forest covered) in the E.	*Macro Scale* The degree of drainage modification to the Shannon River system is unknown. No arterial drainage. Some works done for navigation. Hydroelectrical needs may affect river water levels. *Meso Scale* There has been a general intensification of drainage in the E, where there is widespread hopper cutting, which has removed up to 0.8km width of peat. However, EC's are no more than 150 µS/cm, hence there is a downwards gradient of water in this zone. *Local Scale* There is a natural gradation from bog to the Camlin river, on the S side, causing a linear lag, which is undisturbed. Only erosion channels occur here.

BALLYKENNY, CO. LONGFORD- Floodplain Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB MARGINAL	SUB CENTRAL	CENTRAL
l l + Cl +Mo etc. 6/6 :/6 +My + Pine Total ha 53.4 % of Site 29.3 I (29.3%) (0%)	o 6/10 Total ha 9.5 % of Site 5.2 HI (5.2%) P (0%)	10/6 10/6+TP 10/6+Cl 10- Total ha 113.3 % of Site 62.3 HI (62.3%) P (0%)	

FLUSHES

WOODED	OPEN WATER	UNDERGROUND STREAMS/ SWALLOW HOLES	MOLINIA	OTHER
			Molinia flushed area seen along Drains bM and bK with *Pteridium* and *Myrica*.	Small flushed area dominated by *Sphagnum* lawns at the SE of the site follows the line of an old drain. Some *Betula* scrub and other flush species such as *Empetrum* seen.

TOTAL ha 5.8; % OF SITE 3.2

INDICATOR SPECIES

I = INFREQUENT
F = FREQUENT

WEST/EAST INDICATORS

Racomitrium (+)
Pleurozia purpurea (+)
Andromeda (++)
S. magellanicum (++)
S. imbricatum (+)
S. fuscum (+)
Campylopus atrovirens (I)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
33.3	15.9 (1.21km)

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
96.8	6047.6m (34.2m/ha)		

INVASIVE SPECIES AND FORESTRY

Rhododendron is seen all along the W edge of the site and along some drains. *Pinus sylvestris* is invading at the N and S.

OWNERSHIP

This site is privately owned.

SPECIAL FEATURES

- Semi-Natural Margins (66.5%, 5.05km).
- 66.5% of the original dome remains.
- Adjacent Habitats
  - Lough Forbes
  - Rivers Shannon and Camlin
  - Callows
  - Old mixed woodland
  - Fisherstown Bog (NHA)
  - Wooded till mound within bog.
- Sub-Central ecotopes seen close to bog edge.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Ballynafagh **[N 81 28]**	Bii	KE	67	249	6.3	(i) 91 (ii) - (iii) -	(a) 793mm (b) 442mm (c) 351mm (d) 218days	*Macro Scale* *Bedrock* Muddy limestone interbedded with calcareous shales underlie the main part of the bog and are faulted against Waulsortian dolomitised limestone. *Meso Scale* *Subsoils* Clayey limestone till.	*Macro Scale* Situated in an area with high undulating hills. *Meso Scale* Bog is surrounded by high hills on all sides except to the east which is part of an original basin. *Type* BASIN	*Macro* Situated in a groundwater discharge zone. *Meso* All drains in the area have ECs of >350-360µS/cm. Low permeability subsoils.	*Meso Scale* The degree of drainage modification to the local drainage system is unknown but the drains in area have definitely been deepened. *Meso Scale* All sides of the bog have been intensively cut away and so lagg zone potential is zero.

BALLYNAFAGH BOG, CO. KILDARE - Eastern Midland Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 2 RB 2/7 5/2	6/7	9/10	10/15
Total ha 17.5 % of Site 26.0 HI (26.0%) P (0%)	Total ha 13.3 % of Site 19.9 HI (19.9%) P (0%)	Total ha 17.4 % of Site 26.0 HI (26.0%) P (0%)	Total ha 5.2 % of Site 7.8 HI (7.8%) P (0%)

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWALE-LOW HOLES	MOLINIA	OTHER
NONE				

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

S. magellanicum (++)
Vaccinium oxycoccus (+)
Andromeda (++)

Disturbance Indicators
Campylopus introflexus (++)
Cladonia floerkeana (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
73.0	3122m 74.0%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
100	3929m 58.6m/ha	SC old	SC old

INVASIVE SPECIES AND FORESTRY

13.6ha or 20.3% of high bog planted with Lodgepole pine.

OWNERSHIP

Private

SPECIAL FEATURES

- Natural surface patterns.
- Grand Canal reservoir to N.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Barroughter [M 790 030]	A (TM)	GY	91.5	202	4.9	(i) 37 (ii) 38 (iii) 37.5	(a) 957mm (b) 466.5mm (c) 510mm (d) 207days	*Macro Scale* *Bedrock* Muddy limestone with interbedded calcareous shales. South eastern area is underlain by Waulsortian reef limestone. *Meso Scale* *Subsoils* Overall poorly sorted clayey limestone till. Pure sands underlie the W section of the bog.	*Macro Scale* Situated alongside a lake shore and narrow river estuary. *Meso Scale* There is a shallow slope to the lake. *Type* RIDGE RIVER C	*Macro* Situated in a groundwater discharge zone. *Meso* Drains in N lie in till where groundwater upwells. Natural discharge of groundwater in east where there is fen vegetation lying between *Sphagnum* hummocks.	*Macro Scale* The degree of drainage modification is unknown. The lake, Lough Derg may have been at a higher level than present. *Meso Scale* There is heavy intensification of drainage around all sides of the bog except in the east which the river periodically floods.

BARROUGHTER BOG, CO. GALWAY - Midland Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI Human Impact; P Primary

MARGINAL	SUB - MARGINAL	SUB - CENTRAL	CENTRAL
1 2/3 3/2/6 3/2/6/4 5/2/3 5/2 1/2 5/3/2	6 4/6 4/6 + P 6/10RB 4/6/2	4/6/10-	4/6/10 4/6/15
Total ha **44.1** **% of Site** **48.2**	**Total ha** **20.9** **% of Site** **22.8**	**Total ha** **9.4** **% of Site** **10.3**	**Total ha** **17.1** **% of Site** **18.7**
HI (48.2%) **P (0%)**	**HI (22.8%)** **P (0%)**	**HI (10.3%)** **P (0%)**	**HI (0%)** **P (18.7%)**

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWALLOW HOLES	MOLINIA	OTHER
NONE				

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Pedicularis stylvatica (+)
S. imbricatum (++)
S. fuscum (++)
S. magellanicum (+)
Vaccinium oxycoccus (+)
Andromeda (++)
Pleurozia purpurea (+)

Disturbance Indicators
Campylopus introflexus (++)
R. fusca (++)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
54.7	3706m 82%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
81.3	2762.4m 30.2m/ha	SC new and old	C old

INVASIVE SPECIES AND FORESTRY

OWNERSHIP

Private

SPECIAL FEATURES

- Close to Cloonmoylan NHA, Lough Derg and Cappagh River.
- Fen area to NE
- Sphagnum pulchrum frequent.
- Area of natural surface pattern

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA Recent (ha)	AREA 1840s (ha)	AREA Area (km^2) : Perimeter (km)	ALTITUDE (m. OD) on the bog (i) Min. (ii) Max. (iii) Mean	CLIMATE (a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	GEOLOGY Macro Scale Bedrock Meso Scale Subsoils	GEOMORPHOLOGY Macro Scale Meso Scale Type of Bog	GEOHYDROLOGY Macro Meso Local	HYDROLOGY Macro Scale Meso Scale Local Scale
Bellanagare [M 710 860]	A(W)	RN	741	231.5	7.6	(i) 102 (ii) 123 (iii) 112.5	(a) 1090mm (b) 428mm (c) 662mm (d) 234days	*Macro Scale* *Bedrock* Carboniferous muddy limestone underlies the bog. Yellow sandstone lies immediately east of this bog. *Meso Scale* *Subsoils* Generally the bog is underlain by clayey limestone till often with a stoney matrix. Sandstone till (stoney) lies along the east side of the bog.	*Macro Scale* This bog is situated in an upland area and at the top of a surface water catchment divide. *Meso Scale* Peat occurs on ridge apices and flushes/streams occur between the ridges. *Type* BLANKET	*Macro* The bog is situated in a regional recharge zone for groundwater. However, the limestone has a low permeability causing much run-off, aiding bog formation. *Meso* Nearly all the ECs were in the 70-160µS/cm range showing overall that the bog recharges groundwater. Subsoils generally have a low permeability. Stoney sandstone tills to the east have a moderate permeability. *Local* Local groundwater discharges to the NW.	Macro Scale The bog lies on a regional surface water /groundwater catchment divide which runs NW/SE through the centre of the bog. The northern part lies within the Lough Gara catchment and the southern part drains to the Frances River (R. Suck) There has been no major arterial drainage in the area. Meso Scale There has been intensification of drainage around all margins (cut-away) and so the lagg zone potential is zero.

BELLANAGARE BOG, CO. ROSCOMMON - Western/Intermediate Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	MARGINAL cont.	SUB-MARGINAL	SUB-CENTRAL
1 1+Mo 2 2+ER 4/2 2/3+TP 2/3+Cl 2/3+ER 2/3/4+ER 2/3/6 2/3/6+My 2/3/6+TP+Cl 2/7 2/7+ER 3/2 3/2+Cl 3/2+My 3/2/7 3/2/7+TP 3/2/6 3/2/6+TP 3/2/6+CL 3/6/2 2/7/6+My	2/7/9 2/7/9+Cl+TP 2/9/7 2/9/7+Cl 2/6/3 2/6/3+Cl 2/6/3+My 2/6/3+TP 2/6/3+AP 6/7 7/3 7/9 7/9+Mo 7/9+Cl 7/9+My 9A/3/2 7/9/2 7/9/2+TP 7/9/3 9/7/2 9/7/2+Cl 9/7/3 9A/7 **Total ha 373.2** **% of Site 50.4** **HI (44.2%) P (6.2%)**	3/6/9A+P 3/6/9A 3/9/7 6/9A 9/7 9/7+Cl 9/3/2 6/2/3 6/2/3+TP 6/3/2 6/3/2+P 7/9A **Total ha 129.8** **% of Site 17.5** **HI (16.9%) P (0.6%)**	2/6/3+P 2/6/3+P+Cl 2/6/4+P 6/3+P+Cl 9/7+Enr+Cl 9/7+My 9/7+P **Total ha 109.8** **% of Site 14.8** **HI (10.3%) P (4.5%)**

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER

TOTAL ha 128.2; % OF SITE 17.3

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (+)
Pedicularis stylvatica (+)
S. imbricatum (+)
S. fuscum (+)
S. magellanicum (+)
Andromeda (+)
Pleurozia purpurea (+)

Disturbance Indicators

Cladonia floerkeana (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
68.0	25.4

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
72.5	60866m 82m/ha 32652m of drains on the Northern Lobe.		

INVASIVE SPECIES AND FORESTRY

15.4ha (1.2%) of forestry on the high bog.

OWNERSHIP

588ha of the site are owned by NPWS.

SPECIAL FEATURES

- *Sphagnum pulchrum.*
- Area of natural surface partterns.
- Natural internal slopes.
- Small rivers adjoin the site.

BLACKCASTLE BOG, CO. OFFALY - Eastern Midland Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 2 RB 3/7 3RB 3 7/9 7/9+Cl	6	10 10/4	NONE
Total ha 71.7	**Total ha** 2.0	**Total ha** 23.8	
% of Site 73.5	**% of Site** 2.1	**% of Site** 24.4	
HI (73.5%) **P (0%)**	**HI (2.1%)** **P (0%)**	**HI (24.4%)** **P (0%)**	

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWALLOW HOLES	MOLINIA	OTHER
NONE				

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (+)
S. magellanicum (++)

Disturbance Indicators
Campylopus introflexus (++)
Cladonia floerkeana (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut
63.0	509.6m 9.7%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
100	4371.5m 44.8m/ha	SC old	SC old

INVASIVE SPECIES AND FORESTRY

Pinus sylvestris and *Betula* are invadinf the high bog.

OWNERSHIP

Private - at least 75 owners.

SPECIAL FEATURES

♦ Old deciduous woodland to the E.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Brown Bog [N 095 762]	A	LD	51	96	6.6	(i) 49 (ii) 50 (iii) 49.5	(a) 933mm (b) 442mm (c) 491mm (d) 218days	*Macro Scale* *Bedrock* Pure limestone. *Meso Scale* *Subsoils* Clayey limestone till	*Macro Scale* Situated on the broad River Shannon valley. *Meso Scale* The bog is surrounded on all sides by higher mineral ground. *Type* BASIN	*Macro* Situated in a groundwater discharge zone. *Meso* Few drains. Main outlet drain has an EC of 400µS/cm. Overall bog recharges groundwater.	*Macro Scale* The degree of drainage modification to the Shannon River system is unknown. No arterial drainage. Some works done for navigation. Hydroelectrical needs may affect river water levels. *Meso Scale* Most of the original bog boundary remain and are intact.

BROWN BOG, CO. LONGFORD - Midland Raised Bog

ECOLOGY										HUMAN IMPACT							OWNERSHIP	SPECIAL FEATURES
ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY		
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWALE-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++= FREQUENT	% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
1 1/2+Cl +Pine 1/3 1/3+Cl 2/3/4/6 2/3/6 7/4	6+Cl 6/3+Cl	6/3+TP+Cl	15+Cl					Very wet quaking area (Possible old bog burst). Water flows through the pools. A small spring may be present.	WEST/EAST INDICATORS *S. imbricatum* (+) *S. fuscum* (+) *S. auriculatum* (+) *Vaccinium oxycoccus* (++) *Andromeda* (++)	47.0	67m 2%	95.7	None	C and SC			Private	♦Possible spring in bog centre. ♦<2km from Ballykenny and Fisherstown NHA. ♦Remnant of old deciduous woodland to the NW. ♦Low frequency of drains and APC. ♦Natural surface patterns.
Total ha 14.5 **% of Site 28.4** **HI (28.4%) P (0%)**	**Total ha 18.0** **% of Site 35.3** **HI (35.3%) P (0%)**	**Total ha 7.6** **% of Site 14.9** **HI (14.9%) P (0%)**	**Total ha 8.7** **% of Site 17.1** **HI (17.1%) P (0%)**															
				TOTAL ha 2.2 ; % OF SITE 4.3														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Callow **[M 685 960]**	Bi	RN	163	520	4.4	(i) 71 (ii) 77 (iii) 74	(a) 1080mm (b) 428mm (c) 652mm (d) 234days	*Macro Scale Bedrock* Limestone *Meso Scale Subsoils* Clayey tills and lake clays.	*Macro Scale* Situated in a drumlin filled valley. *Meso Scale* This bog is situated in a depression alongside a lake shore and river floodplain. *Type* RIDGE RIVER C	*Macro* The bog lies in a discharge zone for regional groundwater. *Meso* In general where cutting is limited the bog recharges local groundwater. There is natural discharge of regional groundwater (390µS/cm) along the NE side of the bog at the lake shores. Here the bog faces are in a natural state with deep erosion channels. The subsoils have a low permeability.	*Macro Scale* The degree of drainage modification is unknown although there has been some deepening of the Lung River. *Meso Scale* There has been widespread impact to the bog's drainage system, except in the northern margin. Cut-away area is very large and has diminished any chance of a lag restoration. *Local Scale* There is a lag zone potential along NE side of bog at Lough Gara where groundwater discharges at the lake shore.

CALLOW BOG, CO. ROSCOMMON - Western/Intermediate Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	MARGINAL cont.	SUB - MARGINAL	SUB - CENTRAL
1 3 3RB 3/2 2/3 3/7 3/2/6 3/6 3/6RB 3/6+Cl 3/9A 3/6/7+ Mo 7/9 7/9A 9A 6B 6/3B+My 6/3+TP 6/3+AP	6/3B 6/3+My 6/3/9 4/2 4/2B 4/6 2/4/6B 9/7 9/7+Cl 9/7/6 6/9A/3 6/9/7 6/3/2	4/6/3+P+Cl 4/6/3+TP+Cl 6/7/9+TP 6/7/9 6 6+Cl 6+P 6+P+My 6+My 6/3+Cl	9A/6/4+P 6/3+P+Cl 6/9AB
	Total ha 87.9 **% of Site 53.9** **HI (53.9%) P (0%)**	**Total ha 52.4** **% of Site 32.1** **HI (32.1%) P (0%)**	**Total ha 7.7** **% of Site 4.7** **HI (4.7%) P (0%)**

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER
		Lines of swallow holes occur surround-ed by *Molinia*.	Large area of *Molinia* occurs in the centre of the site. It may be associat-ed with a thin peat layer. Some *Phragm-ites* and other mesotrop-hic species seen.	

TOTAL ha 15.0 ; % OF SITE 9.2

INDICATOR SPECIES

+ = INFREQUENT
++= FREQUENT

WEST/EAST INDICATORS

Racomitrium (++)
Pedicularis sylvatica (++)
S. fuscum (++)
S. magellanicum (+)
S. auriculatum (++)
Campylopus atrovirens (++)
Andromeda (+)
Pleurozia purpurea (++)

Disturbance Indicators
Campylopus introflexus (+)
Cladonia floerkeana (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1948) Cut-away	Approx. % of Margin actively cut
68.7	3057m 42.6%

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
90.8	6048m 37m/ha	SC old and new	

INVASIVE SPECIES AND FORESTRY

Rhododendron bush seen close to Drain bH and at the NNE of site

OWNERSHIP

Private

SPECIAL FEATURES

- Eastern edge partly intact along lake shore.
- Area of natural surface pattern.
- Close to Lough Gara and the Lung River.
- *Frangula alnus*.

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA Recent (ha)	AREA 1840s (ha)	AREA Area (km^2) : Perimeter (km)	ALTITUDE (m. OD) on the bog (i) Min. (ii) Max. (iii) Mean	CLIMATE (a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	GEOLOGY Macro Scale Bedrock Meso Scale Subsoils	GEOMORPHOLOGY Macro Scale Meso Scale Type of Bog	GEOHYDROLOGY Macro Meso Local	HYDROLOGY Macro Scale Meso Scale Local Scale
Camderry [M 70 57]	Bii	GY	197.0 (1970)	359	5.2	(i) 81 (ii) 92 (iii) 87	(a) 1069mm (b) 428mm (c) 641mm (d) 234 days	*Macro Scale Bedrock* Limestone *Meso Scale Subsoils* Clayey/Silty limestone till. Overall the subsoils are calcareous.	*Macro Scale* This bog is situated in a drumlin filled valley. *Meso Scale* Interdrumlin depressions. *Type* RIDGE BASIN. The bog occupies two basins with ridges in between.	• *Macro* Recharge zone for regional groundwater. • *Meso* Overall recharge occurs in the drumlins; natural discharge along the river in the N and extreme SW, and artificial discharge in the cut-away areas • Subsoils are low to moderate permeability (k). • *Local* One natural discharge zone for local groundwater occurs at the drumlin to the very south.	*Macro Scale* The degree of drainage modification to the river system is unknown. No arterial drainage. *Meso Scale* There has been a general intensification of drainage around this bog, apart from the N. In the SE and W, there is a marked impact on drainage coincident with cutting. *Local Scale* There is a natural gradation from bog to river, in the N, causing a linear lag, which is undisturbed. Only erosion channels occur here. Groundwater discharges in the river, EC is > 330µS/cm. Potential infiltration lagg zones in the SW lobe, to the N (S of Corarcullin drumlin), E (W side of Boogauns drumlin) and S (N side of Cloonshivna drumlin), since peat is thin on mineral soils near to original boundaries.

CAMDERRY, CO. GALWAY - Intermediate/Western Raised Bog

ECOLOGY

ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary

MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL
1 3/2 3/2+Cl 3/2RB 3/2/4 6/2/3 6/2/3+Cl 6/2/3RB 3+Cl 2/9A/7 *Myrica* **Total ha 144.1** **% of Site 73.1** **HI (73.1%) P (0%)**	2/6/3 3+Rac 9A/7+Cl 9/7/6+Cl 3/10 3/10+Cl **Total ha 19.5** **% of Site 9.9** **HI (9.9%) P (0%)**	6/9A 10 **Total ha 3.5** **% of Site 1.8** **HI (1.8%) P (0%)**	15- **Total ha 8.0** **% of Site 4.1** **HI (4.1%) P (0%)**

FLUSHES

WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER
			Dry *Molinia* flush at the NE edge.	3 small wet flushes on the high bog. Dry *Myrica* area on the mineral ridge separating the two lobes.

TOTAL ha 7.9; % OF SITE 4.0

INDICATOR SPECIES

+ = INFREQUENT
++ = FREQUENT

WEST/EAST INDICATORS

Racomitrium (++)
Pleurozia (++)
Andromeda (++)
S. magellanicum (+)
S. imbricatum (+)
S. fuscum (+)
S. auriculatum (+)
Campylopus atrovirens (++)
Vaccinium oxycoccus (+)

DISTURBANCE INDICATORS

Huperzia (++)
R. fusca (+)

HUMAN IMPACT

PEAT CUTTING

% of Original Dome (1849) Cut-away	Approx. % of Margin actively cut
45.0	18.4 (1.88km)

DRAINAGE EFFECTS

% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains
96.0	3486.5m (17.7m/ha)	Sub-Central (old)	Sub-Central (old)

INVASIVE SPECIES AND FORESTRY

14ha (7.1%) Lodgepole pine forestry on the high bog at W edge (Coillte).

OWNERSHIP

NPWS own a large section (80ha) from BnM. Remainder private.

SPECIAL FEATURES

- Semi-Natural Margins (134m, 13%).
- Adjacent Habitats
  - River
  - Cloon-cullaun and Leaha Bogs (NHA)
- Absence of invasion by scrub.

SHANKILL WEST, CO. GALWAY - Intermediate/Western Raised Bog

ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.; ha covered; % of site) III = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++= FREQUENT	% of Original Dome (1838) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
1 3 6/3+My 3/2 Total ha 24.0 % of Site 31.4 III (31.4%) P (0%)	6/3/2 9/7 Total ha 30.2 % of Site 42.8 III (42.8%) P (0%)	15- 15-+My Total ha 5.4 % of Site 7.7 III (7.7%) P (0%)	15 15+My Total ha 9.4 % of Site 13.3 III (13.3%) P (0%)				Small dry *Molinia* flushes seen close to the bog edge, some with *Myrica*.	In the centre of Complex 15 small patches of flushed vegetation are seen. Species such as *Empetrum*, *Aulacom-Nium palustre* and *Vaccinium* occur.	WEST/EAST INDICATORS *Racomitrium* (+) *Pedicularis sylvatica* (+) *S. imbricatum* (++) *S. fuscum* (++) *S. magellanicum* (++) *S. auriculatum* (+) *Campylopus atrovirens* (+) *Vaccinium oxycoccus* (++) *Andromeda* (++)	38.0	25.0 Approx. 1185m	100.0	3620.0 (51.46m/ha)		Central (New)		BnM (on offer to NPWS) and private multiple ownership.	•Semi-natural Margins (0.94km, 19.8%) present. •Adjacent Habitats - Fen - Lake •*Sphagnum auriculatum* v. *inundatum* recorded in Complex 15. •62% of Original Dome remaining. •Absence of scrub invasion.
				NEGLIGIBLE AREA														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Sharravogue [S 045 985]	Bi	OY	137	286	4.5	(i) 50 (ii) 54 (iii) 52	(a) 816mm (b) 350mm (c) 466.5mm (d) 207days	*Macro Scale Bedrock* Waulsortian limestone. Ridge to the east has much outcrop. *Meso Scale Subsoils* There is little section exposure; clayey till lie to the eastern margins of the bog.	*Macro Scale* The bog is situated at the bottom of a narrow river valley. *Meso Scale* There is a high N/S ridge to the east of the bog. A deepened river lies to the west. *Type* RIDGE RIVER B	*Macro* Situated in a regional discharge zone. *Meso* The bog generally recharges groundwater. Natural upwelling of regional groundwater occurs along the E side of the bog, where fen peat occurs. Original boundaries remain around most of the sides.	*Macro Scale* The Little Brosna which runs along the east side of the bog may have been deepened. *Meso Scale* The W and E bog boundaries are development free.

SHARAVOGUE BOG, CO. OFFALY - Midland Raised Bog

ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.; ha covered; % of site) III = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++= FREQUENT	% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
1 2/7 4/9 6/7 7/2 7/4 7/6 7/9 Drain complex Total ha 52.6 % of Site 39.6 III (39.6%) P (0%)	4/6/2 4/7 6 6/9 6/2 Total ha 59.6 % of Site 43.5 III (43.5%) P (0%)	4/6 6/9/15 Total ha 23.1 % of Site 16.8 III (16.8%) P (0%)	NONE						WEST/EAST INDICATORS *S. imbricatum* (++) *S. fuscum* (+) *S. magellanicum* (+) *Andromeda* (+) Disturbance Indicators *Campylopus introflexus* (++) *Cladonia floerkeana* (++) *R. fusca* (+)	52.3	308.4m 5%	99.9	19940m 146m/ha Concent-rated in a band of 22 E?W drains atthe centre of the site. 18492m or 637.7m/ha in 29ha (21%).	SC old	SC old	*Rhododendron* close to Drain bA17. *Pinus*, *Betula*, *Pteridium* and *Quercus* are invading to the S.	Most of the site is in the process of being bought by NPWS.	♦*Frangula alnus* along river. ♦Fen area to E. ♦The W edge is very close to the original bog extent. ♦Little Brosna River to the W. ♦Bedrock ridge to the E.
				TOTAL ha 0.1; % OF SITE 0.1														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog	CLIMATE	GEOLOGY	GEOMORPHOLOGY	GEOHYDROLOGY	HYDROLOGY
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)	(i) Min. (ii) Max. (iii) Mean	(a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	Macro Scale Bedrock Meso Scale Subsoils	Macro Scale Meso Scale Type of Bog	Macro Meso Local	Macro Scale Meso Scale Local Scale
Tawnaghbeg	Bi	MO	78	134	6.1	(i) 82 (ii) 92 (iii) 87	(a) 1229mm (b) 428mm (c) 801mm (d) 234days	*Macro Scale* *Bedrock* Muddy limestone. *Meso Scale* *Subsoils* Poorly sorted clayey limestone till.	*Macro Scale* Situated in an upland area within drumlin area. *Meso Scale* The drumlin topography is important. A ridge runs through the middle of the bog with a flush. there is a sharp slope to the NW. *Type* RIDGE BASIN	*Macro* Situated in a groundwater recharge zone. *Meso* All drains have low ECs. Subsoils have a low permeability.	*Macro Scale* The bog lies at the top of a catchment and so drainage in the area will have little affect. *Meso Scale* Many of the original boundaries remain. Forestry drainage is a problem.

TAWNAGHBEG BOG, CO. MAYO - Western/Intermediate Raised Bog

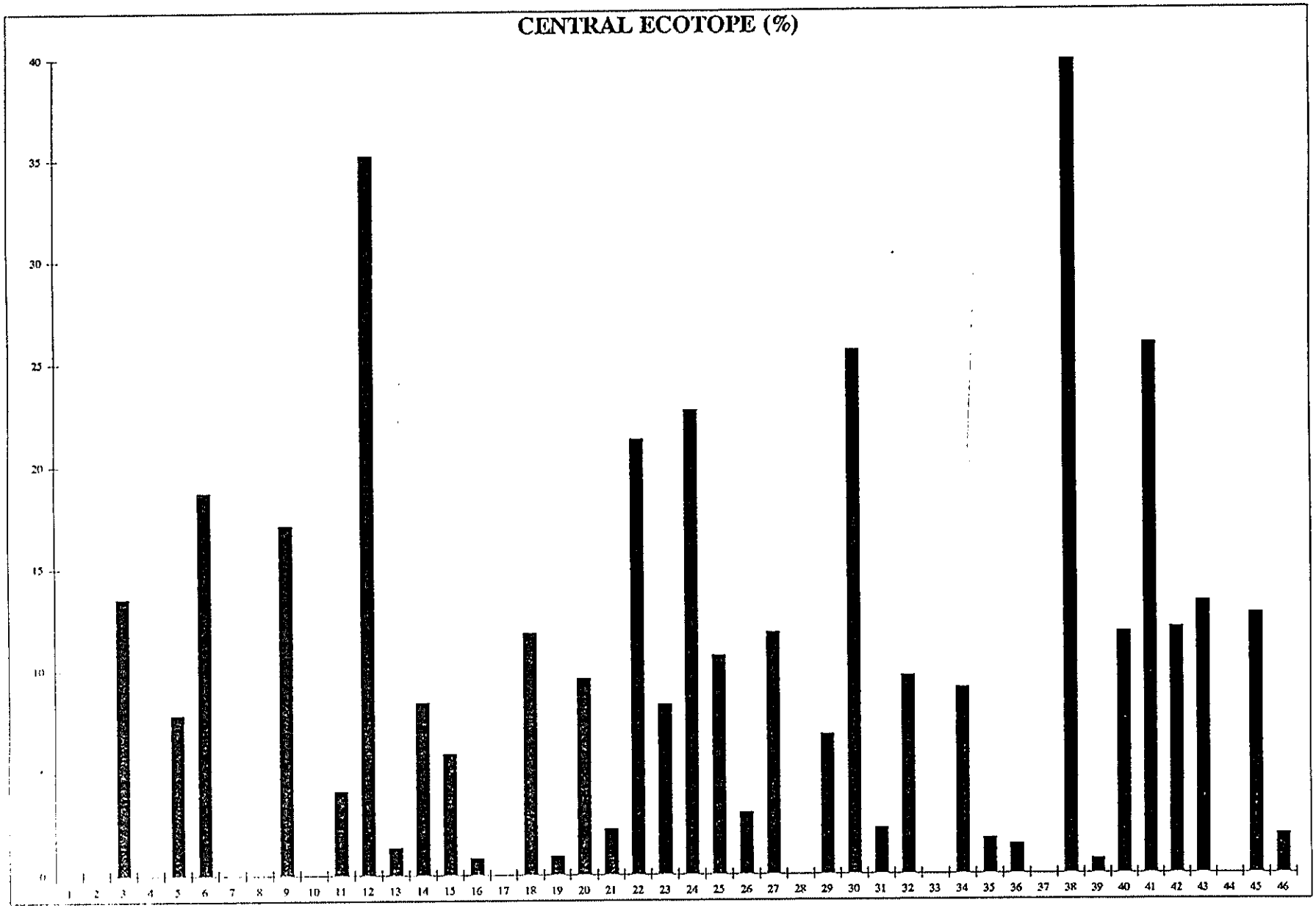
ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++= FREQUENT	% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
1 2/3 2/6/3 Total ha 14.5 % of Site 18.6 HI (18.6%) P (%)	6/3 6/3+Cl+My 6/3/9A 6/3/2 6 Total ha 34.6 % of Site 44.3 HI (44.3%) P (0%)	6/10 6/10+My 10/6/3+Cl 6/3/10 Total ha 5.7 % of Site 7.3 HI (7.3%) P (0%)	35/6 Total ha 9.9 % of Site 12.7 HI (0%) P (12.7%)						WEST/EAST INDICATORS *Racomitrium* (++) *Pedicularis sylvatica* (++) *S. magellanicum* (+) *S. auriculatum* (++) *Campylopus atrovirens* (++) *Pleurozia purpurea* (+) Disturbance Indicators *Campylopus introflexus* (+)	42	911.9 19.2%	74.7	2413m 30.7m/ha			*Rhododendron* Lodgepole pine plantation 3.5ha (4.5%).	16.5ha are owned ny NPWS.	♦The bog edge at the NNW edge is very close to the original edge and the bog is also close to the original extent along the S edge which is bounded by a river.
				TOTAL ha 9.8; % OF SITE 12.6														

RAISED BOG RESTORATION PROJECT

SITE [National Grid Reference]	STATUS	CO.	AREA			ALTITUDE (m. OD) on the bog (i) Min. (ii) Max. (iii) Mean	CLIMATE (a) Precipitation (b) Actual Evapotranspiration (c) Effective Rainfall (d) Raindays	GEOLOGY Macro Scale Bedrock Meso Scale Subsoils	GEOMORPHOLOGY Macro Scale Meso Scale Type of Bog	GEOHYDROLOGY Macro Meso Local	HYDROLOGY Macro Scale Meso Scale Local Scale
			Recent (ha)	1840s (ha)	Area (km^2) : Perimeter (km)						
Trien [M650 755]	Bi	RN	126	212	6.3	(i) 70 (ii) 75 (iii) 72.5	(a) 1026mm (b) 428mm (c) 598mm (d) 234days	*Macro Scale Bedrock* Limestone *Meso Scale Subsoils* Clayey limestone till is the dominant subsoil deposit. Some silty till with sandstone clasts in cut-away drains at drumlins.	*Macro Scale* This bog is situated in a drumlin filled valley. *Meso Scale* Interdrumlin depressions connect to Trien Bog. *Type* RIDGE BASIN	*Macro* The bog lies in a recharge zone for regional groundwater. *Meso* Local recharge occurs in the drumlins. Artificial discharge of groundwater occurs in drains to the NE and SE. The clayey subsoils have a low permeability.	*Macro Scale* The degree of drainage modification is unknown although there has been some deepening of the Island River to the south of the bog. *Meso Scale* There has been a general intensification of drainage to the north along the main bog track.

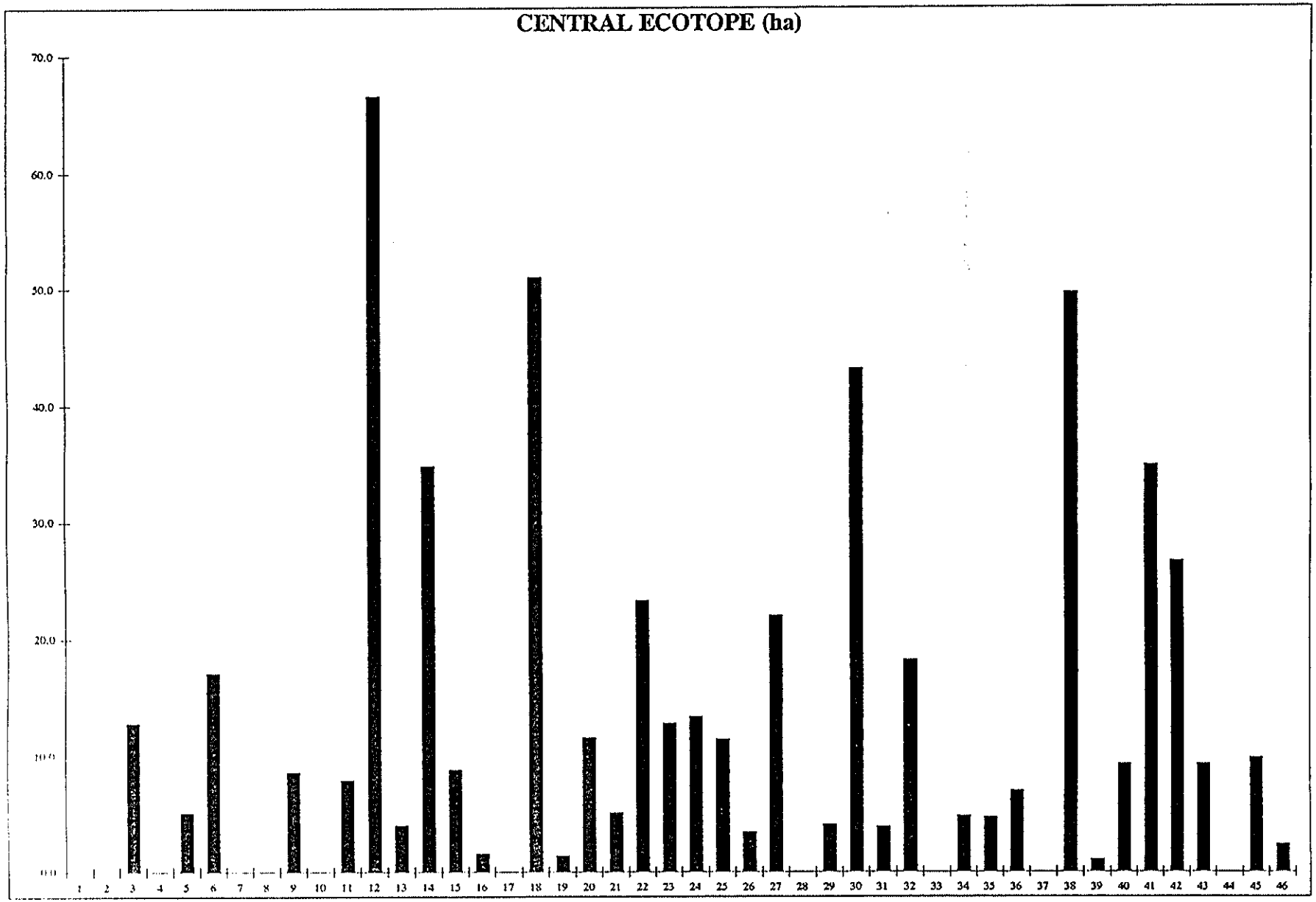
TRIEN BOG, CO. ROSCOMMON - Western/Intermediate Raised Bog

ECOLOGY										HUMAN IMPACT								
ECOTOPES (Complexes incl.; ha covered; % of site) HI = Human Impact; P = Primary				FLUSHES					INDICATOR SPECIES	PEAT CUTTING		DRAINAGE EFFECTS				INVASIVE SPECIES AND FORESTRY	OWNERSHIP	SPECIAL FEATURES
MARGINAL	SUB-MARGINAL	SUB-CENTRAL	CENTRAL	WOODED	OPEN WATER	UNDER-GROUND STREAMS/ SWAL-LOW HOLES	MOLINIA	OTHER	+ = INFREQUENT ++= FREQUENT	% of Original Dome (1848) Cut-away	Approx. % of Margin actively cut	% Area affected by drains	Length of Functional Drains	Threat to Central/Sub-Central by Marginal Drains	Threat to Central/Sub-Central by Surface Drains			
2 2+My 3/2 3/2+Mo/My 2/3 2/4 4/2 4/2RB 3+My 2/3/4 2/3/6 3/6/4 6/2/3 6/2/3+P 3/6+AP 3/6+P 3/6/2+P 6/3/2 6/3/2+My 6/3/2+Cl	6/3 6/3+My 6/3+TP 6/3+P	6+P	6/35 6/15+Cl						WEST/EAST INDICATORS *Racomitrium* (+) *S. imbricatum* (+) *S. fuscum* (+) *S. auriculatum* (+) *Campylopus atrovirens* (++)	40.6	4078.8m 51%	84.8	9802.1m 78m/ha	C and SC new. SC old.	C new		NE corner of Main Lobe (30ha) owned by NPWS. Remainder multiple private ownership.	♦Cephalozia elachista.
Total ha 59.0 % of Site 46.8	Total ha 39.7 % of Site 31.5	Total ha 8.2 % of Site 6.5	Total ha 2.4 % of Site 1.9															
HI (46.8%) P (0%)	HI (31.5%) P (0%)	HI (6.5%) P (0%)	HI (0%) P (1.9%)															
TOTAL ha 16.7 ; % OF SITE 13.3																		



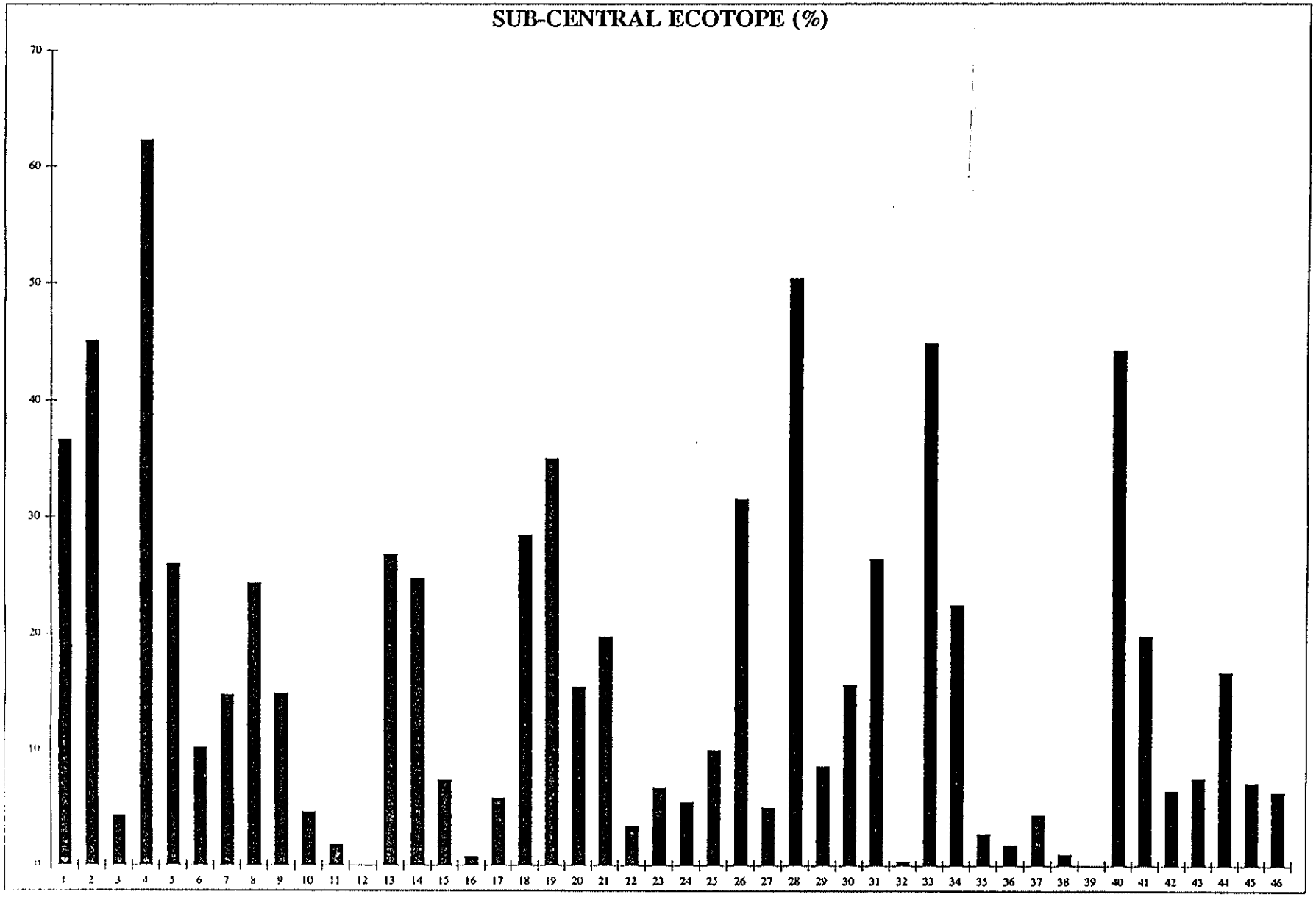
Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynafagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Camderry	11
Carrowbehy	12
Carrowmaggaul	13
Clara	14
Clonfinane	15
Cloonchambers	16
Clooncullaun	17
Cloonmoylan	18
Cloonsbunville	19
Corbo	20
Corliskea	21
Crosswood	22
Curraghchurgh	23
Derrinea	24
Derrynabrock	25
Ferbane	26
Firville	27
Fishertown	28
Flughany	29
Garriskil	30
Kilcarren	31
Killeallagh	32
Killycomy	33
Knockacoller	34
Lismgeeragh	35
Lough Lurgeen	36
Moanveanlagh	37
Morgan	38
Moniva	39
Moyclare	40
Raheenmore	41
Redwood	42
Shankill West	43
Shravogue	44
Tawnaghbeg	45
Trien	46

Figure 5.1 % of Central Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.



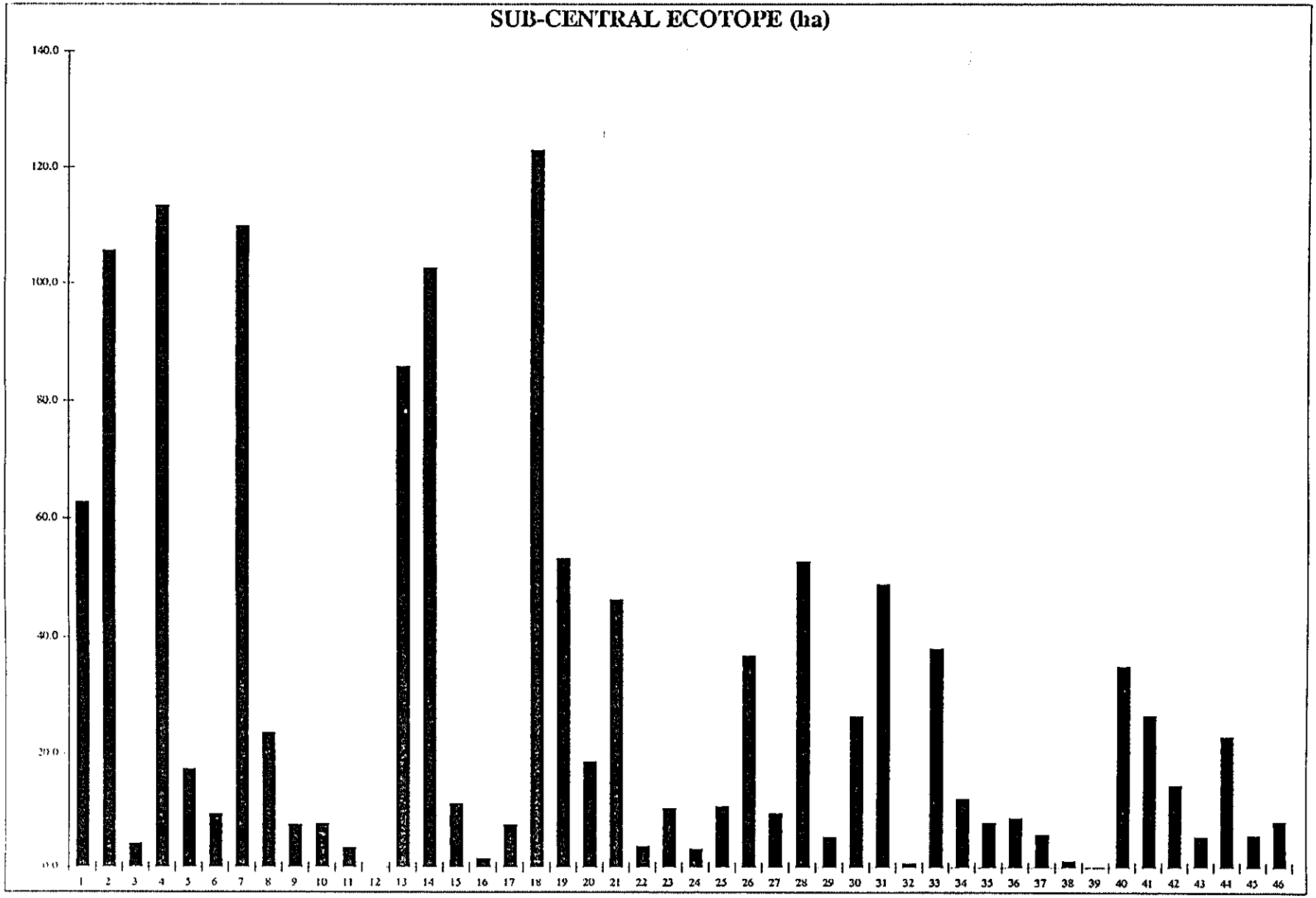
Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynalagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Camderry	11
Carrowbehy	12
Carrowmaggaul	13
Clara	14
Cloonfinane	15
Clooncbambers	16
Clooncullaun	17
Cloonmoylan	18
Cloonsharville	19
Corbo	20
Corlalea	21
Crosswood	22
Curraghchasagh	23
Derrinea	24
Derrynabrock	25
Ferbane	26
Firville	27
Fisherstown	28
Fluphany	29
Garrishil	30
Kilcarren	31
Killsallagh	32
Killycosey	33
Knockacoller	34
Lisnageeragh	35
Lough Lurgeen	36
Mountcanlagh	37
Morgan	38
Mouivea	39
Moyclare	40
Rahcenmore	41
Redwood	42
Shankill West	43
Sharavogue	44
Tawnaghbeg	45
Trien	46

Figure 5.2 **ha of Central Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.**



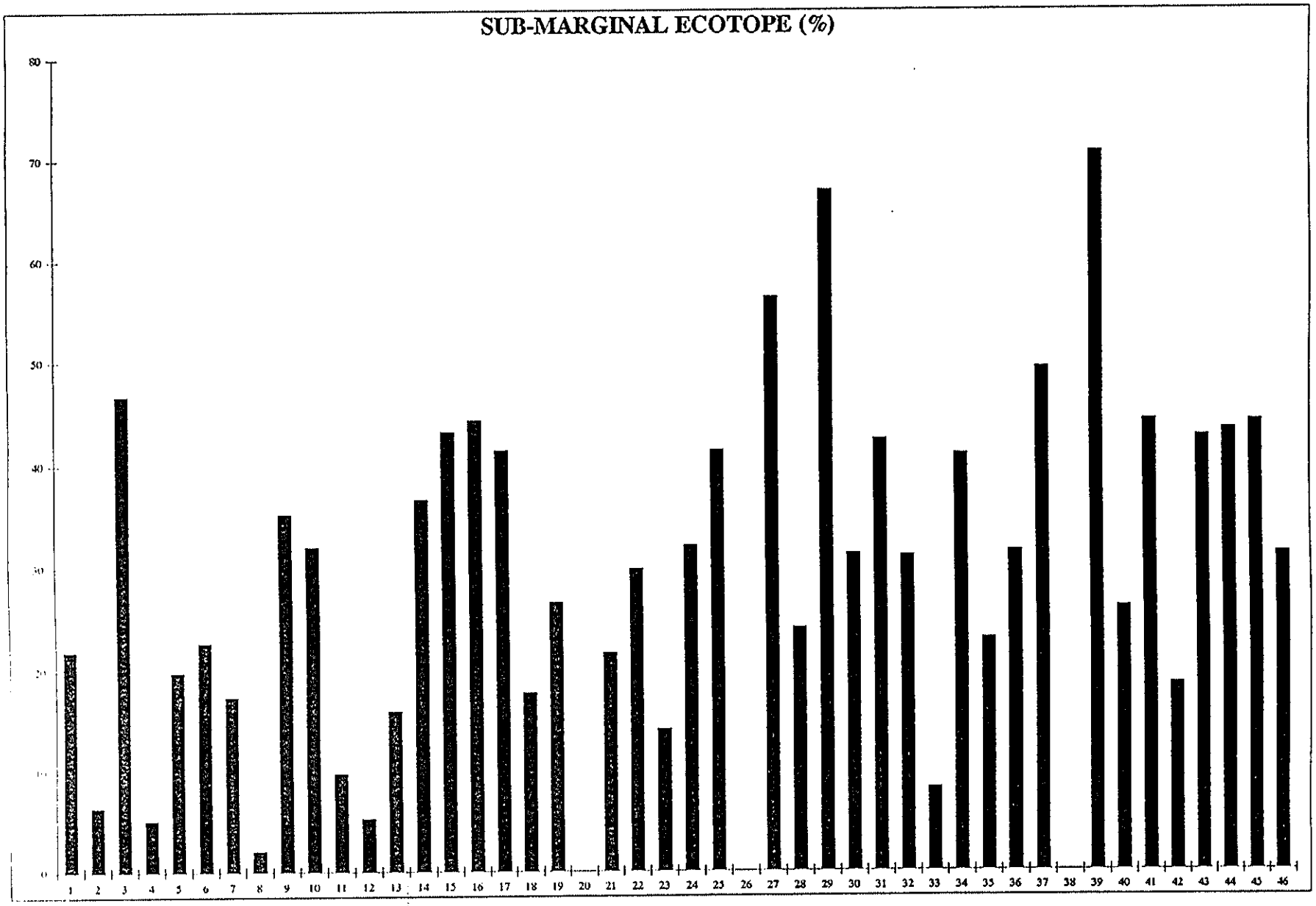
Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynafagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Camderry	11
Carrowbehy	12
Carrowmaggaul	13
Clara	14
Cloonfinane	15
Cloonbambers	16
Clooncultaun	17
Cloonmoylan	18
Cloonshanville	19
Corbo	20
Corliskea	21
Crosswood	22
Curraghchanagh	23
Derrinea	24
Derrynabrock	25
Ferbane	26
Firville	27
Fisherstown	28
Flughany	29
Garriskil	30
Kilcarren	31
Kilfaillagh	32
Killyconny	33
Knockacoller	34
Lisnageeragh	35
Lough Lurgeen	36
Moanveanlagh	37
Mongan	38
Moniva	39
Moyclare	40
Raheenmore	41
Redwood	42
Shankill West	43
Sharavogue	44
Tawnaghbeg	45
Ticn	46

Figure 5.3 % of Sub-central Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.



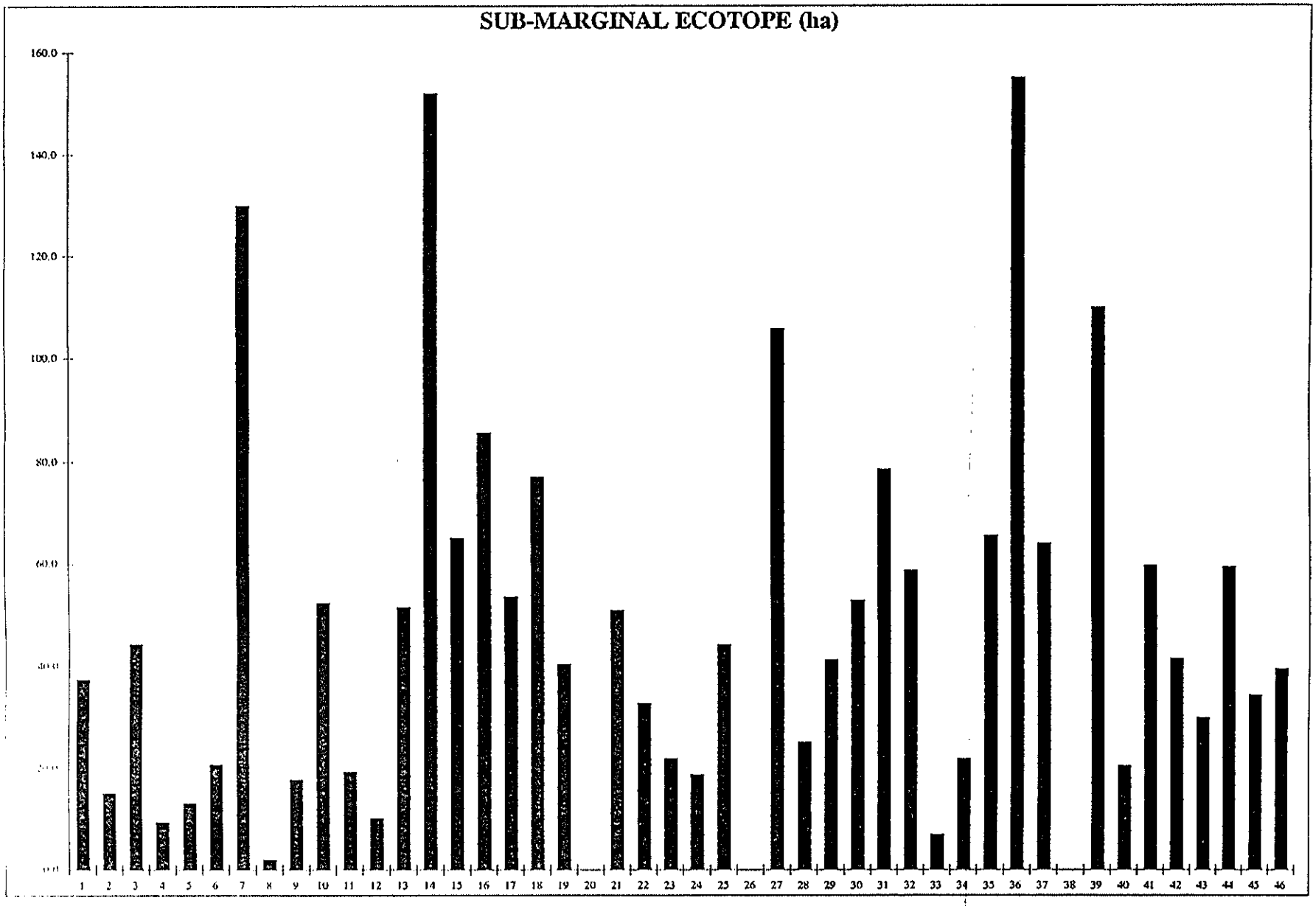
Addergoole
All Saint's Bog
Ballyduff
Ballykenny
Ballynafagh
Barroughter
Bellanagare
Blackcastle
Brown Bog
Callow
Camderry
Carrowbehy
Carrowngappal
Clara
Clonfinane
Cloonchambers
Clooncullaun
Cloonmoylan
Cloonsharville
Corbo
Corliskea
Crosswood
Curraghlehanagh
Derrinea
Derrynabrock
Derbane
Firville
Fisherstown
Fughany
Garriskil
Kilcarren
Killasallagh
Killycomy
Knockacollier
Lisnageeragh
Lough Lurgeen
Moanveanlagh
Morgan
Moulvea
Moyclare
Raheenmore
Redwood
Shankill West
Shrawpoe
Tawnaghbeg
Trien

Figure 5.4 ha of Sub-central Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.



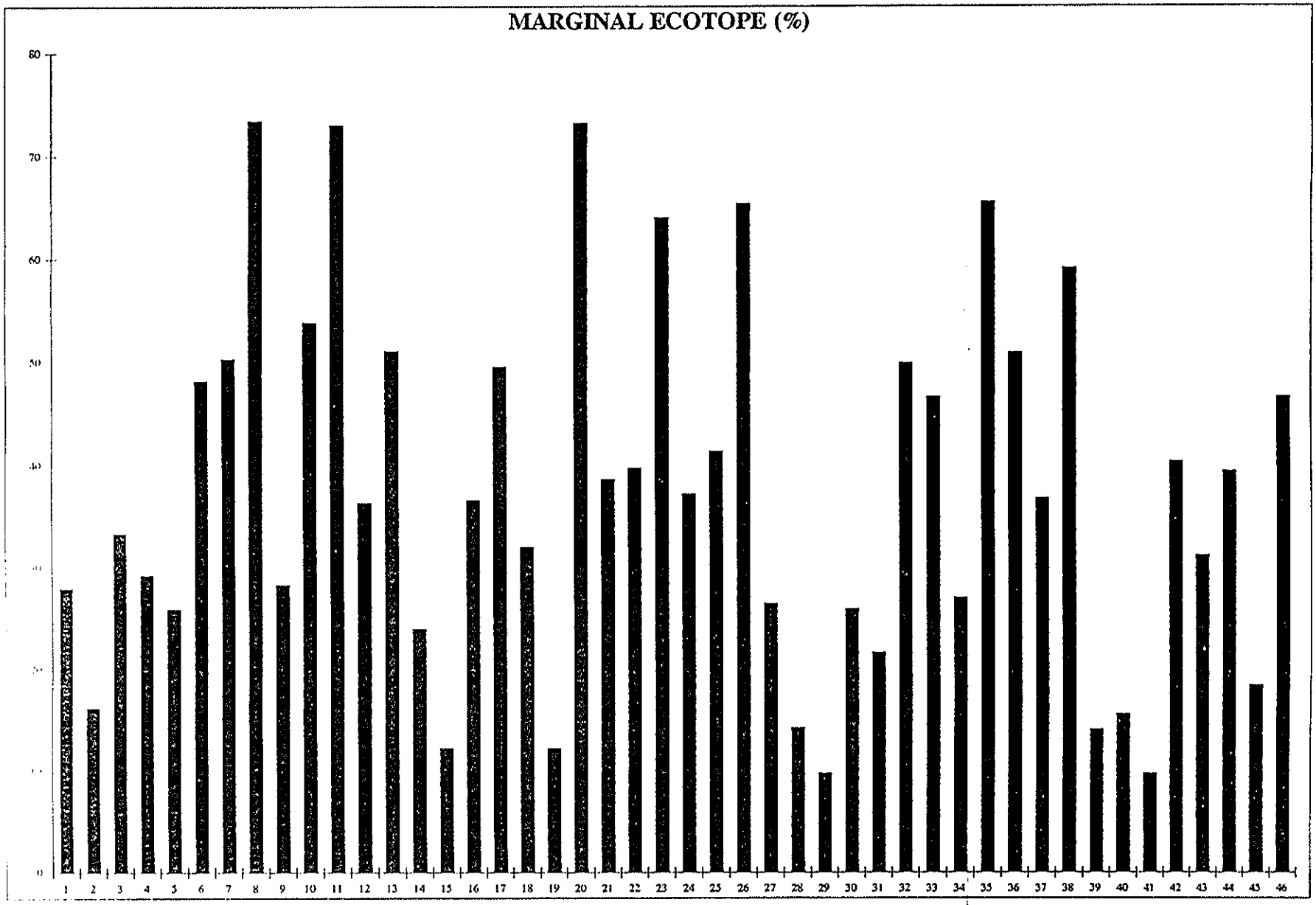
Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynafagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Canderry	11
Carrowbehy	12
Carrownagappul	13
Clara	14
Clonfinane	15
Clooncham bers	16
Clooncullaun	17
Cloonmoylan	18
Cloonshanville	19
Corbo	20
Corliskea	21
Crosswood	22
Curraghcharagh	23
Derrinea	24
Derrynabrock	25
Ferbane	26
Firville	27
Fishertown	28
Fluphany	29
Garriskil	30
Kilcarren	31
Killsallagh	32
Killycomy	33
Knockacoller	34
Lismeeragh	35
Lough Lurgeen	36
Meanveanlagh	37
Mongan	38
Monivea	39
Moyclare	40
Raheenmore	41
Redwood	42
Shankill West	43
Sharavogue	44
Tawnaghlaig	45
Trien	46

Figure 5.5 % of Sub-marginal Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.



Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynafagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Camderry	11
Carrowbehy	12
Carrowngappul	13
Clara	14
Cloonlusmo	15
Clooncbambers	16
Clooncuflaun	17
Clooncmoylan	18
Cloonshanville	19
Corbo	20
Corliskea	21
Croaswood	22
Curraghchasagh	23
Derrinea	24
Derrynabrock	25
Ferbane	26
Firville	27
Fisherstown	28
Flughany	29
Garriskil	30
Kilcarren	31
Killsallagh	32
Killyconny	33
Knockacoller	34
Lisnageeragh	35
Lough Lurgeen	36
Moanveanlagh	37
Mongan	38
Moniwea	39
Moyclare	40
Raheenmore	41
Redwood	42
Shankill West	43
Shanwogue	44
Tawnaghdaw	45
Trien	46

Figure 5.6 ha of Sub-marginal Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.



Addergoole	1
All Saint's Bog	2
Ballyduff	3
Ballykenny	4
Ballynafagh	5
Barroughter	6
Bellanagare	7
Blackcastle	8
Brown Bog	9
Callow	10
Camderry	11
Carrowbehy	12
Carrowmagappal	13
Clara	14
Clonfinane	15
Cloonchambers	16
Clooncullaun	17
Cloonmoylan	18
Clounsharville	19
Corbo	20
Corliska	21
Crosswood	22
Curraghchwagh	23
Derrinea	24
Derrynabrock	25
Derrybrine	26
Girville	27
Fisherstown	28
Flaghany	29
Garriskil	30
Kilcarren	31
Killsallagh	32
Killycoony	33
Knockacolla	34
Lisnageeragh	35
Lough Lurgeen	36
Mountcanlagh	37
Mongan	38
Moniva	39
Moyclare	40
Rahaninane	41
Redwood	42
Shankill West	43
Sharavogue	44
Tawnaghbeg	45
Trien	46

Figure 5.7 % of Marginal Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.

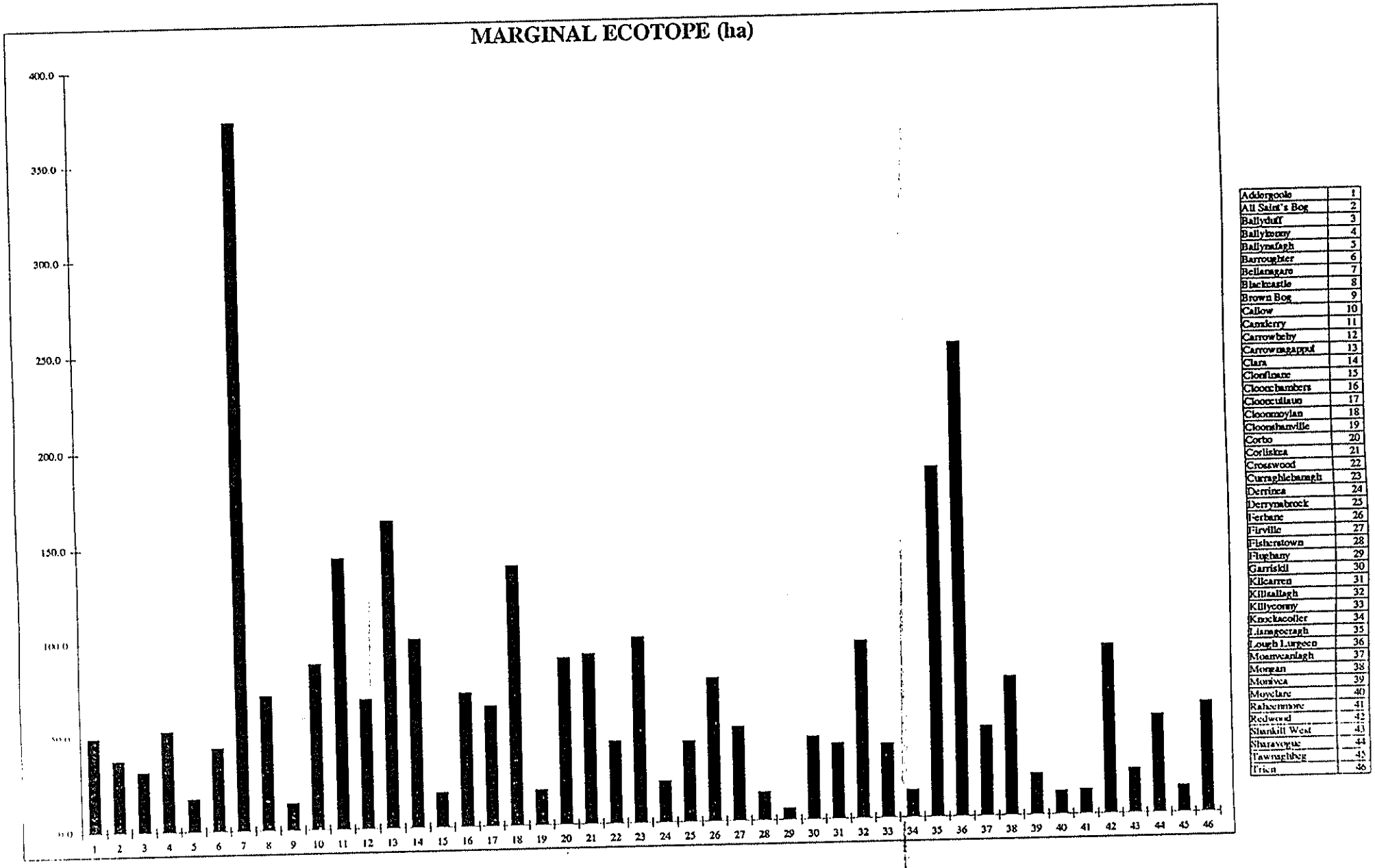


Figure 5.8 ha of Marginal Ecotope on each Bog visited during the Raised Bog Restoration Project, 1994.

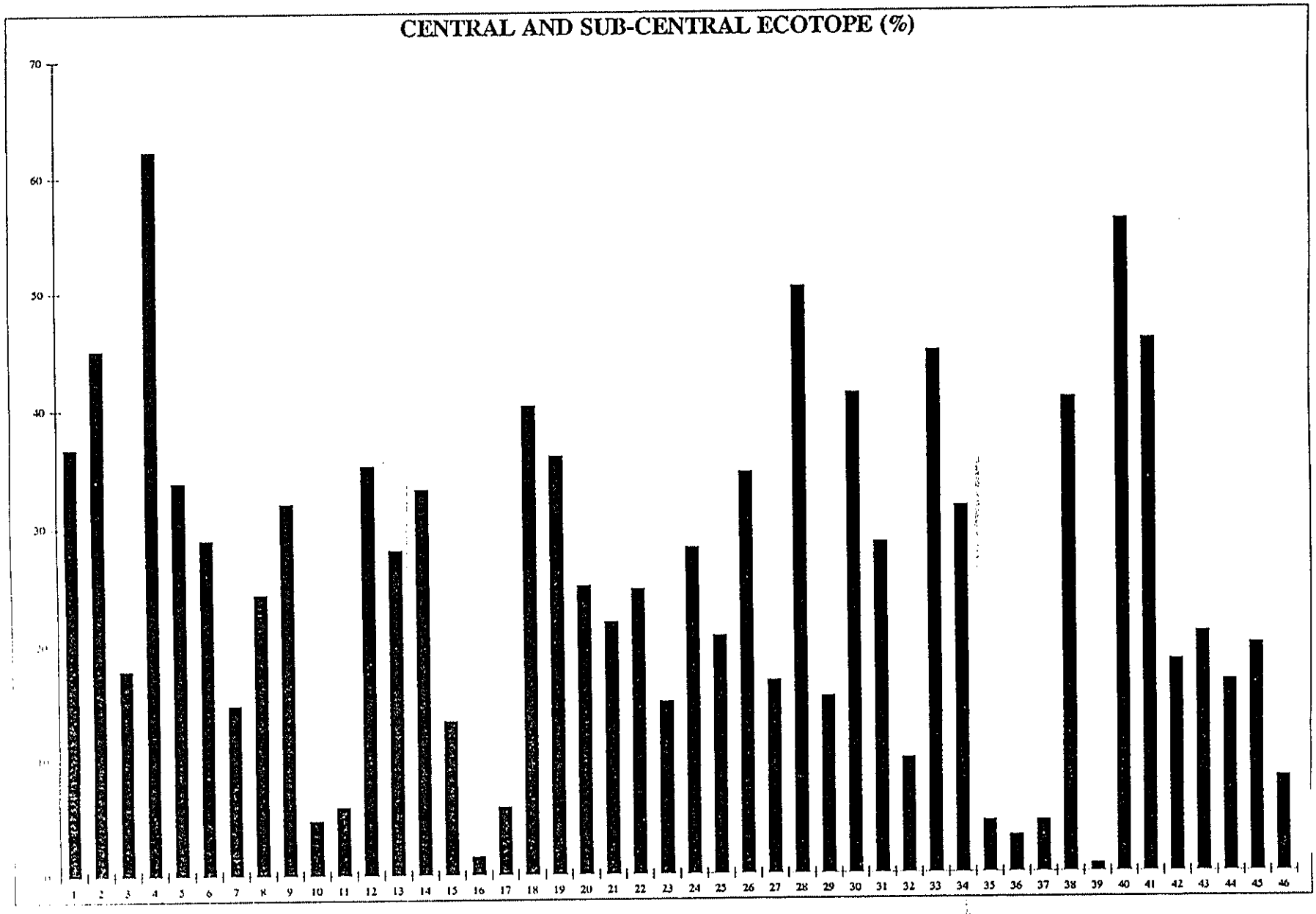


Figure 5.9 % of Central and Sub-central Ecotopes combined on each Bog visited during the Raised Bog Restoration Project, 1994.

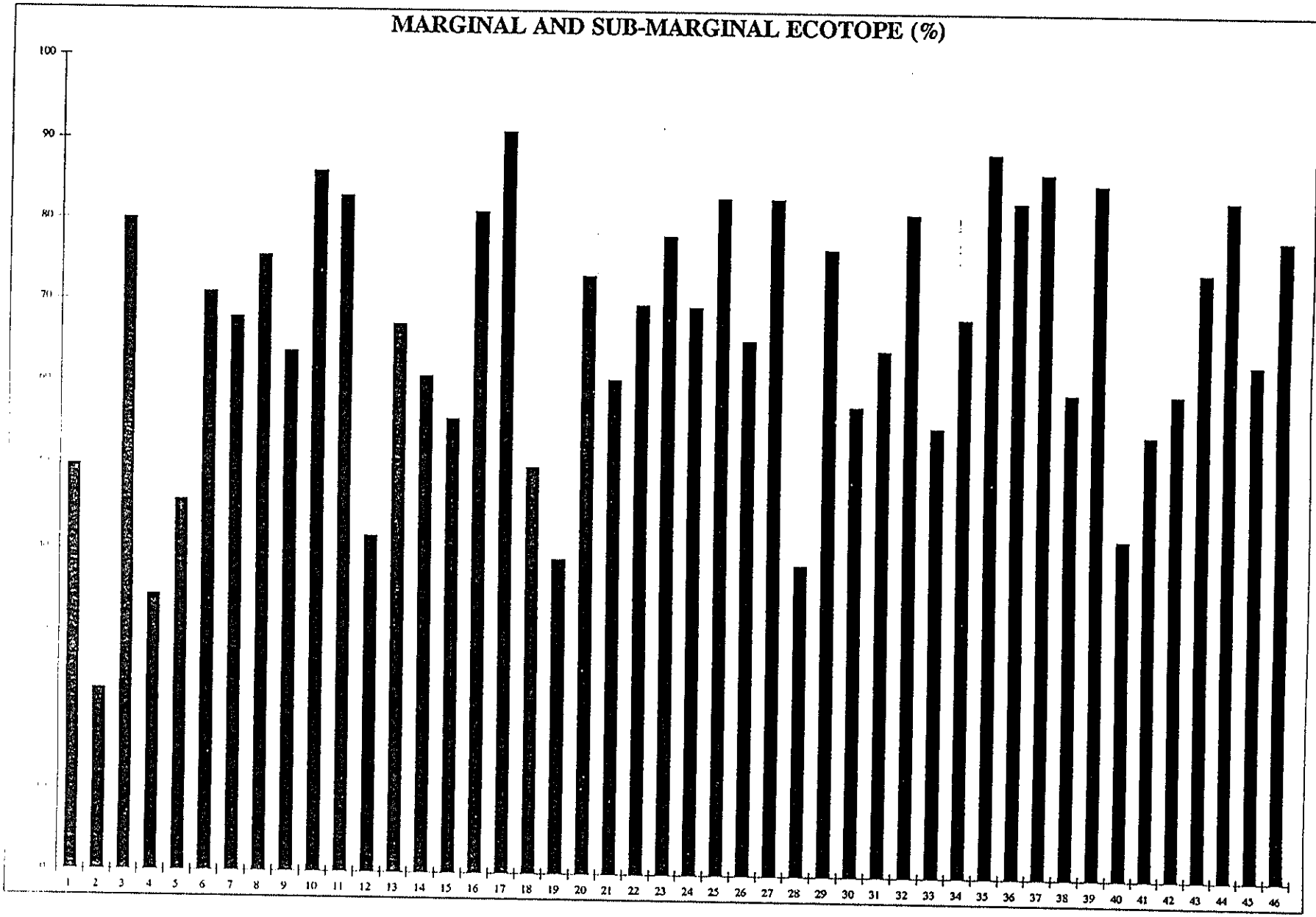


Figure 5.10 % of Marginal and Sub-marginal Ecotopes combined on each Bog visited during the Raised Bog Restoration Project, 1994.

Marginal and sub-marginal ecotopes cover greater than 50% of the surface on 38 sites. They are as follows:

Addergoole	Ferbane
Ballyduff	Firville
Barroughter	Flughany
Bellanagare	Garriskil
Blackcastle	Kilcarren
Brown Bog	Kilsallagh
Callow	Killyconny
Camderry	Knockacoller
Carrownagappul	Lisnageeragh
Clara	Lough Lurgeen
Clonfinane	Moanveanlagh
Cloonchambers	Mongan
Clooncullaun	Monivea
Corbo	Raheenmore
Corliskea	Redwood
Crosswood	Shankill West
Curraghlehanagh	Sharavogue
Derrinea	Tawnaghbeg
Derrynabrock	Trien

5.3 LEVELLING

The 28 sites where levelling transects were requested are as follows:

East Galway (6)	NE Galway/NW Roscommon (6)	SE Galway (1)
Shankill West	Corliskea/Trien	Barroughter
Lisnageeragh	Bellanagare	
Curraghlehanagh	Derrinea	
Clooncullaun	Cloonshanville	
Camderry	Carrowbehy (Caher)	
Carrownagappul		
North Offaly (3)	**S. Offaly/N. Tipperary (4)**	**Mid-West Galway (1)**
Mongan	All Saints	Addergoole
Ferbane	Sharavogue	
Moyclare	Firville/Kilcarren	
E. Mayo (1)	**Longford/E. Roscommon (3)**	**Situation or Isolated (4)**
Derrynabrock	Ballykenny/Fisherstown	Knockacoller
	Brown Bog	Ballynafagh
		Garriskil

Transects of levels were taken across the bog and slopes (cm/m) were estimated. These transects were related to the vegetation maps so that a series of slope values were available for a number of vegetation complexes. Means and standard deviations were calculated for a vegetation complex at a particular site and results from different sites from the same vegetation complex were combined. The former was to establish if there was a difference between the slopes associated with a particular complex on an eastern bog as compared to the slopes with which the complex was associated with on a more westerly site. If there was no difference between east and west, the latter gives an indication of the overall slope associated with a particular complex. In addition the mean was calculated for all slopes associated with each of the four complex types. These can be equated with the ecotope divisions: Marginal, Sub-marginal, Sub-Central and Central.

There were a few problems establishing a relationships between slopes and vegetation. The transects which were levelled did not always correspond to those specified. This was due to the difficulty of locating oneself on site. For this reason a number of vegetation complexes were not covered by the transect.

The levelling transects and site plans are not bound into this report but are available in NPWS.

It was decided that only the results of levels from vegetation complexes which were crossed by a transect on at least two sites would be considered. The vegetation complexes dealt with in this analysis are shown in Table 5.1.

Table 5.1: Vegetation Complexes where Relationships with Slopes were Investigated.

Marginal Complexes	Sub-Marginal Complexes	Sub-Central Comlexes	Central Complexes
1 (13 sites)	6/2 (2 sites)	6 +Pools (2 sites)	15 & 15 +Cladonia (3 sites)
2 & 2+ Cladonia (3 sites)	6/7 (2 sites)	6/3 +Pools (2 sites)	10/15 (3 sites)
2/3 & 2/3 + Cladonia (4 sites)	3/6 (2 sites)	9/7 +Myrica (2 sites)	6/25 (3 sites)
3/2 & 3/2 +Cladonia (4 sites)	6/3/2 (3 sites)	9/7/6 & 9/7/6 +Cladonia (2 sites)	35 (2 sites)
2/6 (2 sites)	6/3 & 6/3+Cladonia (2 sites)	6/10 (2 sites)	14 (3 sites)
2/7 (3 sites)	6 (6 sites)	9/10 (2 sites)	
2/3/6 (2 sites)		10 & 10 + Cladonia	
2/6/3 (4 sites)		10/6 & 10/6 +Cladonia	
3/2/6 (2 sites)			
3/6/2 (2 sites)			
6/3/2 (2 sites)			
6/3 (3 sites)			
3 & 3 +Cladonia (7 sites)			

The results of the analysis are contained in Appendices A-D. In most cases there is a large variation of slopes encountered within a single vegetation complex, that is the standard deviations are usually larger than the mean.

5.3.1 Marginal Vegetation Complexes and Relationship with Slope.

In general there is no difference between the slopes associated with a particular marginal complex on a westerly or easterly located site. There is one exception, Complex 3 & 3 +*Cladonia* which on the two easterly located sites, Ferbane and All Saint's, has much lower associated mean slopes: 0.4cm/m and 0.34cm/m as compared to the overall mean slope of the complex of 0.74cm/m. The reason for this is unclear. Mongan another easterly site has a mean slope associated with Complex 3 & 3 +*Cladonia* which is more similar to the western sites.

The overall mean for all marginal complexes is 0.9cm/m +/- 1.01cm/m. This is much higher than the critical slope of 0.3cm/m over which poor or no acrotelm development is seen. All marginal complexes are associated with little or no *Sphagnum* cover.

5.3.2 Sub-marginal Vegetation Complexes and Relationship with Slope.

Again variation in slope within these vegetation complexes does not appear to be related to location. Some of these complexes have mean slope values which are close to the critical slope (Complexes 6 (mean 0.35cm/m) and 9/7 (mean 0.33)) and in one case is below (6/3/2 (mean 0.24)). High values are also encountered in Complexes 3/6 (mean 0.78), 6/7 (mean 0.58) and 6/3 (0.53).

The overall mean for all sub-marginal complexes is 0.36cm/m +/- 0.38cm/m. This is greater than the critical slope of 0.3cm/m but only just.

5.3.3 Sub-central Vegetation Complexes and Relationship with Slope.
Again location does not appear to be associated with the variation seen. The lowest mean value of 0.15cm/m is associated with Complex 10 which has a very well developed *Sphagnum* layer. The highest values were recorded for Complex 6/3 +Pools which supports a mixture of *Narthecium* and *Carex panicea* communities and may be in transition to a sub-marginal type due to drying out.

The overall mean for all sub-central complexes is 0.28cm/m +/- 0.29cm/m. This is lower than the critical slope of 0.3cm/m.

5.3.4 Central Vegetation Complexes and Relationship with Slope.
Once more location does not appear to be associated with the variation seen. Complex 10/15 (high *Sphagnum* cover with permanent pools) has the lowest mean slope value of 0.18cm/m. Complex 6/35 (the western hummock/hollow complex) is associated with a mean slope value of 0.26cm/m. The highest mean value of 0.4cm/m is associated with Complex 14 which, on the three sites recorded, is related to subsidence.

The overall mean for all sub-central complexes is 0.31cm/m +/- 0.29cm/m. This is very close to the critical slope of 0.3cm/m.

The higher value of the overall mean for the Central versus Sub-central complexes may be due to the fact that many Central complexes on these sites are associated with subsidence hollows where slopes have developed. Central complexes can still be supported as water is funnelled through the area. In contrast Sub-central complexes are often widespread on flat sites where subsidence has not occurred.

Although it was initially thought that a higher *Sphagnum* cover and thus an acrotelm layer could be supported on greater slopes on the more westerly sites (due to higher precipitation) this is not the case. In general it can be said that the central and sub-central complexes are only seen on the flatter areas of the more westerly located sites.

It is suggested that more detailed work is necessary on the relationship between slopes and vegetation cover as the relationships established here are only preliminary.

5.4 HYDROCHEMISTRY

In total 33 samples for hydrochemical analyses were collected; 8 from flushes by the ecologists and 25 by the geohydrologist. These results are discussed in the relevant section within the detailed report for the particular site (Parts 2 and 3 of the report).

In addition results from samples collected by Kelly (1993) and M. Proctor while on the IMCG trip in 1988 are tabulated (Table 5.2).

TABLE 5.2 Hydrochemical Results from Raised Bog Sites: Sampled by M. Proctor (IMCG Trip, 1988), L. Kelly (1993) and Raised Bog Restoration Project (1994).

SITE	FEATURE	Date	Ca	Mg	K	Na	HCO3	SO4	Cl	Al	NO3	NH4	Fe	Cu	Zn	Mn	PO4	pH	EC
All Saint's Bog, Co. Offaly	Bog Pools	14.9.88	1.01	1.18	0.06	8.90		0.27	0.50									3.90	114.40
			1.23	1.33	0.21	8.60		0.28	0.49									3.90	124.60
			1.20	1.43	0.17	9.60		0.34	0.51									3.90	130.30
			1.39	1.40	1.36	8.70		0.26	0.52									4.20	142.90
			1.98	1.29	0.38	8.50		0.24	0.46									4.20	107.80
		Mean	1.36	1.33	0.44	8.86		0.28	0.50									4.02	124.00
		SD	0.33	0.09	0.47	0.39		0.03	0.02									0.15	12.26
	Birch Wood		1.47	1.42	0.65	11.20		0.45	0.59									3.80	154.60
			1.08	1.40	0.28	8.80		0.29	0.49									3.90	153.30
			1.81	1.80	0.81	7.20		0.30	0.50									4.10	149.40
			0.88	1.46	1.73	8.70		0.26	0.56									4.20	136.60
		Mean	1.31	1.52	0.87	8.98		0.33	0.54									4.00	148.48
		SD	0.36	0.16	0.53	1.43		0.07	0.04									0.16	7.12
	S. cuspi pool in Birch		0.99	1.34	1.35	10.2		0.31	0.53									3.9	122.4
Lough Lurgeen, Co. Galway	Bog Pools	15.9.88	0.39	0.80	0.45	6.00		0.13	0.34									4.30	65.90
			0.43	0.83	0.44	6.40		0.11	0.38									4.30	70.20
			0.47	0.77	0.23	6.30		0.12	0.39									4.20	72.30
		Mean	0.43	0.80	0.37	6.23		0.12	0.37									4.27	69.47
		SD	0.03	0.02	0.10	0.17		0.01	0.02									0.05	2.66
	Stream from lake	15.9.88	8.37	1.21	0.22	6.60	0.39	0.15	0.39									6.40	95.60
	Fen in lake	15.9.88	6.46	1.13	0.18	6.40	0.26	0.16	0.40									6.10	82.40
	Lake	15.6.94	11.40	1.62	0.35	7.92	0.34	1.47	13.33	0.11	<0.02	0.09	1.31	0.29	<0.2	<0.2	<0.02	7.16	104.00
Derrynabrock, Co. Mayo	Central Complex 35	14.7.94	0.63	0.78	0.54	9.32		<0.20	16.10	0.36	0.02	0.05	<0.5	0.22	<0.2	<0.2	<0.02	4.09	81.00
Cloonmoylan, Co. Galway	Flush Y	9.4.94	0.62	0.73	0.22	8.92		0.44	17.20	0.15	0.59	0.22	<0.5	<0.2	<0.2	<0.2	0.14	4.20	75.00
Brown Bog, Co. Longford	Flush Z	27.4.94	3.22	1.04	0.72	7.10		<0.5	11.00	0.16	<0.02	0.08	0.63	<0.2	<0.2	0.35		5.59	67.00
Carrowbehy, Co. Roscommon	Flush Z	23.3.94	0.33	0.61	0.45	6.85		<0.5	11.00	0.02	<0.02	<0.02	<0.5	<0.2	<0.2	<0.2		4.36	62.00
Trien, Co. Roscommon	Flush X	3.8.94	1.11	0.84	0.11	9.12		0.58	12.5	0.24	0.04	0.08	0.9	0.32	<0.2	<0.2	<0.02	4.44	64
	Flush W	3.8.94	5.65	1.39	0.27	5.92		2.64	8.3	0.33	0.05	0.36	8.88	0.32	<0.2	0.36	0.2	5.67	68
	Drain b2D	3.8.94	8.35	1.51	1.93	9.02		0.29	15	0.2	<0.02	<0.02	10.34	<0.2	<0.2	0.4	<0.02	5.82	108
Addergoole, Co. Galway	Betula wood	6.6.93	0.55	0.89	0.08	10.3							0.04			0.02		3.62	81.4
	Small lake	6.6.93	0.52	0.74	1.13	8.8							0.08			0.01		3.73	67.6

6. SITE SELECTION FOR CONSERVATION/RESTORATION AND DESIGNATION AS SITES OF COMMUNITY IMPORTANCE (POTENTIAL SPECIAL AREAS OF CONSERVATION).

The final aim of this project is the conservation and restoration of the sites which are considered to represent the range of raised bogs remaining in the country. In 1992 The European Community issued Council Directive 92/43/ECC on the conservation of natural habitats and of wild fauna and flora (more commonly known as The Habitat's Directive) which requires each member State to designate Sites of Community Importance (SCIs) or proposed Special Areas of Conservation (SACs) which contain the habitats listed in Annex I and species listed in Annex II. The aim is to form a coherent ecological network to help maintain biodiversity within the European community.

Where certain habitats are more threatened than others they are given priority status so that their protection and conservation are undertaken quickly.

This designation of sites is taking place under the general heading of NATURA 2000.

The habitats listed in Annex II of The Habitat's Directive which were encountered during this survey are as follows:

- 7110 Active raised bog (Priority).
- 7120 Degraded raised bog.
- 7210 Calcareous Fens with *Cladium mariscus* and *Carex davalliana* (Priority).
- 7230 Alkaline Fens.
- 91D0 Bog woodland (Priority).
- 4030 Dry heaths.
- 3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation.
- 6210 Grassland on calcareous substrates (Priority).
- 3180 Turloughs (Priority).

Habitats 7210, 7230, 4030 and 3150 are dealt with as part of the raised bog system and are therefore not assessed separately.

The sites assessed during this project were examined and selected for conservation/restoration and for designation as proposed SACs.

6.1 SITE SELECTION

6.1.1 Representativity

A number of criteria were considered to be of importance in the selection of sites.

VEGETATION

(a). Primary Central Complexes.
(b). Secondary Central Complexes.
(c). Flushes/Fens/Laggs.
(d). E/W and N/S indicator species.
(e). Presence of numerous open water pools on an eastern site.
(f). General site condition.
(g). Adjacent NHAs or NHA complex sites
(h). Re-examination of other raised bog sites

PHYSICAL SYSTEM

(a). Geomorphic Classification
(b). Climate

6.1.1.1 Vegetation

- (a) Primary (and (b) Secondary) central complexes.

The variation in different central vegetation types must be covered in order to ensure an adequate representativity of the wet central core of raised bogs. Primary central complexes are considered to be the most important as they represent the type of vegetation cover that one would expect to see covering a large portion of an undisturbed raised bog. Secondary central complexes are also of importance but have a lower priority as the bog will have gone through a period of drying out which will have probably resulted in the loss of invertebrate species (Key, 1989; Reynolds, 1990) and micro-flora elements that would be associated with primary central complexes.

The sites were divided according to the presence/absence of a central ecotope in the way shown in Table 6.1.

Table 6.1: Presence or Absence of Central Ecotope on the Sites Surveyed.

CENTRAL ECOTOPE PRESENT			
NO (10)	YES (35)		
	Primary & Secondary	*Primary only*	*Secondary only*
Addergoole	Lisnageeragh	Barroughter	Camderry
Clooncullaun	Cloonshanville	Carrownagappul	Shankill West
Ballykenny	Firville	Cloonmoylan	Brown Bog
Fisherstown	Curraghlehanagh	Cloonmoylan	Mongan
All Saint's	Carowbehy	Clonfinane	Redwood
Sharavogue		Corliskea	Ferbane
Blackcastle		Crosswood	Corbo
Callow		Derrinea	Cloonchambers
Moanveanlagh		Derrynabrock	Ballyduff
Killyconny		Flughany	Kilcarren
		Kilsallagh	Ballynafagh
		Lough Lurgeen	Knockacolier
		Monivea	Garriskil
		Moyclare	Clara
		Tawnaghbeg	
		Trien	
		Raheenmore	

The sites with a central ecotope present were then divided according to the central complexes that they contain (Table 6.2). This is divided into two types, primary, indicating that its presence is not due to human interference and secondary, which is due to human interference (as described in Section 4.2.2).

The following sites were selected on the basis of their primary central vegetation complexes. Sites were also selected on the basis of their secondary central complexes if no primary example of that complex was recorded. This added one site to the list.

Barroughter	Only occurrence of Complexes 4/6/10 and 4/6/15
Carrownagappul	Only occurrence of Complex 6/15
Cloonmoylan	Largest area of 4/15 and example of 15 with *S. pulchrum* (Larger area than on Crosswood).
Clonfinane	Best example of Complex 15 without *S. pulchrum*.
Raheenmore	Large area of 15, pools not as well developed as on Clonfinane.

TABLE 6.2 Central Vegetation Complexes Present on the Sites Surveyed During the Raised Bog Restoration Project, 1994.

PRIMARY CENTRAL COMPLEXES

COMPLEXES	4/6/10	4/6/15	6/15	4/15	15	6/3/35	6/35	35	35/3	4/6/35	35/6	6/10	6/10+P	10/15	6/14
Sites with only Primary central Complexes	Barroughter	Barroughter	Carrownagappul	Cloonmoylan	Cloonmoylan Clonfinane Crosswood Raheenmore Monivea	Corliskea	Derrinea Derrynabrock Kilsallagh Trien	Derrinea Derrynabrock Lough Lurgeen	Derrynabrock	Flughany	Tawnaghbeg	Kilsallagh	Kilsallagh	Moyclare	
Sites with Secondary Central Complexes also				Curraghlehanagh				Lisnageeragh Carrowna-gappul				Cloonshanville			Firville

SECONDARY CENTRAL COMPLEXES

COMPLEXES	15	14	10/15	10/9	6/35	4/15	35	9/7/35
Sites with only Secondary Central Complexes	Camderry Shankill West Brown Bog Mongan Cloonchambers Ballyduff Redwood Clara	Ferbane Corbo Clara	Ballyduff Ballynafagh Knockacoller Garriskil	Kilcarren	Garriskil		Garriskil	
Sites with Primary central Complexes also	Firville	Firville				Curraghlehanagh	Lisnageeragh	Cloonshanville

Corliskea	Only occurrence of 6/3/35
Derrinea	Most representative example of 6/35 and best example of 35.
Derrynabrock	Only occurrence of 35/3
Flughany	Only occurrence of 4/6/35
Tawnaghbeg	Only occurrence of 35/6
Kilsallagh	Only occurrence of 6/10+Pools and larger area of 6/10 than on Cloonshanville.
Moyclare	Only occurrence of 10/15
Firville/Kilcarren	Only occurrence of 6/14 and best example of secondary 14 and secondary 10/9.
Cloonshanville	Only occurrence of secondary 9/7/35.

- (e) Flushes

The areas of flushed vegetation which were described on the sites during the vegetation survey were divided into a number of different types. The sites in which they occur are listed. Sites were selected from these groupings on the basis of their representativity. If only one site had a particular feature it was automatically selected, otherwise the best example of the flush type (based on extent, species diversity etc.) was selected.

Some flush types were given lower priority than others, such as pine dominated flushes which are thought to be secondary features (O'Connell and Doyle, 1990), dry *Betula* flushes (which are also thought to be secondary), till mounds and subsidence features (bog bursts or small focussed flow areas).

The different flush types are listed below. Sites which were selected to represent that flush type are marked with an asterisk. The reason for selection of the particular example over another is also given.

Some flush types represent habitats listed in Annex I of the Council Directive 92/43/EEC. The listed habitats which are seen within the flush areas recorded on the raised bog sites are as follows:

- Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (3150).
- Bog Woodland (91D0) - Priority Habitat.
- Alkaline Fens (7230).
- Calcareous Fens with *Cladium mariscus* and *Carex davalliana* (7210) - Priority Habitat.

Annex I is indicated beside the feature which contains one or other of these habitats.

1.WATER BODIES

A. Lakes(Annex I)	Lough Lurgeen*	(Unique)
B. Ponds		
a. Infilling	Monivea	
or Infilled	Derrinea*	(Swallowhole)
	Carrowbehy	
	Addergoole*	(Species rich)
	Bellanagare*	(*Sphagnum pulchrum*)
	Clara*	(Ground water)
	Camderry (Drained)	
b. Open	Monivea	
	Addergoole*	(*Scirpus lacustris*)
	Derrinea	
	Corliskea/Trien	
	Carrowbehy*	(*Sphagnum recurvum* v. *mucro.*)
	Clara	

2. RIVERS/STREAMS

A. Internal	Lough Lurgeen*	(mesotrophic, EC 176-196)
	Corliskea/Trien*	(Ombrotrophic, EC 70)
B. External	Cloonmoylan*	(Wooded, *Salix* and *Betula*)
With Fen (Annex I)	Cloonchambers*	(Meso/ombro, EC 58-104)
	Lough Lurgeen*	(Minerotrophic, EC 563-588)

3. BETULA WOODLAND

A. Dry	Cloonmoylan	
	Firville/Kilcarren	Low Priority
	Corliskea/Trien	
B. Wet		
a. Typical (Annex I)	Trien/Corliskea*	(Species rich)
	All Saint's*	(Species rich, more woodland)
	Corliskea/Trien	
	Clara	
	Ballykenny/Fisherstown	(drained)
b. *Salix* and	Addergoole*	(Dilute regional water)
Schoenus (Annex I)	Cloonshanville*	(As above with more Fe)
c. *Salix*	Bellanagare*	(Local discharge)

4. PHRAGMITES

A. Typical	Flughany	
	Cloonshanville	
	Cloonchambers*	(Large area)
B. With *Schoenus*	Cloonshanville	
C. With *Molinia*		
a. *Molinia* dominant	Tawnaghbeg	
	Callow	
	Curraghlehanagh	
	Monivea	Low Priority
	Lisnageeragh	
	Carrownagappul	
	Bellanagare	
b. *Phragmites* dominant	Carrownagappul	
	Cloonchambers	Low Priority
	Lough Lurgeen	

5. MOLINIA

A. dry		
a. *Molinia* dominant	Shankill West	
	Cloonchambers	
	Camderry	
	Corliskea/Trien	
	Carrownagappul	
	Bellanagare*	(High species diversity)
b. With *Betula* scrub	Bellanagare	
	Lough Lurgeen*	(Most intact)
B. Moist	Lough Lurgeen	
	Corliskea/Trien*	(Most extensive)
	Kilsallagh	
	Moanveanlagh	

6. SWALLOWHOLES/CHANNELS

A. Typical		
a. extensive	Carrowbehy	
	Monivea	
	Lisnageeragh	
	Carrownagappul*	(wooded)
	Bellanagare*	(Extensive, not recent)
b. Medium	Carrownagappul	
	Tawnaghbeg	
	Clooncullaun	
	Redwood	
	Lough Lurgeen	
	Lisnageeragh	
	Kilcarren/Firville*	(Additional species)
c. Small scale	Moanveanlagh	
	Derrynabrock	
B. With *Frangula*	Cloonmoylan	
	Callow	
	Corliskea*	(Least human impact)
C. With other notables	Flughany	Low Priority
	Lisnageeragh	(Human Impact)
	Carrownagappul	

7. MARGINAL FENS/LAGGS

A. Bog and Ridge (Annex I)	Sharavogue*	(Extensive and species)
	Redwood	
	Carrowbehy*	(Rare species)
B. Bog, River & Lake (Annex I)	Addergoole*	(Extensive, with *Cladium*)
	Barroughter*	(Species rich, Fe)
C. Infiltration Lagg	Firville/Kilcarren*	(Unique)
D. Ombro Lagg	Clonfinane/Ballyduff*	(Unique)
E. Intact Lagg	Sheheree*	(Unique)
F. Discharge/recharge (Annex I)	Shankill West*	(Unique)

8. PINE — Low Priority

A. < 1ha	Ballyduff/Clonfinane
	Firville/Kilcarren
B. > 1ha	Clonfinane/Ballyduff
	All Saint's (Part of Main flush)
	Crosswood
	Cloonmoylan

9. TILL MOUNDS		Low Priority
A. *Calluna*	All Saint's	
	Derrinea	
	Carrowbehy	
	Cloonmoylan	
	Cloonchambers	
B. Wooded	Cloonchambers	
	Derrinea	
	Ballykenny/Fisherstown	
	Clonfinane/Ballyduff	
C. *Phragmites*	Cloonchambers	
	Corliskea/Trien	
	All Saint's	

10. SUBSIDENCE FEATURES		Low Priority
A. Bog Burst		
a. Wooded	Bellanagare	
	Curraghlehanagh	
b. Not wooded	Curraghlehanagh	
B. With Spring	Brown Bog	
	Trien/Corliskea	
	Addergoole	
C. Without Spring	Corbo	
	Trien	
	Moyclare	
	Garriskil	
	Corliskea/Trien	
	Kilcarren/Firville	
	Bellanagare	

- (d) E/W and N/S indicator species.

Raised bogs in Ireland have been divided in the past into Midland and Western sub-types. This division is based on the relationship between climate and phytosociology. In the midlands, *Andromeda polifolia* and *Vaccinium oxycoccus* are abundant, whereas moving westwards, with an increasing oceanic influence, indicator species of the western sub-type, *Pleurozia purpurea* and *Campylopus atrovirens* occur (Hammond, 1979).

Raised bogs may be separated from blanket bogs using the differential species, *Andromeda* and *Vaccinium oxycoccus* (White and Doyle, 1982). However *V. oxycoccus* can occur in flushes on blanket bogs (Doyle and Foss, 1986; Douglas et al., 1989). On the western raised bogs both *Andromeda* and *V. oxycoccus* occur but at much lower frequencies and in the case of Carrowbehy, Co. Roscommon the former was only recorded in a flush.

Pedicularis sylvatica is a differential species for Atlantic blanket bog (White and Doyle, 1982). Therefore its occurrence is also associated with an increased oceanic influence. Moore (1972) states that *Sphagnum magellanicum* is much rarer on the western low level blanket bogs, meaning that its frequency decreases westwards across Ireland.

M. Schouten (*pers. comm.*) from his work on Irish raised bogs says that *Racomitrium lanuginosum* is also an important western indicator species. This species is also said to have a northern distribution (Smith, 1993)

Cross (1990) states that the western sub-type is characterised by the presence of *Campylopus atrovirens*, *Pleurozia purpurea* and an abundance of *Carex panicea*. Doyle (1982) also suggests that *Carex panicea* occurs more frequently as one moves westwards across the country.

A survey carried out on raised bogs in Northern Ireland (Leech and Corbett, 1987) found that *Vaccinium oxycoccus* was scarce in the west of the region while *Andromeda* was found on only one site. *Pleurazia purpurea* was common on raised bogs in Tyrone but rare elsewhere. *Racamitrium* was found on a number of the sites, supporting the theory that is has a northern as well as western distribution.

In reality there is no clear division between the midland and western sub-types of raised bogs but rather a continuum east to west across the country with extremes at either end but with mixtures in between. However it is of importance to ensure that the full continuum is covered. The following were the species used.

Racomitrium lanuginosum (western and northern)
Pleurozia purpurea (western distribution).
Campylopus atrovirens (western distribution).
Pedicularis sylvatica (western, at high frequencies.)
Carex panicea (This species is absent from the more easterly bogs, occurs on the edges of the more midland sites and extends into the central areas of the western bogs).

Andromeda (used as the Midland raised bog indicator. However it is seen at low frequencies and in flushes at the more western sites.
Vaccinium oxycoccus (used as the Midland raised bog indicator).
S. magellanicum (used as the Midland raised bog indicator).

The presence or absence of these species was noted in the central vegetation complexes at each site. The results are shown in Table 6.3. The sites may be divided into a number of groupings.

- An eastern group with no western indicators present.
- An eastern group with only *Carex panicea* occurring in the central complexes.
- A NE group with no western indicators but with the N indicator *Racomitrium*.
- A group with eastern indicators and the western indicators *Racomitrium* and *Pleurozia*.
- A western group with eastern indicators at low frequencies.
- A SW group with no eastern indicators.
- A western group with all western indicators present.

One site, Monivea, Co. Galway had suffered damage and therefore could not be fitted into these divisions using E/W indicators..

The spread of sites already selected for the three previous criteria was checked to ensure that representatives had been chosen from each of the groupings. The only groupings not covered were the NE and the SW groups. Two sites were selected so that this variation would be represented. These were Garriskil, Co. Westmeath (NE group) and Moanveanlagh (SW group).

- (e) Presence of numerous open water pools on a midland or eastern site.

In general pools on eastern sites tend to *Sphagnum* filled as compared to more westerly sites where both *Sphagnum* filled pools and mud bottomed pools are common. There is some evidence, however, that in the past mud bottomed pools occurred on some of the largest midland bogs which have now all been cut-away. It has been shown that open water pools provide a different habitat for invertebrate species than *Sphagnum* pools and that the assemblages which occur are significantly distinct (M. Schouten, *p. s. comm.*). In addition there are some differences between species seen in both pool types when eastern sites are compared to western types.

Two eastern sites which were surveyed during this study had a significant number of open water pools. These were Mongan, Co. Offaly and Redwood, Co. Tipperary. In addition a north-easterly located site, Garriskil, Co. Westmeath also had a large number of open water pools. At all sites the origin of the pools is thought to be secondary as they appear to be tears that have developed due to stress on the bog surface. This was probably caused by the effects of peat cutting and water loss leading to subsidence. Although the pools are probably secondary it is thought that they provide an

TABLE 6.3 Spread of Plant Indicator Species in the Central Vegetation Complexes 1994.

SITE NAME	Pedicularis	C. atrovirens	Racomitrium	P. purpurea	C. paniceа	V. oxycoccus	Andromeda	S. magellanicum
Crosswood								
Knockacoller							*	*
Blackcastle								*
Ballynafagh							*	*
Killyconny						*	*	*
Firville						*	*	*
Sharavogue								*
Ballyduff								*
Mongan					low	*	*	*
Moyclare					*	*	*	*
Ferbane					low	*	*	*
Kilcarren					low	*	*	*
Brown Bog					*		*	*
Garriskil			*			*	*	*
Clonfinane			small	*		*	*	*
All Saint's Bog			*	*		*	*	*
Redwood			*	*	low		*	*
Cloonmoylan			*	*	low	*	*	* low
Barroughter			*	*	low	*	*	
Corbo			*					*
Fisherstown			*	*			*	*
Ballykenny				*	*		*	*
Cloonshanville			*	*	*	*	*	*
Derrinea		*	*		*	*		*
Bellanagare		*	*	*	*	*	*	*
Carrownagappul		*	*	*	*	*	*	*
Shankill West	*	*	*			*	*	*
Camderry		*	*		*	*	*	*
Lough Lurgeen			*	*	*		*	*
Lisnageeragh		*	*	*	*		*	*
Callow		*	*	*	*		*	
Cloonchambers			*		low	*		
Curraghlehanagh		*	*	*	*			*
Kilsallagh		*	*		low		*	
Clooncullaun			*	*	*		*	
Flughany		*	*	*	*	*		
Corliskea		*	*		*			
Trien		*	*	*	*			
Moanveanlagh	*	*						
Tawnaghbeg	*	*	*	*	*			*
Derrynabrock	*	*	*	*	*			*
Carrowbehy	*	*	*	*	*		*	
Addergoole	*	*	*	*		*	*	*
Monivea								*

important invertebrate and possible microfloral habitat that should be conserved. For this reason Mongan bog was added to the list of selected sites as it had the more widespread pools than Redwood. Garriskil was not selected for this feature as it is unknown if open water pools were present on north-easterly located sites in the past.

Other criteria were also considered when selecting the sites.

- (f) General site structure

Structure Index

As already described above in Section 4.2.2 the most important vegetation cover of the site is the primary central complexes. Also of importance are flush areas and any primary sub-central, primary sub-marginal or primary marginal ecotopes. The present extent of these complexes gives an indication of how much human influence the site has suffered.

To give an indication of the amount of interference all secondary complexes and the area of bog which has been cut-away is calculated (based on the 1840s maps).

A measure of the degree of conservation of structure of the site can be estimated using the following formula:

$$\frac{\text{All primary complexes (including flushes)}}{\text{Secondary sub-central, secondary sub-marginal, secondary marginal and area of cut-away.}} \times 100$$

The results of this analysis are shown in Table 6.4 where the sites are ranked according to their score.

Conservation of function Index

An index was developed to give some indication of whether the remaining high bog was still drying out/deteriorating or if it was re-wetting/stable or improving i.e. were trends favourable or unfavourable for conservation. This index on the high bog was based on the ratio of all Primary Vegetation Complexes (undisturbed raised bog), plus the Secondary Central complexes (which indicate that the bog is recovering following a drying episode), to all other Secondary Vegetation Complexes.

An evaluation of whether the site is still deteriorating of if it is re-wetting may therefore be made using the following formula:

$$\frac{\text{All Central (Primary and secondary) and all other Primary}}{\text{All secondary}} \times 100$$

Secondary central means that the site is probably re-wetting, that is if it is located in a subsidence area. The site has gone through a period of drying out and now due to subsidence of the peat water collects and re-wetting can occur.

Sub-central means that it is difficult to tell if the site is re-wetting or if it is still drying out.

Large areas of secondary marginal and secondary sub-marginal means the site is in decline.

The results of these analyses are shown in Table 6.5 where the sites are ranked according to their score.

The sites are divided into three groups depending on their score:

I Good structure or conservation of function.
II Medium structure or conservation of function.
III Poor structure or conservation of function.

The amount of active peat cutting was also considered in this assessment. These tables, as indicated in Section 6.4, were used for filling out the NATURA 2000 forms.

TABLE 6.4 **A Measure of the Structure/Intactness and Ranking of Sites visited during the Raised Bog Restoration Project, 1994.**

SITE NAME	Ha Primary Complexes	Flushes (Ha)	+ve Structure	SC (ha)	Sec SM	Sec M	C/away (ha)	-ve Structure	Structure Index	RANKING
Fisherstown	0	0	0	52.9	25.4	15.1	59.5	152.9	**0.00**	
Blackcastle	0	0	0	23.8	2	71.7	167.5	265	**0.00**	
Killyconny	0	0	0	38.2	7.1	39.7	145	230	**0.00**	
Ferbane	0	0	0	37	0	76.5	100	213.5	**0.00**	
Knockacoller	0	0	0	12.2	22.2	14.7	212	261.1	**0.00**	III
Ballynafagh	0	0	0	17.4	13.3	17.5	182	230.2	**0.00**	
Shankill West	0	0	0	5.4	30.2	24	43.5	103.1	**0.00**	
Mongan	0	0	0	1.2	0	74.1	184	259.3	**0.00**	
Sharavogue	0	0.11	0.11	23.1	59.6	52.6	149.5	284.8	**0.04**	
Corbo	0	1.99	1.99	18.7	0	88.7	290	397.4	**0.50**	
Garriskil	0	2.1	2.1	26.6	53	44.1	160	283.7	**0.74**	
Clooncullaun	0	3.8	3.8	7.6	53.6	64	108	233.2	**1.63**	
Ballyduff	0	1.9	1.9	4.2	44.5	31.7	33	113.4	**1.68**	
Ballykenny	0	5.8	5.8	113.3	9.5	53.4	88	264.2	**2.20**	
Camderry	0	7.9	7.9	3.5	19.5	144.1	162	329.1	**2.40**	
Brown Bog	0	2.2	2.2	7.6	18	14.5	45	85.1	**2.59**	
Callow	0	15	15	7.7	52.4	87.9	357	505	**2.97**	
Carrownagappul	4.1	15.1	19.2	85.9	51.6	163.3	316	616.8	**3.11**	
Redwood	0	8	8	14.6	41.7	90.4	105	251.7	**3.18**	
Moanveanlagh	0	12	12	5.9	64.2	47.9	203	321	**3.74**	
Firville	11.3	0.4	11.7	9.6	105.8	44.5	127	286.9	**4.08**	
Kilcarren	0	12.9	12.9	49	78.5	40.4	147	314.9	**4.10**	II
Addergoole	0	22.8	22.8	62.8	37.5	47.9	912	1060.2	**7.14**	
All Saint's Bog	0	29	29	105.7	15.2	38.1	242	401	**7.23**	
Cloonshanville	0.8	17.1	17.9	53.4	40.6	18.8	129.5	242.3	**7.39**	
Curraghlehanagh	11.3	10.3	21.6	10.5	22.2	99.2	151	282.9	**7.64**	
Kilsallagh	18.3	7	25.3	0.78	58.9	94.6	165	319.28	**7.90**	
Cloonchambers	14.1	24.5	38.6	1.6	85.3	57.5	327.5	471.9	**8.18**	
Clonfinane	11.6	1.9	13.5	11.3	65.2	15.9	71.5	163.9	**8.24**	
Moyclare	9.4	1.5	10.9	35.2	20.8	12.6	56.5	125.1	**8.71**	
Barroughter	17.1	0	17.1	9.4	20.9	44.1	110.5	184.9	**9.25**	
Derrynabrock	19.6	0	19.6	10.8	38.4	40.9	111	201.1	**9.75**	
Bellanagare	82.7	121.1	203.8	76.5	125.5	328.1	1574	2104.1	**9.69**	
Trien	2.4	16.7	19.1	8.2	39.7	59	86	192.9	**9.90**	
Lisnageeragh	22.6	19	41.6	8	61.2	168	160	397.2	**10.47**	
Flughany	8.2	4.8	13	5.4	40.5	3.1	68	117	**11.11**	
Carrowbehy	65.1	8.1	73.2	0	10.3	68.9	506.5	585.7	**12.50**	
Monivea	22.1	22.2	44.3	0	89.5	21.7	227	338.2	**13.10**	
Cloonmoylan	51	41.7	92.7	123	77.1	138.3	255	593.4	**15.62**	I
Crosswood	23.4	6.1	29.5	3.8	32.9	43.8	97	177.5	**16.62**	
Corliskea	51.7	35.5	87.2	18.8	44.1	78.7	357	498.6	**17.49**	
Tawnaghbeg	9.9	9.8	19.7	5.7	34.6	14.5	55.5	110.3	**17.86**	
Derrinea	28.4	1.3	29.7	3.3	7	19	36	65.3	**45.48**	
Lough Lurgeen	253	69.1	322.1	8.8	82.1	77	168	335.9	**95.90**	

TABLE 6.5 **A Measure of the Conservation of Function of Sites (Trends) visited during the Raised Bog Restoration Project, 1994.**

SITE NAME	Ha Primary Complexes	Sec C(ha)	Flushes (Ha)	+ve Function	-ve Function	Function Index	%APC	%Bog Left	Ranking
Fisherstown	0	0	0	0	93.4	**0.00**	9	63.8	
Blackcastle	0	0	0	0	97.5	**0.00**	9.7	37	
Killyconny	0	0	0	0	85	**0.00**	42	37	
Sharavogue	0	0	0.11	0.11	135.3	**0.08**	5	47.7	
Clooncullaun	0	0	3.8	3.8	125.2	**3.04**	24.5	54.7	
Ferbane	0	3.5	0	3.5	113.5	**3.08**	11.3	46	
Ballykenny	0	0	5.8	5.8	176.2	**3.29**	15.9	66.7	III
Carrownagappul	4.1	0	15.1	19.2	300.8	**6.38**	38.6	50	
Camderry	0	8	7.9	15.9	167.1	**9.52**	18.4	55	
Knockacoller	0	4.9	0	4.9	49.1	**9.98**	41	20	
Kilcarren	0	4	12.9	16.9	167.9	**10.07**	10.2	56	
Callow	0	0	15	15	148	**10.14**	42.6	31.3	
Moanveanlagh	0	0	12	12	118	**10.17**	42	39	
Ballynafagh	0	5.2	0	5.2	48.2	**10.79**	74	27	
Corbo	0	11.6	1.99	13.59	107.4	**12.65**	52	29.4	
Clonfinane	11.6	0	1.9	13.5	92.4	**14.61**	33.4	67.8	
Addergoole	0	0	22.8	22.8	148.2	**15.38**	53.6	15.8	
Shankill West	0	9.4	0	9.4	59.6	**15.77**	25	62	
Moyclare	9.4	0	1.5	10.9	68.6	**15.88**	31	58.4	
Kilsallagh	18.3	0	7	25.3	154.28	**16.40**	29	53.4	
Cloonshanville	0.8	0.6	17.1	18.5	112.8	**16.40**	10	46	
Curraghlehanagh	11.3	1.5	10.3	23.1	131.9	**17.51**	36.6	51	II
Firville	11.3	16.4	0.4	28.1	159.9	**17.57**	0	60	
Trien	2.4	0	16.7	19.1	106.9	**17.87**	51	59.4	
All Saint's Bog	0	0	29	29	159	**18.24**	36	49.2	
Ballyduff	0	12.8	1.9	14.7	80.4	**18.28**	30	74	
Lisnageeragh	22.6	4.2	19	45.8	237.2	**19.31**	51.3	63.9	
Derrynabrock	19.6	0	0	19.6	90.1	**21.75**	49.8	49	
Barroughter	17.1	0	0	17.1	74.4	**22.98**	82	45.3	
Redwood	0	26.8	8	34.8	146.7	**23.72**	23.9	67.9	
Flughany	8.2	0	4.8	13	49	**26.53**	26	48	
Brown Bog	0	8.7	2.2	10.9	40.1	**27.18**	2	53	
Cloonmoylan	51	0	41.7	92.7	338.4	**27.39**	76	62	
Cloonchambers	14.1	1.6	24.5	40.2	144.4	**27.84**	26	37	
Tawnaghbeg	9.9	0	9.8	19.7	54.8	**35.95**	19.2	58	
Garriskil	0	43.2	2.1	45.3	123.7	**36.62**	0	51	
Crosswood	23.4	0	6.1	29.5	80.5	**36.65**	46	53	I
Bellanagare	82.7	0	121.1	203.8	530.1	**38.44**	25.4	32	
Monivea	22.1	0	22.2	44.3	111.2	**39.84**	71	47.3	
Corliskea	51.7	0	35.5	87.2	141.6	**61.58**	48.2	39.6	
Mongan	0	49.7	0	49.7	75.3	**66.00**	4.8	40.5	
Carrowbehy	65.1	1.5	8.1	74.7	79.2	**94.32**	24.7	27.2	
Derrinea	28.4	0	1.3	29.7	29.3	**101.37**	16	62	
Lough Lurgeen	253	0	69.1	322.1	167.9	**191.84**	11	74.5	

- (g) Adjacent proposed NHAs or NHA complex sites

A number of sites which were visited during this survey directly adjoin other NHA areas or form part of a complex of sites. From a nature conservation point of view sites which closely adjoin others can act as support systems. For example a fen site could be a seed source for lagg areas at the margins of a bog. Using the recently produced proposed NHA maps, each site was examined to see if it was part of a larger system or close to other proposed NHA sites. Adjoining means that a site directly joins another. Close to implies that the site is less than 1km away.

- *Mayo*

  Derrynabrock (457) adjoins Kilgarriff Bog (510) and Gowlaun Bog (502).
  Flughany (497), close to Cloonakillina Lough (1899).
  Tawnaghbeg (547), close to Derrynabrock Bog (457), Gowlaun Bog (502) and Kilgarriff Bog (510).

- Longford

  Brown Bog (442), close to Lough Forbes complex (1818).
  Lough Forbes Complex (1818) includes Fisherstown Bog, Ballykenny Bog, Lough Forbes and is adjoined to the Rin River (691), Clooneen Bog (445), Lough Boderg and L. Bofin (1642) and Kilglass and Grange Loughs (608).

- Westmeath

  Garriskil (679), close to Lough Derryvaragh (684) and Lough Garr (1812).

- Kildare

  Ballynafagh Bog (391), close to Ballynafagh Lake (1387).

- Tipperary

  Ballyduff/Clonfinane, Co. Tipperary (641) adjoined also to Killeen Bog (648).
  Kilcarren/Firville, Co. Tipperary (647), close to Arragh More Bog (640).
  Redwood, Co. Tipperary (654), part of Little Brosna Callows (564), River Shannon Callows (216) and Ballymaceagan Bog (642).

- Roscommon

  Carrowbehy, original bog extends as far S as Lough O'Flynn (1645), close to Drumalough (1632) and Errit Lough (607).
  Cloonchambers (600), Close to Drumalough (1632).
  Corbo (602), Close to Lisnanarriagh Bog (2072).
  Corliskea, (part in Galway) (219), adjoins Cloonfelliv Bog (217), Moorfield/Farm Cottage Bog (221) and Trien Bog (616).
  Cloonshanville (614), adjoins Ardagh Bog (1222) and is close to Bella Bridge Bog (591).
  Trien Bog (616), adjoins Cloonfelliv Bog (217), Moorfield/Farm Cottage Bog (221) and Corliskea (219).
  Lough Gara Complex (587) includes Callow Bog and is close to Tullaghanrock Bog (2013).

- Offaly

  All Saint's Bog (566), includes esker, adjoins Little Brosna Callows (564), Cloghan Demesne Bog and Wood (1613), River Shannon Callows (216) and is close to Cloghan Beg (2059).
  Mongan (580), adjoins Pilgrim's Road Esker (1776) and River Shannon Callows (216) and is close to Clonfinlough Esker (892) and Fin Lough (576).

- Galway

  Barroughter (231), adjoins Lough Derg (11) and is close to Cloonmoylan Bog (248).
  Camderry (240), adjoins Leaha Bog (292), Clooncullaun Bog (245) and Funshin Bog (267).
  Carrownagappul (1242), close to Curraghlehanagh (256).
  Clooncullaun (245) adjoins Leaha Bog (292), Camderry (240) and Funshin Bog (267).
  Cloonmoylan (248), close to Lough Derg (11), Barroughter (231) and Rosturra Wood (1313).

Curraghlehanagh (256), close to Carrownagappul (1242).
Lisnageeragh (296), close to Lough Lurgeen (301) and Keeloges Bog (281).
Lough Corrib Complex (297), includes Addergoole.
Lough Lurgeen/Glennamaddy Turlough Complex (301), close to Lisnageeragh Bog (296) and Kiltullagh Lough (1282).
Monivea (311), close to Tiaquin Bog (1709).

- (h) Re-Examination of other raised bog sites

As the list of sites visited during this survey were a selection of a much larger number of sites initially examined during the Raised Bog Survey (1983-87) it was decided at this stage that a number of sites would be re-examined in order that no diversity of habitat or features of special interest were omitted from the designation of SAC sites.

Stage 1. Of the original 141 sites, 44 of the sites in better condition were selected for detailed survey work as part of the RBRP (Raised Bog Restoration Project - as already outlined). Two other sites, surveyed in detail under another project (Irish/Dntch), but also from the original list of 141 sites, were considered as potential SACs - Clara and Raheenmore Bogs in Co. Offaly.

Stage 2. Of the remaining 95 sites from the original list of 141 it was decided not to examine the very small Grade Biii sites or sites which had been lost to development. This left a remaining 43 sites from the original list of 141 still needing examination as potential SACs.

Stage 3. Nine new sites not listed by Cross were added to this list of 43 giving a total of 52 (incl. Sheheree). These sites were put through a selection process. This selection process, involving the 52 sites, required looking at aerial photographs, reading NHA and other field notes and comparing sites in a given locality with each other and also with bogs from the RBRP which were in the area. Bogs in good condition were selected as were bogs with unusual features or in areas not represented by a RBRP site. This group of 52 sites was reduced to the best 23 (incl. Sheheree) which were examined in more detail as possible potential SACs. Information on the better 22 sites (but excluding Sheheree as it was visited and surveyed in detail) is given in Table 6.6. Reasons why some of the remainder of the 52 sites were not selected (24) is given below. The 5 remaining sites which are not documented here were in very poor condition.

Stage 4. From the list of possible potential SACs (24 incl. Sheheree), only Sheheree was selected. It was also decided to include Cloonfelliv Bog in Co. Galway/Roscommon as part of an SAC already selected through the RBRP. These sites were selected after discussion with J. Ryan, C. Douglas and D. Norris of NPWS.

Reasons for not selecting some Raised Bog sites at Stage 3 of the selection process

- **Co. Galway**

Site and No.	*Ardraigue* NHA
Area and Status (Cross 1990)	<100ha Category A
Surveyed	1984 (Douglas and Grogan) not NHA surveyed.
Location	NW of All Saint's Bog and W of the River Shannon.
Verdict	**No**

Large deep drains inserted in 1984. Active peat cutting is approx. 80%. *S. pulchrum* present in 1984. Keep as an NHA

Site and No.	*Moorfield* NHA 1303
Area and Status (Cross 1990)	87ha Category Bi
Surveyed	1984 (Douglas and Mooney) and NHA surveyed 93/94.
Location	W of Eyrecourt in E Galway.
Verdict	**No**

TABLE 6.6 **Information on some sites not visited as part of the Raised Bog Restoration Project but nonetheless considered for SAC selection.**

Site	Status + No	Ha	Data	Location	%Left	APC	Intact	Pools	Tear Pools	Lawns	Quaky
Galway											
Kilmore	Bi, 283 (7)	90	'85+94	mid E Galway Group		extensive Hopper	none		*R. fusca*		20ha
Kilnaborris	Bi, 284 (2)	117	'84+94	Near Moyclare	60	3.5 sides	None	none	burst		
Raford River	Bii, 321 (12)	194	'84+94	SE of Monivea	< 50	to N	None				Soak to W
Lough Tee	Bii, 307 (11)	329	'84+94	NE Monivea		to N + NW	None	20ha, R. fusca			
Cloonfelliv	Bi, 217 (9)	55	'84	near Trien + Corliskea	70	Small bit	W+NW+river		internal burst		
Roscommon											
Derrycanan	Bii, 605 (28)	253	'84+94	WSW of Corbo	<40	90%	none	none	in 3 areas	none	
Drumalough X 3	Biii, 1632	100	91+94	Near Cloonchambers+Carrowbehy	<40	some to S	small amt N	steep+ Sph filled		*S.pap/Narth*	parts
Ballynamona	Bii, 590	< 100	'84+94	8 kms W of Athlone	10-20	all but NW	none	in flush	to SE,N, NW	in flush + N	to N+flush
Tullaghanrock	new 2013	<100	'87+94	NW Callow, E Derrinea	85	SW	to S along river+N	< 5% 1987		Soft/wet C	none
Leitrim											
Cashel	Biii, 1405	55	'86+94	S Mohill	20-70	a little S+W	none	a little in C	to E		to E
Westmeath											
Ballynagrenia	Bii, 674 (35)	128	'86+94	N Clara + Horseleap	50	little W, SW, NE	to S at esker	with S. auric to N	to E		
Woodown	Bii, 694 (34)	140	'86+94	E Mullingar	40-50	v. little		+/- 0			
Carn Park	Bii, 676 (33)	208	'86+94	NE Crosswood	<50	35% Hopper at N+W	None	Hummock/Hollow		to W+C	
Offaly											
Cloghan Demesne	Bi, 1613	50	'87+94	NNE Redwood, SW All Saints	<25	all around	none	H/H algal		none	v. small
Tipperary											
Monaincha	Bii, (32)	40-60	'83	SW of Knockacoller	<25	little to NE	part of S at esker	H/H in '83. Flow N			none
Ballymacegan	Bii, 642 (38)	80	'83	NW of Redwood	<50	little to S	parts to N		burnt to S		none
Scohaboy	Bi, (31) 937	240	'82	S Redwood, Firville, C'finane	40-50	some to S+E	none	H/H+P		2 areas	none
Nore valley/Timony	1853	<150	mid 70s	S Roscrea, SW Knockacoller	35	30% incl Hopper to E	to SE near river	not visible on AP			none
Laoise											
Coolrain	Bii, 415	40-50	'83+94	Near W Knockacoller	<30	70%, Hopper SW+SE	none	few to S	Centre		none
Kildare											
Ballina	Bii, 39 (17)	140	'83	Near Ballynafagh	<20	to SW	none				
Mouds	Bii, 395 (16)	540	'82	Near Ballynafagh							

APC = active peat cutting, HH = Hummock Hollow, Mo = Molinia, My = Myrica, Rac = Racomitrium, Ph = Phragmites, Sph = Sphagnum.

TABLE 6.6 cont. **Information on some sites not visited as part of the Raised Bog Restoration Project but nonetheless considered for SAC selection.**

Site	Species	Dry	Flush	Associated Habitats	Developments Since 80s
Galway					
Kilmore	*Drosera intermedia, Potamogeton polygonifolius*	Parts and fire damage	Collapsed or Spring, Fraxinus		lot of recent APC
			Potg.,Eq.fluv,Tpha (10%)		
Kilnaborris	*R. fusca, S. imbricatum, Hyperzia*	trees	poor Betula Flush	none	No significant damage but drying
	high Sph				
Raford River	*Drosera intermedia*		Swallow holes	mineral ridges, Callows, Rivers,	severe PC to N , some at S
				fen, wooded mounds	
Lough Tee		Little Sph outside C. For. ENE	none	Improved Esker + drained lakes	seems drier, seeded esker
Cloonfelliv	S. imbricatum, High Sph		Phrag + Myr to S	adj bogs+rivers	Stable
Roscommon					
Derrycanan	High Sph: S.fuscum, S.imbricatum,S.auriculatum	some burning. roads = 3 parts	Mo+Ph to W, Mo to NE		seems drier, lot of burning
Drumalough X 3	*Carex limosa, S.imbricatum, S.fuscum*	2 blocks forestry	*My/Mo*	Drained lake to E + marsh	
	Cladonia rangiferina			Wet+dry calc grassland	
Ballynamona	*S.magellanicum, R.fusca, Carex limosa*	forestry E+burning	12ha wet Betula and a	Turlough/lake WNW, wet/	seems little change
	High Sph		treeless flush	dry calc grass incl Parnassia	
				+ rocky outcrops	
Tullaghanrock	S. imb + high Sph ('87)	lot of Campylopus	*My/Mo*	Lung River+Wet grass	
Leitrim					
Cashel	*S. fuscum*	burnt to SW	none	none	has not degraded much
Westmeath					
Ballynagrenia	*S.auriculatum, S.fuscum, S.imbricatum, Rac*	lot of burning	none	esker to S,	subsidence + burning/drying
Woodown	S.recurv v tenue in flush	narrow and drying	Betula med wet		Significant new drains + forestry
Carn Park	*S. pulchrum, S.imbricatum, S. fuscum*	trees + Rhododendron to E	none	adj ridge with forestry	forestry to Sx2
Offaly					
Cloghan Demesne	*R.fusca, S.imbricatum, S.fuscum*		small enriched area	Little Brosna Callows	seems drying, extensive APC
Tipperary					
Monaincha		lake < 70s AP. Deep drain to SE		Esker, lakes, Golf Club	lakes reduced + v tall trees at its S edge
Ballymacegan	*C. limosa*	Drained + drying to S	Betula in sunken area	Callows	Drained
Scohaboy	*R.fusca, S.imbricatum, S.fuscum*	Burnt + Drained to NE			Drained + drying to E + NE
	High Sph in R. alba lawns				
Nore valley/Timony	*Rhamnus*	Drained S of river	Betula flush (Wet)	2 rivers, 1 dredged	
Laoise					
Coolrain	*S.imbricatum, S.fuscum, R.fusca, Racomitrium*	New forestry in cut-away NE	Bet, Pine, Mo+My	deciduous wood to W	Bog seems v.dry. Significant no. trees at S.
Kildare					
Ballina		Drains to SW + new at E			Ext long drains to SW, trees at SE
Mouds	*Sarracenia*	0.33 drained at W			Drained

TABLE 6.6 cont.

Site	Comment
Galway	
Kilmore	Close to L. Lurgeen , Species list is same. Grouse also
Kilnaborris	Moyclare has all. Both BnM. Grouse here.
Raford River	Many adj habs. Geomorph? GWF
Lough Tee	Large site, drained, drying, GWF on lakes
Cloonfelliv	Small bog, G veg, biological div supported by being near Trien+Corliskea
Roscommon	
Derrycanan	lot APC, like Corbo with S fuscum. Grouse
Drumalough X 3	As good as Cl'felliv + high Species diversity. No more extra than
	Carrownehy and Cloonchambers
Ballynamona	Flush similar to All Saints+Corliskea. This bog may be difficult to
	restore. Many assoc habitats. Interesting and isolated bog
Tullaghanrock	grades easily to river unlike Derrinea and has large intact area GWF
Leitrim	
Cashel	Has no more than Longford Bogs
Westmeath	
Ballynagrenia	W species at E as in Garriskil. B'derry to SE. No RBRP site near here
Woodown	pools seem degraded. Wetter than B'lackcastle. No RBRP in the area
Carn Park	near Crosswood + similar but rounded. Lot Hopper
Offaly	
Cloghan Demesne	Near Redwood and is part of All Saints complex - nothing extra. GWF
Tipperary	
Monaincha	Bog v. dry. Trees from SW. Different to Knockacoller
Ballymacegan	Seems to be drying. No more than at Redwood.
Scohaboy	No more than at Clonfinane, Sharavogue, Firville
	but better Sph cover than Sharavogue
Nore valley/Timony	Some old AFF notes only
Laoise	
Coolrain	Seems to be drying out. Racomitrium here + not at Knockacoller
Kildare	
Ballina	Sounds dryer than Ballynafagh, trees encroaching
Mouds	Large site. Lot APC especially to W

This is a small site with a flush where both *Cladium* and *S. pulchrum* are found. The site was drained by the time of the NHA survey and there was some burning. Pools in the central area are drying out. There is still a small wet central area (10%). There is some active peat cutting along the E and W. The NHA team have ranked this site as locally important.

Site and No.	*Ballygar*	NHA 229
Area and Status (Cross 90)	122ha	Category Bii
Surveyed	1984 (Donglas and Mooney.)	
Location	NNE Monnt Bellew in E Galway near Camderry, Clooncullaun and Carrownagappul. The latter has been chosen as a proposed SAC.	
Verdict	**No**	

The bog seems to be drying out and there are Pines encroaching. There is forestry on the high bog. This bog has no features which are not already represented in the group of proposed SACs from this area. Kilmore Bog slightly further W seems in better condition (Table **X**).

Site and No.	*Crit Island West*	NHA 254
Area and Status (Cross 90)	102ha	Category Bii
Surveyed	1984 (Douglas and Mooney).	
Verdict	**No**	

Burnt and seems badly damaged by drains

Site and No.	*Meneen*	NHA 310
Area and Status (Cross 90)	126	Category Bii
Surveyed	1984 (Douglas and Mooney)	
Location	Close to Redwood and All Saint's Bogs (both proposed SACs) but W of the Shannon.	
Verdict	**No**	

There is extensive active peat cutting (90%) and some large drains. The NHA team have assigned it Regional Status. There is nothing extra on this site in comparison to others selected in the area. Kilnaborris to the NW seems in better condition (Table **X**).

Site and No.	*Bracklagh*	NHA 235
Area and Status (Cross 90)	60ha	Category Bi
Surveyed	1984 (Douglas and Mooney) and not surveyed by NHA team.	
Location	S of the Trien/Corliskea/Cloonfelliv Group and N of Lisnageeragh both of which form proposed SACs.	
Verdict	**No**	

This is a very small bog and it seems that a lot has been cut-away.

Site and No.	*Lough Namucka*	NHA
Area and Status (Cross 90)	180ha	Category Bi
Surveyed	1984 (Douglas and Mooney) and not surveyed by NHA team	
Location	S of the Trien/Corliskea/Cloonfelliv Group which form a proposed SAC.	
Verdict	**No**	

There seem to be extensive development especially in the centre and south of the site since the 70s AP and this includes drains/tracks and active peat cutting. There appears to be an interesting lobe to the NW though there is an old drain on it. This bog has no extra features in comparison to the group already selected from this area.

Site and No.	*Cloonmore*	NHA 247
Area and Status (Cross 90)	270ha	Bii
Surveyed	1985 (Douglas and Grogan) and NHA surveyed 93/94	
Location	West of the E. Galway Group and SW of Lisnageeragh (SAC)	
Verdict	**No**	

According to the NHA team drainage affects 60% of the site and there is extensive mechanical peat cutting around 60% of the site. *S. pulchrum* and Grouse were seen during the two surveys. There is

some intact bog along the river edge. The site was not chosen as there are many drains and the bog seems to be drying out. It is close to the E Galway group of bogs with which it has similar characteristics although it also supports *S. pulchrum*. Some of the E. Galway sites have been selected as proposed SACs.

Site and No.	*Funshin*	NHA 267
Area and Status (Cross 90)	130ha	Category Bii
Surveyed	1985 (Douglas and Grogan)	
Location	to the immediate NE of the E Galway Group of bogs and closest to Clooncullaun and Lough Lurgeen.	
Verdict	**No**	

Dry and hard underfoot. The bog does not seem to have features not already present in the proposed SACs from the area.

Site and No.	*Keeloges*	NHA 281
Area and Status (Cross 90)	184ha	Category Bii
Surveyed	1985 (Douglas and Grogan) and surveyed by the NHA team 93/94.	
Location	to the immediate NE of the E Galway Group of bogs and closest to Camderry, Clooncullaun and Lough Lurgeen.	
Verdict	**No**	

The small central quaking area has been drained and the remainder of the bog seems to be drying out. There is a long track/drain through the site. The bog does not seem to have features not already present in the selected proposed SACs from the area. There is forestry to the NW of the site.

- **Co. Mayo**

Site and No.	*Gowlaun*	NHA 502
Area and Status (Cross 90)	154ha	Category Bii
Surveyed	1986 (Douglas and Grogan)	
Location	V. close to the N of Derrynabrock in E Mayo - already proposed SAC.	
Verdict	**No**	

A river to the N of Derrynabrock separates it from Gowlaun. The site description indicates that the site is in poor condition. There is much drainage and turbary and some wet localised areas. It appears that the features of the site are represented in the three N Mayo proposed SACs nearby.

- **Co. Roscommon**

Site and No.	*Bella Bridge*	NHA 591
Area and Status (Cross 90)	166ha	Category Bii
Surveyed	1984 (Douglas and Mooney)	
Location	To the N of Bellanagare	
Verdict	**No**	

This site is not of good quality and is badly damaged by drainage and turbary.

- **Co. Sligo**

Site and No.	*Cloongoonagh*	NHA
Area and Status (Cross 90)	112ha	Category Biii
Surveyed	1986 (Douglas and Mooney) and surveyed by the NHA team 93/94.	
Location	E Sligo very close to the three N Mayo sites (Flughany, Derrynabrock and Tawnaghbeg) which have been selected as proposed SACs.	
Verdict	No	

There is much peat cutting to the W and S and there seems to be severe drying out. The pool/hummock complex is drained. The site would be expensive to restore. There is a river to the N.

- Co. Leitrim

Site and No.	*Aghmamona*	NHA
Area and Status (Cross 90)	275ha	Category Bii
Surveyed	1986 (Douglas and Grogan) and not NHA surveyed	
Location	N of Ballykenny/Fisherstown Bog Complex selected an SAC and E of the Shannon.	
Verdict	**No**	

There is a large track/drain to the W of the site and from the AP new drains have been inserted along the N. The site was dry and burnt in 1986 and the new drains will have made it drier. The flush does not support any unusual species or features. The actual size of the bog is more like 175ha.

Site and No.	*Corracrump*	NHA 1420
Area and Status (Cross 90)	120ha	Category Biii
Surveyed	1986 (Douglas and Grogan) and surveyed by the NHA survey team 93/94	
Location	S of Mohill, E of the Shannon and N of the Longford Bogs which are SACs.	
Verdict	**No**	

The recent AP indicates many drains though these were present in the 70s. There is a lot of peat cutting but also some intact margins. Both reports indicate that the bog has been burnt. Overall the bog is dry and has no features which are not represented in the proposed Longford SACs.

- Co. Longford

Site and No.	*Derrymore*	NHA
Area and Status (Cross 90)	107ha	Category Bii
Surveyed	82/86 (FWS/Douglas and Grogan)	
Location	S of Longford town and Brown Bog	
Verdict	**No**	

This was a small bog and it seems smaller now. There is active peat cutting along the W with forestry to the E. There are also many drains. *S. fimbriatum* was recorded in 1986.

Site and No.	*Clooneen*	NHA 445
Area and Status (Cross 90)	110ha	Category Bii
Surveyed	1986 (Douglas and Grogan.)	
Location	The site is N of Ballykenny/Fisherstown Complex - chosen as an SAC.	
Verdict	**No**	

This is a long and narrow site and the description in 1986 indicates it was not in good condition. There is an interesting *Betula* wood present at the site. Features of the site are represented at adjacent proposed SACs.

Site and No.	*Cloonageeher*	NHA
Area and Status (Cross 90)	157ha	Category Biii
Surveyed	1986 (Douglas and Grogan)	
Location	To the NNE of Ballykenny/Fisherstown Complex and SAC.	
Verdict	**No**	

There is much active peat cutting to the SW and S with a road and drain to the NW. There are extensive drains into the centre of the bog. There is a small wet area in the centre of the bog associated with subsidence. Features of the bog are represented by proposed SACs.

- Co. Westmeath

Site and No.	*Cloncrow*	NHA 677
Area and Status (Cross 90)	124ha	Category Bii
Surveyed	83+86 (FWS/Douglas and Grogan) and by the NHA survey team 93/94.	
Location	NNW of Raheenmore.	
Verdict	**No**	

The site was dry according to the earlier reports and at present there is moss peat production or afforestation to the west of the site. There is a small wet area and a flush with *S. pulchrum* and *S. fimbriatum* (Douglas and Grogan, 1986). The site appears to be drying out considerably and there is much afforestation on and around it. If *S. pulchrum* and *S. fimbriatum* are still present and in good populations at the site then this is the most easterly location for them and it may be important to designate this site as an SAC.

- Co. Offaly

Site and No.	*Clonlyon*	NHA 893
Area and Status (Cross 90)	<100ha	Category Bii
Surveyed	1983 (O'Connell and Mooney).	
Location	Between Mongan, Moyclare and Ferbane all of which are proposed SACs.	
Verdict	**No**	

This is now a small area and 66% approx has been drained by Bord na Mona. *Calluna* dominates much of the site due to drying. there are no features at this site which are not represented at the proposed SAC sites.

Site and No.	*Clonydonnin*	NHA 563
Area and Status (Cross 90)	100ha	Category Bii
Surveyed	1986 (Douglas and Mooney)	
Location	close to the N of Mongan, Moyclare and Ferbane two of which are proposed SACs.	
Verdict	**No**	

The description of the bog suggests it is not iu good condition and that there is severe drying out. 60% of it is drained. There are no indications of features present at this bog which are not present in the sites nearby selected as proposed SACs.

Site and No.	*Woodfield*	NHA 586
Area and Status (Cross 90)	150ha	Category Bi
Surveyed	1982 (FWS)	
Location	to the immediate N of Clara which is a proposed SAC.	
Verdict	**No**	

There are some rare species at this bog but they may have been introduced. *Lycopodiella inundatum* - a Red Data Book species may have been planted. There was a bog burst at this site in 1820 and today there are many new drains to the E. There is a lot of active peat cutting around the site and along a road through the site.

- Co. Tipperary

Site and No.	*Arragh more*	NHA 640
Area and Status (Cross 90)	280ha	Category Bi
Surveyed	1983 (O'Connell and Mooney)	
Location	To the immediate E of Firville/Kilcarren Complex a proposed SAC.	
Verdict	**No**	

The description of the bog indicates that it is in good condition. However pig slurry has been pumped to the N of the high bog. Interesting ecological features of the bog are represented in the proposed SAC next to it.

Site and No.	*Killeen*	NHA
Area and Status (Cross 90)	141ha	Category Bii
Surveyed	1983 (O'Connell and Mooney)	
Location	To the ENE of Ballyduff/Clonfinane SAC	
Verdict	No	

This is a small dry bog with much active peat cutting.

6.1.1.2 Physical System

Geomorphic Classification
Both the recent EU FAEWE project (in press) and Brinson (1993) have adopted a hydrogeomorphic concept to the classification of wetlands.

Brinson (*op. cit.*) presents four hydrogeomorphic categories: depressional, extensive peatland, riverine wetland, and fringe wetland. Each hydrogeomorphic category has 3 components:

- Geomorphic setting
- Water source and its transport
- Hydrodynamics

Geomorphic setting is the topographic location of the wetland in respect to the surrounding landscape. Water sources are simplified into three classes: precipitation, surface or near surface flow, and groundwater discharge. Hydrodynamics refers to the direction of flow and strength of water movement within the wetland. Brinson notes that there is considerable interdependency between the three components.

Brinson's hydrogeomorphic method of wetland classification works well at the broader scale since it includes the three mire types of Rheopilous, Transition, and Tertiary (Ombrophilous). This level of the classification views bogs as macro-features within the landscape. However, this level is too broad when attempting to classify the 47 bogs of this study. All of the bogs in this study are tertiary mires and ombrotrophic, and so they fall into only one hydrogeomorphic category, namely extensive peatlands. It was decided therefore to use the smaller scale geomorphic setting and water source concepts when classifying the bogs in this study to ensure that the full range of physical variation was identified.

Extensive Peatlands cover large areas of land such that the peat substrate dominates the movement and storage of water and the mineral nutrition of the plants (Moore and Bellamy 1974). Raised bogs and intermediate raised bogs are examples of this type. Hydrological connections of these bogs may occur through surface flow paths and sub-surface pathways to peatlands lower in the landscape or drainage basin (Ingram 1967). Hence, there is a gradient from the truly headwater ombrotrophic wetlands with diffuse outlets to ones further downstream with distinct inlets and outlets with fen-like characteristics (Siegel and Glaser 1987). Following the year's fieldwork and an intensive aerial photographic study of each of the bogs it was determined that five geomorphic settings categorise the bogs. These are:

BROAD FLOODPLAIN

RIDGE RIVER — Ridge River A
Ridge River B
Ridge River C

BASIN

RIDGE BASIN

BLANKET

Broad Floodplain. This type of bog occurs in a wide low gradient floodplain where the underlying subsoils are dominantly low permeability clays. These bogs lie in a regional groundwater discharge area (Figure 6.1a) but the groundwater is likely to be confined by the clays. Peat may have formed in depressions within the floodplain and increased in size with radiating paludification, forming a domed shape on an otherwise flat floodplain. These bogs are susceptible to periodic flooding particularly around their edges where callows may form but the domes are too high to be totally immersed in water. At Addergoole, regional groundwater upwells to the north side where there is apparently a lack of a confining clay layer. In contrast the Ballykenny and Fisherstown bogs may be quite separate from the aquifer below since thick confining clays underlie the bogs and callows. Deeper regional groundwater is likely to flow under the floodplain via a confined aquifer and exfiltrate directly to the River Shannon which has cut deep into the clay (Hooyer, in press).

Ridge River. Ridge River bogs are low to middle gradient landforms that lie at the bottom of a ridge/slope and adjacent to a river/lake. Groundwater discharge from the nearby slopes/ridge forms lags (fens) or the potential for lag zones. There are three distinct types within the ridge river geomorphic setting as illustrated in Figure 6.1b.

Ridge River A. The ridges adjacent to the bog consist of high permeability material in which where there is a relatively deep water-table. The hydraulic gradient from ridge to river is shallow. If the ridges are eskers the water-table is liable to change where there has been drainage or gravel extraction below the regional groundwater-table.

Ridge River B. The ridges adjacent to the bog consist of low/moderate permeability rock causing the ridge to have a higher water-table than in A, above. The hydraulic gradient from ridge to river would be steeper and would probably be less affected by regional drainage. There tends to be stronger upwelling of groundwater along the break in slope at the base of the ridge.

Ridge River C. This bog is intermediate between the Ridge River A and Broad Floodplain types and is more likely to be located in a regional groundwater discharge zone. The ridges adjacent to the bog are of a lower relief than in A but higher than in the Broad Floodplain type. The Ridge River C bog has a floodplain element but it is not as marked as in the Broad Floodplain type and the adjacent ridges are likely to be part of a larger area of high ground. Groundwater discharging at the break in slope could have its origins in a much larger area and hence have longer residence times and higher ECs than types A or B.

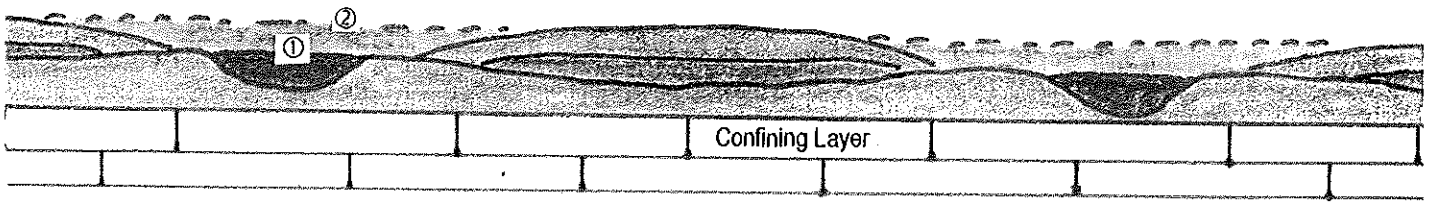
Basin. This setting includes many of the bogs under study. They are in their typical form great convex masses of peat which grow up above the fluctuations of the original groundwater-table (Moore and Bellamy *op. cit.*). Usually the bog dome is surrounded on all sides by higher mineral ground (Figure 6.1a). Discharge laggs (fens) may have occurred at one stage around one or both margins of the basin, where local discharge of groundwater mixes with run-off from the bog and the mineral edge of the basin. Where the water-table is below surface, run-off from the bog and adjacent mineral soils will infiltrate to it around the margins forming infiltration laggs.

Ridge Basin. These bogs lie intermediate between the domed mires of Basins above and the blanket bogs of western Ireland. They are found in areas where peat growth can carry the peat reservoir over low water partings to coalesce with the bogs developing in adjacent basins (Moore and Bellamy *op. cit.*). See Figure 6.1a.

Blanket. Peat can develop directly on the mineral ground up to a considerable angle of slope. A blanket bog is the response to a wetter climate (Figure 6.1a).

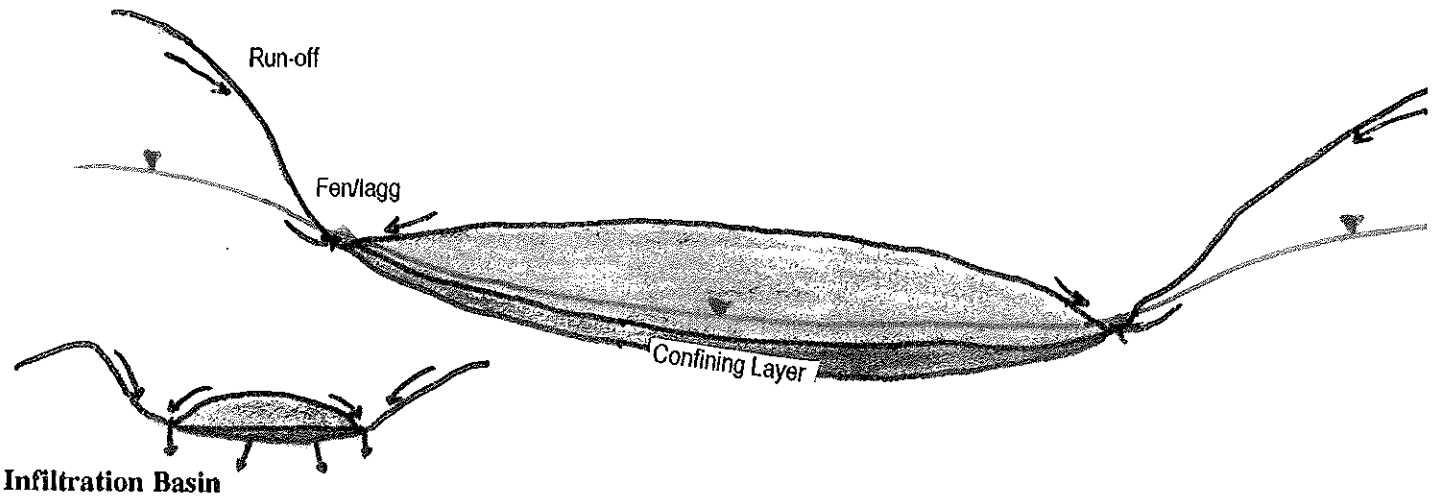
FIGURE 6.1a

Broad Floodplain



FIGURE

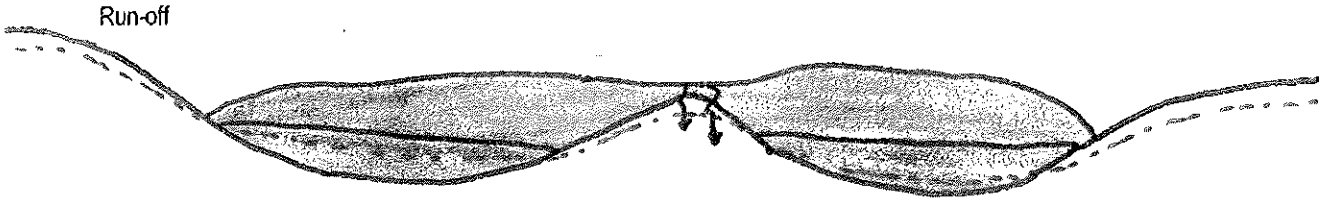
Basin



Infiltration Basin

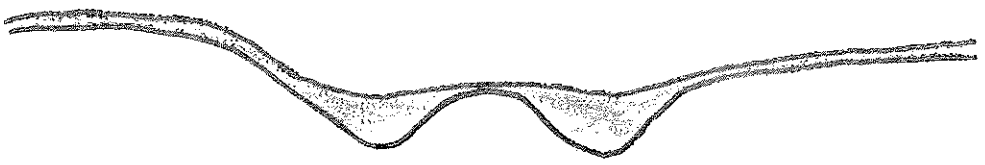
FIGURE

Ridge Raised



FIGURE

Blanket

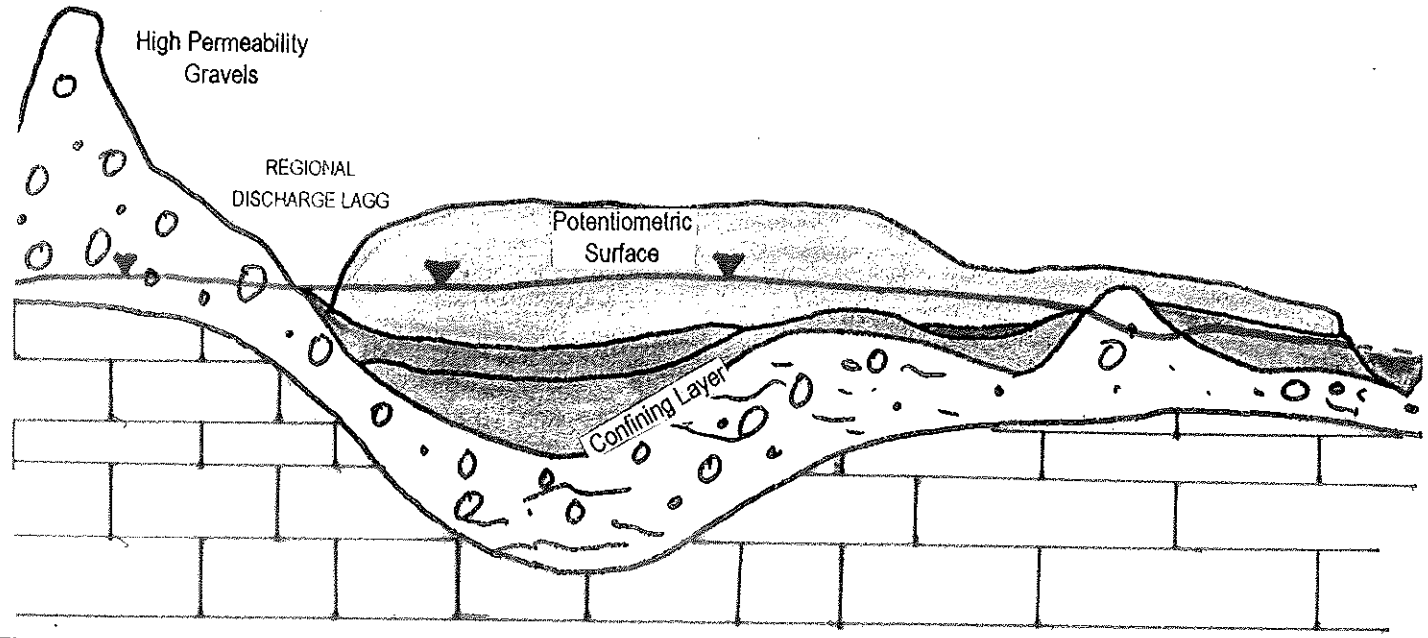


Peat Clays River

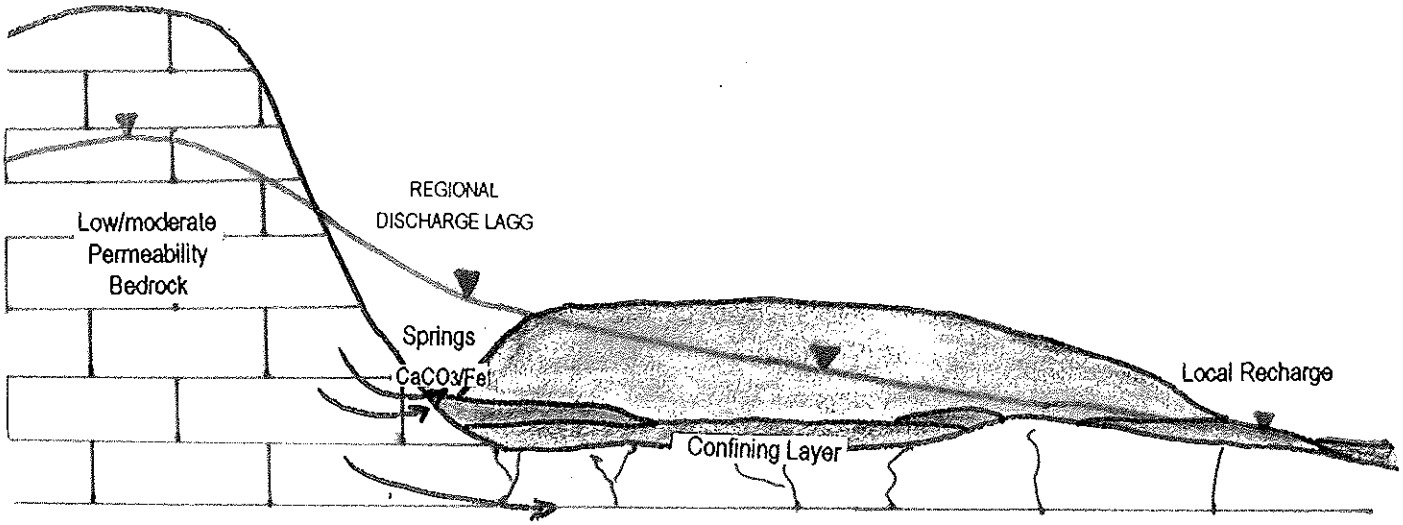
Fen Peat Limestone Flood level

Sketch diagrams of Geomorphic Settings

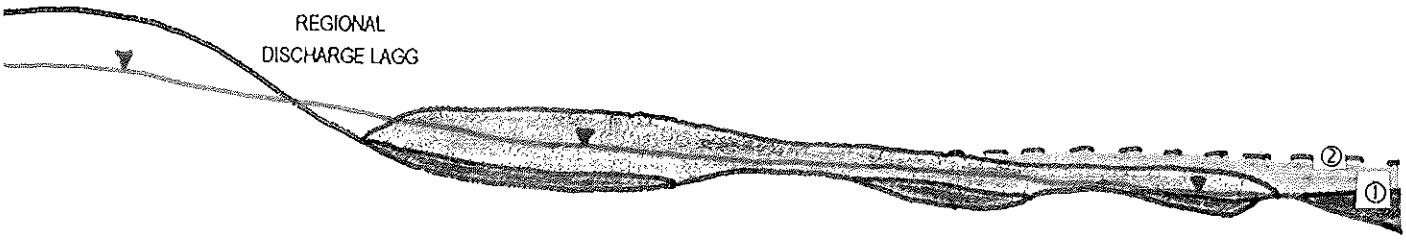
FIGURE 6.1b



Ridge River B



Ridge River C



Sketch diagrams of the Ridge River geomorphic setting

Peat Clays River
Fen Peat Limestone Flood level

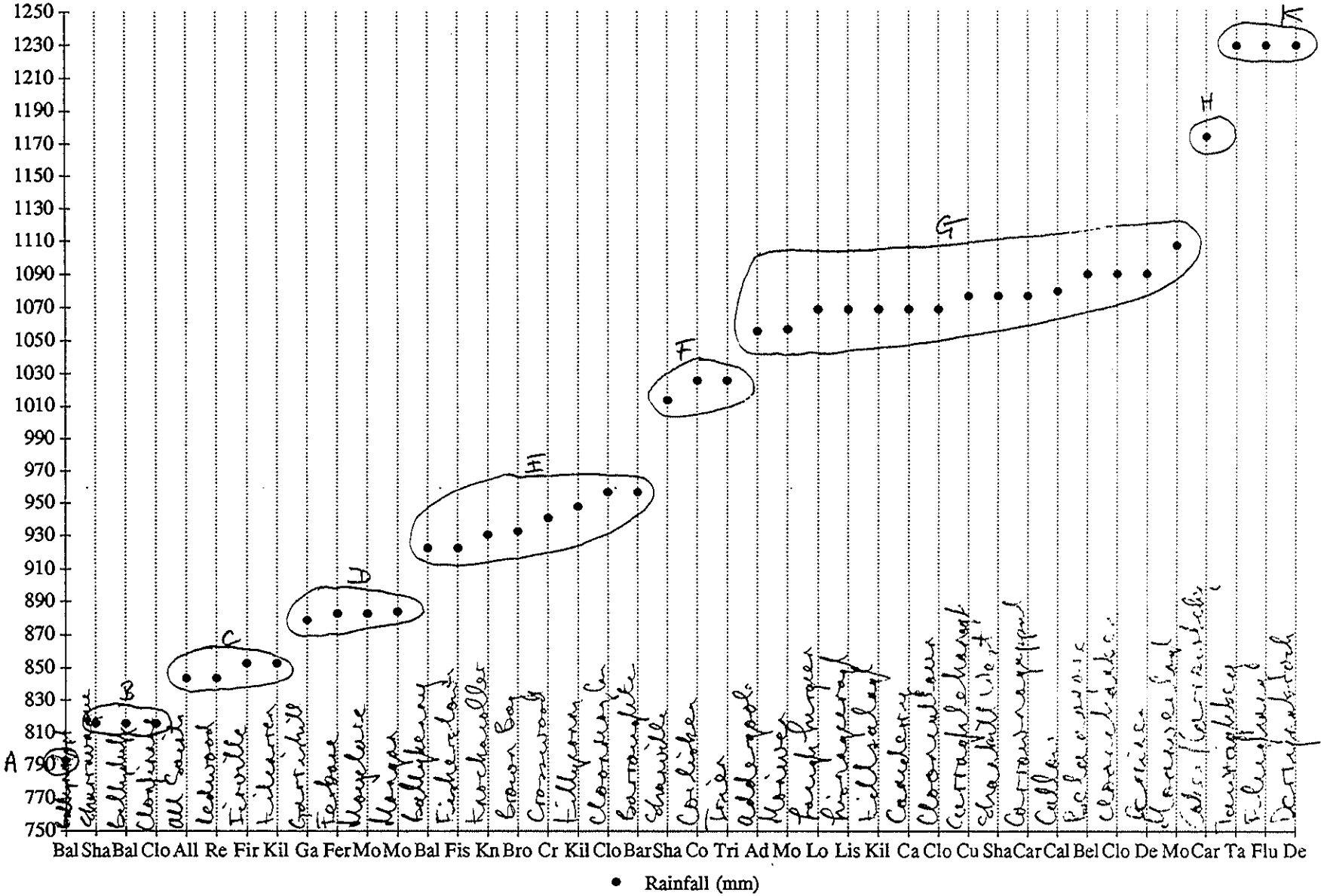


FIGURE 6.2
Graph of Rainfall Range for the Bogs Under Study

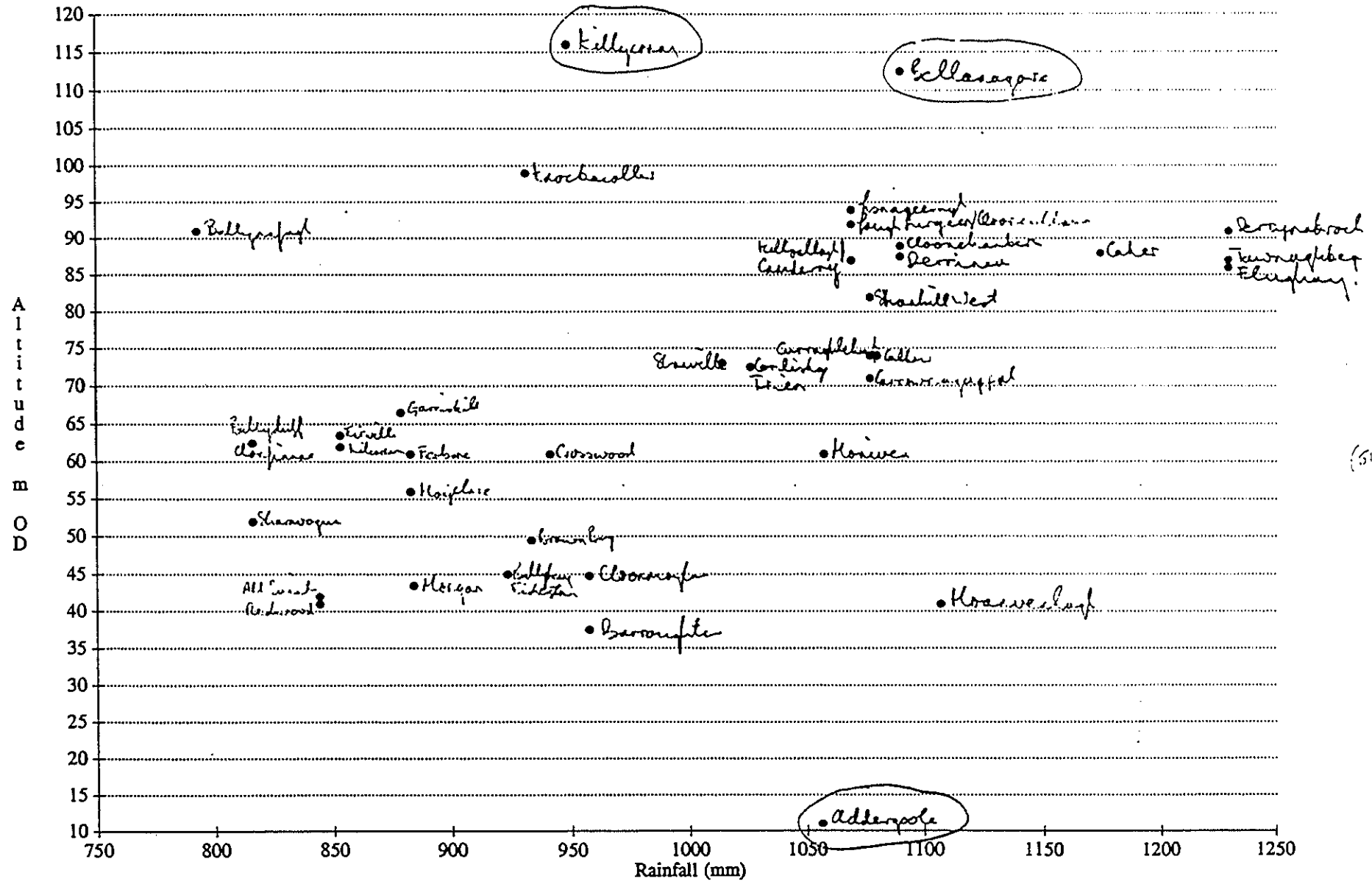


FIGURE 6.3
The Altitude and Rainfall Amounts for the Bogs Under Study

Selection
A table (Table 6.7) was set out dividing the bogs into their separate geomorphic settings (macro scale); Broad Floodplain, Ridge River, Basin, Ridge Basin, and Blanket.

For selection purposes it was decided that a minimum of two bogs should be chosen from each of the 5 geomorphic settings. Since there are only two bogs in the Broad Floodplain category and there is only one in the Blanket category, these three were selected outright.

For the three other geomorphic settings selection of the bogs was more difficult since there were more bog members. The bogs in these groups were selected by the following meso scale criteria as set out in Table 6.7:

- Valley/Upland
- Groundwater recharge area/Groundwater discharge area
- Marginal Influence
- Bedrock

The valley/upland class is considered to be important since it signifies the position of the bog within the landscape. Where a bog is situated in an upland area (>110m OD) it is likely to lie in a groundwater recharge area, on a surface/groundwater catchment divide, and in an area of high rainfall. This survey noted three bogs which lie in an upland area. However, most of the bogs under study fall into the valley situation. Here the bogs lie at the side or bottom of a valley, within a single catchment, and in groundwater discharge/recharge areas.

Once the bogs were classified by the valley/upland classes, they were then grouped on the basis of the local groundwater situation, whether the bog lies in a groundwater recharge area or discharge area.

Once this was done the marginal influence regime was considered. The marginal influence describes the main hydrological/water source system that operates around the bog edges or lagg. The main marginal influences are river, groundwater and rainwater. Where a river lies alongside one or more sides of a bog then it may periodically flood a margin of the bog and deposit nutrient rich silt to an otherwise ombrotrophic area. Where groundwater discharges within the margins of a bog it will bring a nutrient rich water supply to the lagg and form a minerotrophic environment enabling fen vegetation to persist. Where the infiltration of rainwater to the margins is the main feature, then the bog is said to have a rainwater influence. The margin in this case probably has a relatively high permeability and is well drained with grass vegetation. For the bogs in this study the marginal influence may be just one of the above, or it may be a weaker combination of two.

In Table 6.7 the marginal influences are represented by various check-marks.

Strong influence	*Influence of two systems*
River +	River/Groundwater + 0
Groundwater 0	Rainwater/Groundwater - 0
Rainwater -	

Any bogs to be selected for this study should have a marginal influence check-mark. Where bogs do not have such features this means that much of the bog has been cut-away. Where there are more than two bogs with marginal influences within such a subgroup then the bog is selected on the basis of the bedrock type.

Using these criteria one bog was selected from a group with two members; two bogs were selected from groups with less than ten members; and four bogs were selected from the group with more than ten members. The bogs selected are shaded in Table 6.7.

BOG	GEOMORPHIC SETTING			RE/DISCHARGE AREA		MARGINAL INFLUENCE					BEDROCK	SUBSOILS	SITUATION
		VALLEY	UPLAND	GROUNDWATER RECHARGE AREA	GROUNDWATER DISCHARGE AREA	RIVER +	RIVER and GROUNDWATER + o	GROUNDWATER o	GROUNDWATER and RAINWATER o -	RAIN WATER -			
Addergoole	BROAD FLOODPLAIN	X			X	+		o			Pure Limestone	Clayey Till, Clays	2 rivers, lake
Ballykny/Fherstown	BROAD FLOODPLAIN	X			X	+		o			Pure Limestone	Clayey Till	2 rivers

TABLE 6.7

BOG	GEOMORPHIC SETTING			RE/DISCHARGE AREA		MARGINAL INFLUENCE					BEDROCK	SUBSOILS	SITUATION
		VALLEY	UPLAND	GROUNDWATER RECHARGE AREA	GROUNDWATER DISCHARGE AREA	RIVER +	RIVER and GROUNDWATER + o	GROUNDWATER o	GROUNDWATER and RAINWATER o -	RAIN WATER -			
Clara	RIDGE RIVER A	X			X			o			Waulsortian Lst	Clays/gravels	Surrounded by gravel/till ridges
All Saints	RIDGE RIVER A	X			X				o -		Calcareous Shales	Clays/gravels	Basins between/on gravel ridges
Mongan	RIDGE RIVER A	X			X				o -		Muddy Limestone	Clays/gravels	Surrounded by gravel ridges
Shankill West	RIDGE RIVER B	X		X				o			Pure Limestone	Silty Till	Interdrumlin
Clooncullaun	RIDGE RIVER B	X	Part	X							Pure Limestone	Silty Till/Gravels	Drumlins on two sides
Sharravogue	RIDGE RIVER B	X			X			o			Waulsortian Lst	Clayey Till	Ridge, river, narrow floodplain
Shanville	RIDGE RIVER B	X			X				o		Muddy Limestone	Clayey till/gravels	Ridge, river
Knockacoller	RIDGE RIVER B	X			X						Muddy Limestone	Silty Till/Gravels	Ridge, river
Barroughter	RIDGE RIVER C	X			X		+ o				Muddy Limestone	Clayey Till	Floodplain; river, lake
Derrinea	RIDGE RIVER C	X			X	+			o -		Limestone	Silty Till	Interdrumlin floodplain,interlobate
Callow	RIDGE RIVER C	X			X		+ o				Muddy Limestone	Clayey Till, Clays	Floodplain; lake,ridge
Redwood	RIDGE RIVER C	X			X						Waulsortian Lst	Clayey Till, Clays	Floodplain; river,ridge
Garriskil	RIDGE RIVER C	X			X						Muddy Limestone	Clayey Till	Floodplain, 2 rivers

TABLE 6.7 (cont.)

BOG	GEOMORPHIC SETTING			RE/DISCHARGE AREA		MARGINAL INFLUENCE					BEDROCK	SUBSOILS	SITUATION
		VALLEY	UPLAND	GROUNDWATER RECHARGE AREA	GROUNDWATER DISCHARGE AREA	RIVER +	RIVER and GROUNDWATER + o	GROUNDWATER o	GROUNDWATER and RAINWATER o -	RAIN WATER -			
Cloonchambers	RIDGE BASIN	X		X		+			o -		Devonian Sandstone	Sandy/Stoney Till	Drumlin and Interdrumlin
Killyconny	RIDGE BASIN	X		X					o -		Lr. Palaeozoic	Clayey/Stoney Till	Surrounded by drumlins
Firville/Kilcarren	RIDGE BASIN	X		X						-	Waulsortian Lst	Clayey/Stoney Till	Drumlin and Interdrumlin
Carrownagappul	RIDGE BASIN	X		X						-	Muddy Limestone	Silty Till	Flat low lying ground
B'duff/Cloonfinane	RIDGE BASIN	X		X					o -		Waulsortian Lst	Clayey till/gravels	Surrounded by bedrock ridges
Corliskea/Trien	RIDGE BASIN	X		X						-	Muddy Limestone	Clayey/Silty Till	Drumlin and Interdrumlin
Camderry	RIDGE BASIN	X		X						-	Muddy Limestone	Clayey/Silty Till	Interdrumlin
Moanvenlagh	RIDGE BASIN	X		X							Namurian Shales & Sst	Clayey Till	Surrounded by bedrock ridges
Derrynabrock	RIDGE BASIN	X		X							Muddy Limestone	Clayey Till	Drumlin and Interdrumlin
Tawnaghbeg	RIDGE BASIN	X		X							Muddy Limestone	Clayey Till	Drumlin and Interdrumlin
Flughany	RIDGE BASIN	X		X							Muddy Limestone	Clayey Till	Drumlin and Interdrumlin
Lisnageeragh	RIDGE BASIN		X	X							Pure Lst (karstic)	Silty Till/Gravels	Interdrumlin
Killsalagh	RIDGE BASIN		X	X							Muddy Limestone	Clayey Till	Interdrumlin
Lough Lurgeen	RIDGE BASIN	X		X					o -		Pure Limestone	Clayey Till	Drumlin and Interdrumlin

TABLE 6.7 (cont.)

BOG	GEOMORPHIC SETTING			RE/DISCHARGE AREA		MARGINAL INFLUENCE					BEDROCK	SUBSOILS	SITUATION
		VALLEY	UPLAND	GROUNDWATER RECHARGE AREA	GROUNDWATER DISCHARGE AREA	RIVER +	RIVER and GROUNDWATER + o	GROUNDWATER o	GROUNDWATER and RAINWATER o -	RAIN WATER -			
Sheheree	BASIN	X		X					o -		Devonian Sandstone	Clay/gravels	Kettle Hole
Ferbane	BASIN	X		X						-	Waulsortian Lst	Clayey Till	Surrounded by b.rock/till rges
Monivea	BASIN	X		X				o			Muddy Limestone	Sandy/silty Till	Surrounded by bedrock ridges
Raheenmore	BASIN	X		X					o -		Calcareous Shales	Clayey till/gravels	Surrounded by bedrock ridges
Ballynafagh	BASIN	X		X							Dolomite/Muddy Lst (Fault)	Clayey Till	Surrounded by gravel ridges
Curraghlehanagh	BASIN	X		X							Limestone	Sandy/silty Till	Interdrumlin
Crosswood	BASIN	X		X							Muddy Limestone	Clayey till/gravels	Surrounded by b.rock/grvel rges
Moyclare	BASIN	X			X						Waulsortian Lst	Silty Till	Surrounded by bedrock ridges
Carrowbehy	BASIN	X			X		+ o		o -		Shaley Limestone	Silty Till/Gravels	Interdrumlin; on esker
Corbo	BASIN	X			X						Pure Lst, Dolomite	?	Surrounded by bedrock ridges
Brown Bog	BASIN	X			X						Pure Limestone	Clayey Till	Surrounded by bedrock ridges
Cloonmoylan	BASIN	X			X						Muddy Limestone	Clayey/Silty Till	Surrounded by bedrock ridges

TABLE 6.7 (cont.)

BOG	GEOMORPHIC SETTING			RE/DISCHARGE AREA		MARGINAL INFLUENCE					BEDROCK	SUBSOILS	SITUATION
		VALLEY	UPLAND	GROUNDWATER RECHARGE AREA	GROUNDWATER DISCHARGE AREA	RIVER +	RIVER and GROUNDWATER + o	GROUNDWATER o	GROUNDWATER and RAINWATER o -	RAIN WATER -			
Bellanagare	BLANKET		X	X							Muddy Limestone	Clayey Till	Undulating upland

TABLE 6.7 (cont.)

Climate
Two graphs were generated, one showing a range of rainfall for the bogs (Figure 6.2) and the other displaying the height of each bog plotted against rainfall (Figure 6.3).

6.2 SELECTED SITES

All sites are shown in Table 6.8 with selection criterion or criteria indicated. A more detailed version showing the feature or features for which the site was selected is shown in Table 6.9.

Vegetation
As is evident from this list, with respect to vegetation, for each element of variation only one site was chosen to represent that variation although sometimes the feature or variation is duplicated as the site was selected for another criterion. What this means is that this list of sites is the absolute minimum of sites required to represent the range of variation of raised bog in the country.

Geomorphic Setting
The bogs selected in Table 6.7 are highlighted in Table 6.8.

Climate
In Figure 6.2, the rainfall range was separated into ten groups (marked A - M). It was decided that six bogs should be included in Table 6.7 which represent groups A, H, K and M, the extremes of the rainfall range.

In Figure 6.3, it was decided that the Bellanagare, Killyconny and Addergoole bogs should be included since these bogs fall into the extremes of the altitude/rainfall range.

Thirty two sites were selected at this stage. These selected sites are all considered to be potential Special Areas of Conservation (SAC) (see Section 6.4) worthy of conservation/restoration measures. However it is important to investigate if conservation and restoration of the sites in question is technically feasible. That is, can the criteria or criterion for which it was selected be conserved

6. 3 CONDITION OF SITE AND CONSERVATION/ RESTORATION POSSIBILITIES

6.3.1 General Comments on Conservation/Restoration

Conservation of a site is taken to mean that the main section of the bog, or the feature for which it has been selected, can be preserved in its present condition. That is that measures can be taken which will ensure that no further deterioration occurs.

Restoration means that the site or part of the site can be restored to a condition which existed in the past. This usually requires substantial input.

The condition of each site surveyed and the conservation and restoration possibilities are examined in this section.

A number of general points can be made about conservation and restoration at bog sites.

1. Peat cutting. All active peat cutting must be halted as soon as possible at a site where conservation is being considered. In the case of moss peat production immediate action is required. Peat cutting is incompatible with conservation for two main reasons: (a) if peat cutting continues, water loss and subsidence will also continue resulting in a deterioration of the vegetation cover; (b) restoration works can not be carried out where peat cutting is still active.

TABLE 6.8 Features present on Raised Bog Sites surveyed during the Raised Bog Restoration Project, 1995.

SITE NAME	Central Complex	Flushes	E/W	Open Pools	Geomorphic Setting	Precipitation	Altitude	Cond	Restor	In/Out
Callow								poor	diff	
Camderry								poor	m diff	
Moanveanlagh			*					poor	diff	
Blackcastle								poor	diff	
Clooncbambers		* 2			*			VG	easy	*
Corbo								med	diff	political
Clooncullaun								poor	diff	
Lisnageeragh					*			good	eas/med	* political
Ferbane					*			poor	med	*
Redwood								good	diff	political
Sharavogue		* 1			*			poor	eas/med	* political
Mongan				*				Ex ?	med	* political
Killyconny					*		*	poor	diff	*
Curraghlehanagh								med	diff	
Ballynafagh						*		poor	easy	*
Kilsallagh	*							med	diff	*
Knockacoller								poor	easy	political
Shankill West		*			*			med	eas/med	*
Bellanagare		* 4			*		*	med	easy	*
B'kenny/Fishers					*			poor	eas/med	* political
Clonfin/B'duff	*	*						med ?	med	*
Tawnaghbeg	*					*		VG	med	* political
All Saint's Bog		*			*			med	med	* political
Carrownagappul	*	* 1			*			poor	easy	* political
Firville/Kilcarren	*	*			*			p/med	eas/med	* political
Addergoole		* 2			*		*	med	eas/med	*
Monivea								VG	easy	
Lough Lurgeen		* 4			*			Ex	easy	*
Brown Bog								VG	med	
Derrynabrock	*					*		good	eas/med	*
Derrinea	*	* 1			*			Ex	easy	*
Garriskil			*					VG ?	m/diff	*
Crosswood								VG ?	diff	
Corliskea/Trien/Cl	*	*4						Ex/med	diff/m	* political
Carrowbehy		* 2			*	*		Ex	med	* political
Barroughter	*	* 1			*			good	diff	*
Flughany	*					*		VG	eas/med	*
Cloonshanville	*	* 1			*			med	easy	*
Cloonmoylan	*	* 1						VG	easy	*
Moyclare	*				*			med	med	*
Raheenmore	*							VG	diff	* political
Clara		* 2			*			good	med	* political
Sheheree		* 1			*	*		VG	easy	* political
NUMBER	14	18	2	1	20	5	3			
EXTRA		10	2	1	4	1	0			
TOTAL	14	24	26	27	31	32	32			

32 Sites selected in bold type

TABLE 6.9 Details of Selection Criteria for Selected Raised Bog Sites surveyed during the Raised Bog Restoration Project, 1995.

SITE NAME	Central Complex	Flushes/Fens/Laggs	E/W INDICATOR SPECIES	Open Pools
Callow				
Camderry				
Moanveanlagh			*	
Blackcastle				
Cloonchambers		External river, Phragmites		
Corbo				
Clooncullaun				
Lisnageeragh				
Ferbane				
Redwood				
Sharavogue		Alkaline fen		
Mongan				Extensive
Killyconny				
Curraghlehanagh				
Ballynafagh				
Kilsallagh	6/10+Pools			
Knockacoller				
Shankill West		Recharge/discharge lagg		
Bellanagare		Infilling lake, Salix Bog wood, Dry Molinia, Swallow hole		
B'kenny/Fishers				
Clonfin/B'duff	15	Ombrotrophic lagg		
Tawnaghbeg	35/6			
All Saint's Bog		Betula bog wood		
Carrownagappul	6/15	Extensive wooded swallow hole flush		
Firville/Kilcarren	6/14, 14, 10/9	Infiltration lagg		
Addergoole		Infilling lake, open lake, Betula/Salix bog wood, Calcareous fen, Swallow hole		
Monivea				
Lough Lurgeen		Lake, internal river, external river, Molinia/Betula		
Brown Bog				
Derrynabrock	35/3			
Derrinea	6/35, 35	infilling lake		
Garriskil				
Crosswood			*	
Corliskea/Trien	6/3/35	Internal river, Betula bog wood, Wet Molinia, swallow hole with Frangula		
Carrowbehy		Open lake, fen		
Barroughter	4/6/10, 4/6/15	Alkaline fen		
Flughany	4/6/35			
Cloonshanville	9/7/35	Betula/Salix Bog wood		
Cloonmoylan	4/15, 15 (with S. pulchrum)	External river,		
Moyclare	10/15			
Raheenmore	15			
Clara		Infilling lake		
Sheheree		Intact marginal fen (part Alder carr)		

TABLE 6.9 (Cont.) Details of Selection Criteria for Selected Raised Bog Sites surveyed during the Raised Bog Restoration Project, 1995.

SITE NAME	Geomorphic Setting	Precipitation	Altitude
Callow			
Camderry			
Moanveanlagh			
Blackcastle			
Cloonchambers	Ridge Basin; Groundwater Recharge Area; Devonian sandstone.		
Corbo			
Clooncullaun			
Lisnageeragh	Ridge Basin; Groundwater Recharge Area; Pure limestone.		
Ferbane	Basin; Groundwater Recharge Area; Waulsortian limestone.		
Redwood			
Sharavogue	Ridge River B; Groundwater Discharge Area; Waulsortian limestone.		
Mongan			
Killyconny	Ridge Basin; Groundwater Recharge Area; Lower Palaeozoic.		> 110m OD
Curraghlehanagh			
Ballynafagh		Group A	
Kilsallagh			
Knockacoller			
Shankill West	Ridge River B; Groundwater Recharge Area; Pure limestone.		
Bellanagare	Blanket; Groundwater Recharge Area; Muddy limestone.		> 110m OD
B'kenny/Fishers	Broad Floodplain; Groundwater Discharge Area; Pure limestone.		
Clonfin/B'duff			
Tawnaghbeg		Group K	
All Saint's Bog	Ridge River A; Groundwater Discharge Area; Calcareous Shales.		
Carrownagappul	Ridge Basin; Groundwater Recharge Area; Muddy limestone.		
Firville/Kilcarren	Ridge Basin; Groundwater Recharge Area; Waulsortian limestone.		
Addergoole	Broad Floodplain; Groundwater Discharge Area; Pure limestone.		< 110m OD
Monivea			
Lough Lurgeen	Ridge Basin; Groundwater Recharge Area; Pure limestone.		
Brown Bog			
Derrynabrock		Group K	
Derrinea	Ridge River C; Groundwater Discharge Area; Limestone.		
Garriskil			
Crosswood			
Corliskea/Trien			
Carrowbehy	Basin; Groundwater Discharge Area; Shaley limestone.	Group H	
Barroughter	Ridge River C; Groundwater Discharge Area; Muddy limestone.		
Flughany		Group K	
Cloonshanville	Ridge River B; Groundwater Discharge Area; Muddy limestone.		
Cloonmoylan			
Moyclare	Basin; Groundwater Discharge Area; Waulsortian limestone.		
Raheenmore			
Clara	Ridge River A; Groundwater Discharge Area; Waulsortian limestone.		
Sheheree	Basin; Groundwater Recharge Area; Devonian sandstone.	Group M	

2. Acquisition. It is essential to gain full management control so that further damage can not occur and restoration work can proceed unhindered. This is best achieved by acquisition. Management agreements are sometimes suggested as an alternative to acquisition. However these only give short term protection to a system which requires permanent protection and may not allow all restoration possibilities to be implemented. They may however be useful in providing short to medium term protection when acquisition is not immediately possible. Acquisition should include areas of cut-away and adjoining mineral soil in some cases. It is suggested that when dealing with BnM sites they should be encouraged to purchase remaining areas first.

3. Drain blocking. Drains allow water to be rapidly removed from an area. Subsidence associated with drainage increases the slope of the ground around the drain. Water logged conditions cannot develop under these circumstances resulting in a change in vegetation. Plants which grow in water logged conditions and make up the acrotelm are replaced by species better adapted to a drier environment. Restoration of the natural hydrological regime of the bog and the re-growth of acrotelm are prevented while drains continue to remove water. All surface drains on the high bog should be blocked. Specifications for the blocking of surface drains by hand are outlined by Streefkerk and Douglas (1994). Further specifications for blocking using machinery will be available at a later date.

4. Restoration of cut-away and lagg areas. Four main options are available for restoration. For all detailed research is required. Management plans with farmers operating within the catchment area of any of these locations may also be required particularly in relation to the spreading of fertiliser. Research on seed banks for fen species should be undertaken.

   a. At some sites flooding of cut-away areas is suggested particularly where regional groundwater levels can reach above the ground level and an area can therefore be permanently inundated. This should lead to the development of fen vegetation. Some basic requirements are outlined by Streefkerk and Zandstra (1994) for this option at Raheenmore: the substrate should be mesotrophic fen peat; the water table level should remain stable (< 0.3-0.4m fluctuations); the basin should be fed by both regional ground water and bog water and the basin should have a permanent discharge point so that no retention of precipitation occurs. However as mentioned above research into the possibilities at each site are required. This would include items such as extensive topographic levelling, size of flooded areas, deciding where excess water can be channelled etc..
   b. Where mesotrophic peat is exposed, but in contrast to the above situation, the area is not flooded but the regional ground water level is close to the ground level. This should allow the development of wet meadow situations.
   c. Where the regional ground water table level can now influence ombrotrophic peat leading to poor fen development. The success of this will depend on the hydraulic conductivity of the peat and again research would be vital. Removal of existing vegetation cover may be required.
   d. Regeneration of ombrotrophic peat on cut-aways using run-off water from the high bog retained behind small dams.

   Habitat diversity could be obtained by having some areas of mineral soil, some of mesotrophic peat and others of ombrotrophic peat.

   Conservation of lagg areas. In many cases this will involve the purchase of adjoining mineral soil so that marginal drains can be blocked and water table levels increased.

5. Marginal dams. As these are still in an experimental stage at Raheenmore, the feasibility of construction is still not fully known. The purpose of marginal dams is to prevent further subsidence of the high bog surface caused by water loss. They may also be used to decrease the effects of past subsidence (Streefkerk and Zandstra, 1994). Before dams are built research into peat stratigraphy is needed to identify layers of *Sphagnum cuspidatum*. These should be avoided as they represent weak points in the peat profile where slippage can occur relatively

easily. If it is assumed that the construction of dams is possible then there are three situations where they may be required.

a. Where fissures have developed on the bog surface due to subsidence. Here dams should be placed at the facebank edge to prevent water loss through the fissures which would result in further subsidence and drying out of the bog (Fig 6.4a).
b. Where peat cutting has concentrated in one area so that a section of the bog has partly collapsed. A series of short dams could be used here to reduce drying out effects (Fig. 6.4b).
c. More extensive lengths of dams may be required at some sites to halt the drying out effects of subsidence on a large scale. If these are considered necessary, research into subsidence must be carried out for at least three years before the dams are constructed but ideally for a longer period. This research should include the installation of bench marks anchored in the mineral substrate. Monitoring of vegetation is also essential. Peat used for dams should have a humification degree of between 5-10. Details of marginal dam construction at Raheenmore are outlined by Streefkerk and Zandstra (1994).

Peat for building marginal dams can be obtained from four locations:

a. From another site, that is material is transported from an adjacent site.
b. From a section of the site which has become isolated from the main body of the bog due to peat cutting or from the cut-away areas.
c. From the main body of the bog away from the area where the dam is being built.
d. At the site of the dam.

Each of these situations are compared under a number of headings in Table 6.10.

Table 6.10: Comparison of Restoration Costs.

	OTHER SITE	ISOLATED SECTION	CLOSE TO DAM SITE	DAM SITE
Costs of transport	-	+/-	+/-	+
Compaction of peat during transport	-	+/-	+/-	+
Choice of material	+	+/-	+/-	-
Disturbance of the bog	+	+	-	-
Work on site	+	+	+	+/-
Technical possibilities for contruction	+	+	+	-
Stability of bog edge	+	+	+/-	-
Cost of research	+	+	+/-	-

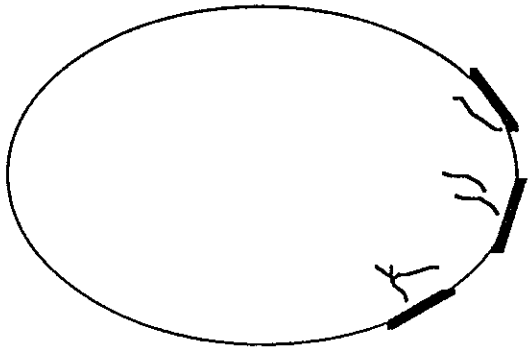
From an ecological viewpoint option (a) is the least damaging grading to the most damaging for option (d).

Research is required into how far material would have to be transported if the closest available site was used as a source.

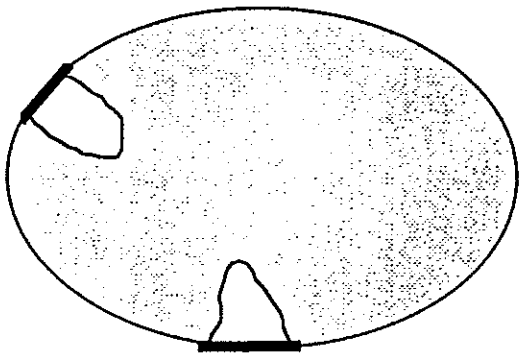
6. Removal of forestry from the high bog. Forestry is damaging to the bog system in four main ways: surface drains are always associated with forestry plantations, these increase water loss from the bog; the canopy of trees intercepts precipitation preventing the normal amount from reaching the bog surface. Removal of the canopy can increase inputs by up to 40% (Lindsay et al., 1995); compression of the peat caused by the weight of the growing trees accelerates subsidence causing further water loss; shading by the canopy also causes a change in vegetation cover.

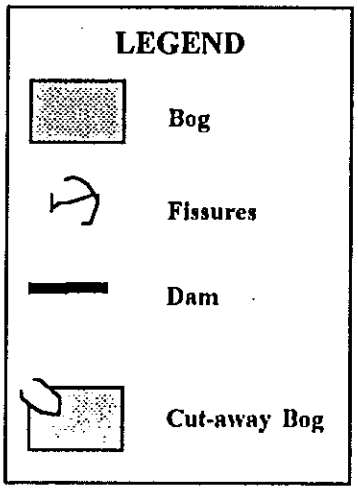
FIGURE 6.4
Suggestions for the Positioning of Short Dams

(a)



(b)





6.3.2 Specific Conservation and Restoration Measures Suggested at Each Site.
This details the present condition of the site and conservation/restoration measures which should be taken if the site is considered to be of conservation/restoration value. The sites are listed in alphabetical order.

If marginal dams are suggested an approximation of the length of dams which may be required is given. This is only a rough estimation and further research is essential. Table 6.11 follows this text. It summarises the main requirements at each site. Research required on this table indicates research needed apart from that which is done for marginal dam construction.

- *ADDERGOOLE, Co. Galway (223)*

  This site has been selected as a site to be conserved due to its representation of the range of geomorphological setting, the presence of a large area of *Betula* bog woodland and a transition to fen along the N edge.

  Condition: Medium to good, large flushed area and sub-central ecotope.

  Active peat cutting: High, occurring all along S and large sections of the E. This must stop as soon as possible.
  % of Bog Remaining since the 1840s: 15.8, only a remnant of a large bog complex to the E. Some cutting has also occurred to the S and SW.

  Surface drains: (3,406m) Most are short and marginal, apart from more recent drains at the SE which extend quite far into the site. All surface drains should be blocked.

  Marginal dams: These may be required to the S and E to protect the ombrotrophic bog vegetation (1-2km). Deep marginal drains are seen in the fen area to the N and in the cut-away to the E. These should be blocked.

  A detailed landscape ecology study is required at this site. This should include:
  Ecology.
  a. A detailed vegetation map of the fen area to the N and the area between Lough Corrib and the high bog. A map of the latter may already be available from work carried out by Enda Mooney.
  b. Mapping of plant indicator species to highlight areas of upwelling ground water.
  c. A detailed vegetation map of the flush (a map is available from the work of Bleasdale and Conaghan).

  Geohydrology.
  a. Investigations into upwelling of regional ground water, infiltration and other geohydrological relationships should be made. This may include the identification of aquifers and resistant layers by the installation of piezometers.
  b. Topographic levelling is needed for the whole area.
  c. How does the flush function?

  When details are known a management plan can be drawn up for the site.

  Conclusion: The *Betula* flush and fen area to the N are the main interest and these may be conserved. Conservation of ombrotrophic bog is essential to support the flush but full scale restoration may not be worthwhile.

- *ALL SAINT'S, Co. Offaly* (566)

  This site has been selected as a site to be conserved due to its representation of the range of geomorphological setting and the presence of an extensive diverse *Betula* bog woodland.

  Condition: Medium, no central complex but an extensive flush.

  Active peat cutting: Medium (Erin peats, milled peat and peat products). All peat cutting should stop at once.
  % of Bog Remaining since the 1840s: 49.0, cut off from large area to the E by a main road. Most cutting has been to the N, W and SW with lesser amounts to the S.

  Surface drains: Few surface drains are seen apart from in the area being exploited by Erin peats (28, 699m). New short drains occur to the NNW. All these should be blocked.

  Marginal dams: These will be required at the edge of the Erin peat exploitation in order to conserve the flush (1-1.5km).

  As this site has been chosen for conservation due to the nature of the extensive flush research should be undertaken to determine how the flush functions. Cores should be taken for paleobotanic research, macrofossil analysis, carbon dating and peat chemistry. These should be taken from both the flush and the ombrotrophic bog. This should help in determining if the flush is a relict feature or if it is still functioning.

  The Erin peat area should probably be flooded but research would be required first.

  Conclusion: The importance of this site is for the *Betula* bog woodland. As the ombrotrophic bog and flush are interlinked conservation of the high bog is also important. While the long term prospects for conservation are uncertain, the uniqueness of the site requires that attempts be made to conserve it even if this involves considerable expense.

- *BALLYDUFF, Co. Tipperary* (641 (641))

  This site has been selected as part of the Ballyduff/Clonfinane site, which together have been chosen on the basis of lagg potential to the N of the site and a representation of the range of variation in central vegetation complex.

  Condition: Medium, no primary but 2^{o} central. The 2^{o} central area occurs in a very shallow subsidence hollow.

  Active peat cutting: medium (facebanks high at the NE and E). All peat cutting must cease immediately.
  % of Bog Remaining since the 1840s: 74.0, peat cutting has occurred to the NW, N and E in small amounts. Very little has occurred to the S and W, the bog is close to its original edge here.

  Surface drains: These are mostly old and infilled and have resulted in some subsidence in the central section. New short drains at the E side. These should be dammed close to the bog edge.

  Marginal dams: Deep marginal drains along the northern margin should be blocked. At the E of the site where high face banks occur marginal dams may be required (1.0km). Research should be carried out first.

  There is a very wide marginal drain between Ballyduff and Clonfinane which should be blocked. Between Ballyduff and Clonfinane bogs where a low ridge of mineral material occurs it may be possible to do something with the regional ground water to develop a fen situation. Along the N edge lagg development may also be possible. Research and management plans for the catchment area would be necessary.

Conclusion: The site is important for central complex and lagg areas , both of which can probably be conserved with medium effort.

- *BALLYKENNY, Co. LONGFORD* (1439 (441)

  This site has been selected as a site to be conserved as part of the combined site of Ballykenny/Fisherstown due to its representation of the range of geomorphological setting.
  Condition: Poor, no primary ecotope apart from a flush (which is now drained). However a large area of sub-central ecotope occurs. This is probably still drying out.

  Active peat cutting: low-medium, (15.9%) concentrated at the mid-east side. Subsidence is ongoing in this area. Peat cutting must stop soon if conservation is to be a possibility. Subsidence has probably ceased in the area to the north.
  % of bog remaining since the 1840s: 66.7, most cut from the E, some from the N.

  Surface drains: (6047m) Old infilling surface drains transverse the site. Blocking of these will cause localised re-wetting. Northern third of the site is at a lower level and is very dry. Drains run through this. Pines are invading.

  Marginal dams: Marginal effects greatest at the E (high facebanks). Marginal dams may be required here if ecological value of site is to be conserved (1km).

  Conclusion: This is an important geochronological site which would retain its essential interest even if further drying out were to occur. Retention of the ecological interest of the site could however be achieved with medium effort. The large area of sub-central complex could possibly be up-graded by blocking a few surface drains.

- *BALLYNAFAGH, Co. Kildare* (391)

  This site has been selected for conservation as it represents a range in the climatic variation, namely lowest rainfall experienced by any of the sites visited.
  Condition: Poor-mediocre, 2^{o} central and 2^{o} sub-central occur.

  Active peat cutting: High at N, E and S (high facebanks all around edge except at SW). All must be halted directly.
  % of bog remaining since the 1840s: 27.0, part of large basin. Most peat cutting has occurred to the W, SW and E but significant amounts have occurred at all edges.

  Surface drains: (3929m) These are mostly associated with forestry on high bog. A long old drain crosses site. This probably caused the subsidence with which 2^{o} central ecotope associated. A number of drains extend into the site which are associated with active peat cutting. Blocking of these drains should cause some re-wetting. The drains within the forestry should also be blocked and the forestry removed.

  If this site is to be conserved it must be bought straight-away

  Marginal dams: If central or sub-central areas to be extended marginal dams would be required (4.2km). Research into subsidence should be carried out first as outlined above in Section 6.X. Research should also be carried out on the resistance of the edges of the bog to water loss. Material for marginal dams could be obtained from the section of the bog which has been cut off from the Main Lobe.

  Conclusion: The importance of the site is from a climatic point of view and conservation of the site in regard to this is possible. The ecological interest may also be conserved as the 2^{o} central and sub-central complexes are in a subsidence area which may therefore be protected. The sub-central area may be in process of re-wetting. For restoration to occur large investment would be required for marginal dams.

- *BARROUGHTER, Co. Galway* (231)

  This site has been selected for conservation as it represents a range in geomorphological setting, central vegetation complex and has an area of alkaline fen.
  Condition: Good, primary central and a large area of sub-central.

  Active peat cutting: Very high, around 90% of the site. This must stop immediately.
  % of bog remaining since the 1840s: Most peat cutting has been carried out to the N, NE and S with lesser amounts to the E and W.

  Surface drains: Short surface drains at the high bog edge are numerous and 2 long old drains cross the site (2,762m). All these should be blocked. There should be some effect from the blocking of the longer drains but unsure as to the impact of blocking the short drains.

  Marginal dams: To protect central and sub-central areas marginal dams would be required all around the site (4.5km). Areas where fissures are numerous should be identified. Subsidence studies should be undertaken.

  Lagg: A vegetation map of the cut-away to the NE and E of the site is required and topographic levelling also in order to understand more fully the fen system in operation. How much of the fen is due to groundwater or, to influence from the adjacent river which periodically floods the area. A management plan for these areas should be drawn up. Research will be required to determine what management is needed.

  As cut-away drains are so numerous they should be blocked to at least 50m from the facebank edge.

  Conclusion: The importance of the site as regards geomorphology and the fen area is possible to conserve. The conservation of the central vegetation may be more difficult as although the condition of the site is good at present the speed of peat cutting may be masking its effects. If the site was left to itself it would probably dry out quite rapidly. Medium to extensive effort may be required to conserve the central area and restoration would also be very difficult.

- *BELLANAGARE, Co. Roscommon* (592)

  This site has been selected for conservation as it represents a range in geomorphological setting, climatic variation (high rainfall) and as it supports a range of different flush types.
  Condition: Good, no central but numerous flushes and other primary ecotopes.

  Active peat cutting: medium-low (high facebanks are seen at the S of the W Lobe, S of the SW Lobe, between the E and SE lobes, N of the NE arm and SW of the N Lobe. All peat cutting areas should be purchased and peat cutting halted.
  % of bog remaining since the 1840s: 56.4, Most cutting has occurred to the N of the site. A section of the S of the original bog extent is now separated from the bog by a road. Peat cutting has occurred around all the lobes with quite a large area being cut from the mid -east.

  Surface drains: Extensive drains on the N Lobe (32, 652m). Old drain runs the full length of the site. Roads extend into the bog. Surface drains are seen on all lobes in varying amounts (60,866m). All of these should be blocked. Some drains are associated with patches of forestry on the high bog. Levelling may be required to ensure that drains are blocked effectively.

  As this site is at the extreme end of the gradient of western raised bog some research may be required to relate vegetation to hydrology. This could include relating vegetation cover to water table depths (duration lines) and water chemistry and investigating how the acrotelm functions on these western raised bogs.

  Marginal dams: None suggested.

Conclusion: Conservation of the interest of the site easy. Restoration of parts also relatively easy as it mostly involves surface drain blocking.

- *BLACKCASTLE, Co. Offaly* (570)

  This site has not been selected for conservation.
  Condition: Poor (no central or primary ecotopes). Some sub-central ecotope in centre of site.

  Active peat cutting: Low at present (9.7%). All active peat cutting must cease if the condition is to remain the same.
  % of bog remaining since the 1840s: 37.0 (Peat cutting carried out all around the site in the past).

  Surface drains: (4,371.5m) Old deep surface drains run through the centre of the site. Blocking of there would cause re-wetting of some areas and help to conserve present situation. Effect limited as elongate site with marginal effects most significant.

  Marginal dams would be required all around the site in order to re-introduce central complexes (5.2km).

  Conclusion: Conservation/restoration of this site is not recommended.

- *BROWN BOG, Co. Longford* (442)

  This site has not been selected for conservation.
  Condition: Very good, no primary central ecotope but a large area of 2^{0} central and a small flush area occur.

  Active peat cutting: Very low but all should be halted.
  % of bog remaining since the 1840s: 53.0, most cutting has been carried out to the NW with a lesser amount to the W and NE.

  Surface drains: None.

  Marginal dams: These may be required to the NW to protect the central area in the long term (1.0km).

  A large area of central complex occurs with associated sub-central complex in a subsidence section. This is probably the result of a bog burst. The area of sub-marginal quite large also. The central area is in a subsidence hollow which may be protected. However a large volume of water flows through the area and exits to the N. There may be a small spring.

  Conclusion: This site is not presently selected for conservation/restoration. However if it was selected in the future, for relatively little input a large area of central complex could be conserved. If competing sites prove too difficult to conserve this site may still be considered.

- *CALLOW, Co. Roscommon* (595)

  This site has not been selected for conservation.
  Condition: Poor-Mediocre, No central just large area of flush.

  Active peat cutting: High (42.6%). As active peat cutting is still widespread subsidence will still be occurring for some time. The site is already very dry and will only become drier.
  % of bog remaining since the 1840s: 31.3, most peat cutting has occurred to the W and the S with a little between Lough Gara and the Lung River.

  Surface drains: (6047.8m) Many new drains along the N edge and one old drain transverses site. The Main Lobe is separated from a strip of bog to the east by a road and drains.

  Marginal dams: None suggested

- *CARROWNAGAPPUL, Co. Galway* (1242)

  This site has been selected for conservation as it represents a range in geomorphological setting, central vegetation complex and has an extensive wooded swallowhole flush system.
  Condition: Poor, some central ecotope and flushes.

  Active peat cutting: Medium (high facebanks on N of N Lobe and NE of the SE Lobe) (38.6%). Attempts should be made to transfer turbary rights from the Main and N Lobes onto the NE Lobe. This should be carried out by Bord na Mona before the site is purchased from them.
  % of bog remaining since the 1840s: 50.0 (most peat cutting carried out to the N and NE of the site.

  Surface drains: Extensive surface drains which cross the wetter sections are seen on the Main Lobe. Blocking of these would cause re-wetting. Total surface drains 26,376m. All surface drains should be blocked.

  A management plan should be drawn up for the wet meadows to the W of the Main Lobe.

  Marginal drains: The three lobes of the site are separated from the Main Lobe by deep drains and roads. Extensive work required to block these.

  Conclusion: Conservation of the geomorphological importance of the site is easy. The conservation of the flush should also be easy. The conservation of the central vegetation complex will require extensive drain blocking. Conservation/restoration work should concentrate on the Main and Northern Lobes. Blocking of surface drains should cause re-wetting and sub-central vegetation areas may extend.

- *CLONFINANE, Co. Tipperary* (641 (641)

  This site has been selected as part of the Ballyduff/Clonfinane site, which together have been chosen on the basis of lagg potential to the N of the site and a representation of the range of variation in central vegetation complex.
  Condition: Medium, Primary central and marginal ecotopes occur.

  Active peat cutting: Medium but moss peat production in centre of site.
  % of bog remaining since the 1840s: 62.0 but multiple basin site. Most peat cutting has occurred to the NW, otherwise close to the original bog edge.

  Surface drains: Total surface drains 3,3215.7m. Pines are encroaching onto both lobes suggesting some drying out. There is an extensive net-work of surface drains associated with the moss peat production (30,614m in 42ha). Blocking of these would cause re-wetting and the protection of the central ecotope. A drain and peat road separate the two lobes of this site, there is some subsidence associated with this. Deep drains also occur at the NE of the Main Lobe. Blocking of these would require major work. Deep drains to the N and S also require blocking.

  A local fen situation could be developed along the N side of this site. Investigations into the regional ground water levels should be carried out.

  Marginal dams: Not necessary at present.

  Conclusion: Conservation of infiltration lagg area to N possible with little effort. The conservation of the central complex area will be more difficult due to ongoing moss peat production. If this ceases immediately and all drains are blocked this could still be achieved. Restoration will be expensive but the site is important.

- *CLOONCHAMBERS, Co. Roscommon* (600)

  This site has been selected for conservation as it represents a range in geomorphological setting and because of a large fen/internal river system.
  Condition: Very good, large flush area, small area of 2^{o} central. A large flush occurs but the remainder of the site is very dry

  Active peat cutting: Medium (26%). This must cease immediately.
  % of bog remaining since the 1840s: 37.0, cutting has occurred all around the site. It has been most extensive to the N and E, particularly to the E.

  Surface drains: (2,440m) Some short surface drains occur associated with peat cutting and field development. These could be dammed but little effect expected.

  Research is needed into how the flush functions. A more detailed vegetation map of the flush would be useful.

  Marginal drains: A deep drain runs through the flush carrying water from the mineral ridge to the E and from agricultural land to the S. This should be made shallower (1528.7m). A management plan should be drawn up as this may cause flooding of adjoining agricultural land.

  Conclusion: Conservation of the geomorphological and fen importance is possible with little effort. Restoration work is not recommended, apart from the suggestion for the fen drain mentioned above. The narrow nature of this site suggests that it may always have been rather dry.

- *CLOONCULLAUN, Co. Galway* (245)

  This site has not been selected for conservation.
  Condition: Poor (No primary ecotope apart from flushes). The bog is on a gentle slope to the S. The northern section is flat and therefore central ecotopes expected whereas the southern section is on a slope and may therefore naturally be drier.

  Active peat cutting: Low to medium (24.5%) (high facebanks to the NE and E). Subsidence will still be occurring in these areas so the site will be drying out further. The prospects are poor for this site in conservation terms. Peat cutting should be phased out.
  % of bog remaining since the 1840s: 54.7.0, cutting has occurred all around the site.

  Surface drains: (2,700m) Large drain/road through the centre of the site with branch to E runs through a flush with swallowholes. Surface drains can be blocked but the effect would probably be limited.

  Marginal dams are not suggested.

  Conclusion: This site is part owned by NPWS, conservation of sections of the site nay be possible if peat cutting ceases soon. A lot of work is required for possible minor improvements to the site. Restoration is not recommended.

- *CLOONMOYLAN, Co. Galway* (248)

  This site has been selected for conservation as it represents a range in central vegetation complex and as it features a wooded stream which originates from an external source.
  Condition: Very good, there is a high proportion of primary central and flushes. Large areas of central and sub-central complexes occur.

  Active peat cutting: High (76%). This must be halted at once.
  % of bog remaining since the 1840s: 62.0, most peat cutting has occurred to the N, NNE and in a band to the S. The main road at the W of the site separates a section of the original basin. It is important that this area is not cut-away. It is not included within the present site

- *CLOONCHAMBERS, Co. Roscommon* (600)

  This site has been selected for conservation as it represents a range in geomorphological setting and because of a large fen/internal river system.
  Condition: Very good, large flush area, small area of 2^{O} central. A large flush occurs but the remainder of the site is very dry

  Active peat cutting: Medium (26%). This must cease immediately.
  % of bog remaining since the 1840s: 37.0, cutting has occurred all around the site. It has been most extensive to the N and E, particularly to the E.

  Surface drains: (2,440m) Some short surface drains occur associated with peat cutting and field development. These could be dammed but little effect expected.

  Research is needed into how the flush functions. A more detailed vegetation map of the flush would be useful.

  Marginal drains: A deep drain runs through the flush carrying water from the mineral ridge to the E and from agricultural land to the S. This should be made shallower (1528.7m). A management plan should be drawn up as this may cause flooding of adjoining agricultural land.

  Conclusion: Conservation of the geomorphological and fen importance is possible with little effort. Restoration work is not recommended, apart from the suggestion for the fen drain mentioned above. The narrow nature of this site suggests that it may always have been rather dry.

- *CLOONCULLAUN, Co. Galway* (245)

  This site has not been selected for conservation.
  Condition: Poor (No primary ecotope apart from flushes). The bog is on a gentle slope to the S. The northern section is flat and therefore central ecotopes expected whereas the southern section is on a slope and may therefore naturally be drier.

  Active peat cutting: Low to medium (24.5%) (high facebanks to the NE and E). Subsidence will still be occurring in these areas so the site will be drying out further. The prospects are poor for this site in conservation terms. Peat cutting should be phased out.
  % of bog remaining since the 1840s: 54.7.0, cutting has occurred all around the site.

  Surface drains: (2,700m) Large drain/road through the centre of the site with branch to E runs through a flush with swallowholes. Surface drains can be blocked but the effect would probably be limited.

  Marginal dams are not suggested.

  Conclusion: This site is part owned by NPWS, conservation of sections of the site nay be possible if peat cutting ceases soon. A lot of work is required for possible minor improvements to the site. Restoration is not recommended.

- *CLOONMOYLAN, Co. Galway* (248)

  This site has been selected for conservation as it represents a range in central vegetation complex and as it features a wooded stream which originates from an external source.
  Condition: Very good, there is a high proportion of primary central and flushes. Large areas of central and sub-central complexes occur.

  Active peat cutting: High (76%). This must be halted at once.
  % of bog remaining since the 1840s: 62.0, most peat cutting has occurred to the N, NNE and in a band to the S. The main road at the W of the site separates a section of the original basin. It is important that this area is not cut-away. It is not included within the present site

boundary. Following studies on the flush systems it may be necessary to enlarge the NHA to protect this aspect of the site (water feeding the flush may originate from Rosturra wood).

Surface drains: 25,518m. These are extensive to the SE and NE of the bog. Several roads are seen in these areas also. Most of these are associated with drying out, so if infilled the re-wetting effect should be significant. Detailed levelling will be required for the effective blocking of these drains. A levelling grid may be needed where the drain intensity is high.

Paleoecological research will be required with the flush system to the N and hydrological investigations would also be desirable. Detailed maps of the flushes would also be of use.

Marginal dams: These may be required at the NNW and to the mid-E where deep marginal drains occur (2km). Deep drains in the cut-away should be dammed.

Conclusion: For relatively little investment, that is, blocking of surface drains should help to conserve a large area of central and sub-central ecotope. Further work will be costly and should only occur if supported by research findings on subsidence and functioning of the flushes.

CLOONSHANVILLE, Co. Roscommon (614)

This site has been selected for conservation as it represents a range in geomorphological setting, central vegetation complex and a large area of *Betula* bog woodland with *Salix* and indications of upwelling ground water.
Condition: Medium, some primary central a large flush and a lot of sub-central.

Active peat cutting: low (high facebank to the W). This must be stopped as soon as possible.
% of bog remaining since the 1840s: 46.0, most peat cutting has been carried out to the S, SE and NE with lesser amounts to the W and E.

Surface drains: (2,977m) Are seen associated with the two forestry plantations on the high bog. A road and drain separates the Main Lobe from the SE Lobe. The SE lobe has many surface drains and the S end of the flush channel has been artificially deepened. Blocking of all surface drains should be carried out. The drains alongside the bog road at the S of the site should be blocked.

The geohydrological relationship between the flush and regional ground water table needs to be investigated further. Paleoecological research including macrofossil analysis is required for the flush. A detailed map of the flush vegetation would also be useful.

Marginal dams: These may be required in the future at the W and N (2.0km). The deep marginal drain to the W should be blocked.

Conclusion: Conservation and restoration relatively easy.

CORBO, Co. Roscommon (602)

This site has not been selected for conservation.
Condition: Low-medium, 2^{o} central and some flushes occur. The 2^{o} central is confined to subsidence sections and therefore may be protected.

Active peat cutting: High, most to the N and mid S. This means that the situation is still unstable as widespread subsidence is still occurring and will occur for some time.
% of bog remaining since the 1840s: 29.4, most cutting has occurred to the S, E, mid W and N but significant amounts have been carried out all around the site.

Surface drains: (2560.5m) There are few surface drains but a small area to the SE has been prepared possibly for moss peat production.

Marginal dams: These would be required all around the site if central or sub-central complexes were to be reintroduced or extended (7.7km).

Conclusion: Due to the shape of this site marginal works would be extensive. Conservation of the wet areas in the subsidence hollows is possible. Restoration is not recommended.

- *CORLISKEA, Cos. Galway/Roscommon* (219 (2110))
  This site has been selected for conservation as part of the combined Corliskea/Trien as it represents a range in central vegetation complex and has an area of *Betula* bog woodland. Condition: Excellent. Primary central and a large area of flush.

  Active peat cutting: Medium to high, mostly to the N and E. All peat cutting must be stopped.
  % of bog remaining since the 1840s: 39.6, most bog has bee cut-away to the E and N with smaller amounts to the S and SW. The bog is close to its original edge at the mid-S.

  Surface drains: These are concentrated to the E and NW with short drains along the S edge. Most of these have significant flow, particularly those associated with the forestry plantation to the NW. An old, long drain crosses the site following the county boundary. This is mostly infilled except where it approaches the bog edge. All surface drains should be blocked.

  Some research is required into how the flushes function. Is there a link with the mineral subsoil?

  Marginal dams: These are not recommended at present but may be considered necessary at a later stage.

  Conclusion: The importance of site is possible to conserve with little input. Restoration would require more effort and further research would be required before any work is undertaken.

- *CROSSWOOD, Co. Westmeath* (678)
  This site has not been selected for conservation.
  Condition: Very good, large area of primary central ecotope.

  Active peat cutting: Medium-high, most at the SE and NW with high facebanks in both areas. This should stop immediately or subsidence will continue.
  % of bog remaining since the 1840s: 53.0, most peat cutting has occurred to the SE, with lesser amounts to the NNW and SW.

  Surface drains: (8,354m) There is a concentration of old drains at the SW with recent drains to the mid-N edge. One old drain extends the length of the site. All of these should be blocked and significant re-wetting should occur. The ones to the N extend into the wettest section of the site.

  Marginal dams: Marginal drying out effects are significant to the SE and NW, due to peat cutting and to the E, due to deep marginal drains. Dams (3.0km) or blocking of marginal drains are required in all these areas.

  Conclusion: Costly work would be required to conserve this site. The large area of central complex and the presence of *S. pulchrum* may make it worthwhile if other competing sites prove impossible to conserve.

- *CURRAGHLEHANAGH, Co. Galway* (256)

  This site has not been selected for conservation.
  Condition: Medium. Primary central, some 2° central and flushes occur.

  Active peat cutting: Medium-high (high facebanks at the SW and mid-north).
  % of bog remaining since the 1840s: 51.0, most peat cutting has occurred to the SE, E, NE and NW. At the SW the bog is close to its original edge.

  Surface drains: A long old drain extends through the site. A series of 6 drains have been dug all along the W edge. There are many small drains to the N and turbary marker drains to the NE. Total surface drains 6,155m. Blocking of all of these is required.

  Marginal dams: Extension of the wet central core would require marginal dams to the E as an absolute minimum as most drying out appears to be occurring from the E but dams would also be required around much of the remainder of the site (3.0km). The drying out from the E is probably related to the two bog bursts seen on this edge. However marginal dams are not considered to be a practical solution as their construction is probably not technically possible.

  Conclusion: Conservation of this site is not suggested. Restoration would be difficult to impossible.

- *DERRINEA, Co. Roscommon* (604)

  This site has been selected for conservation as it represents a range in the geomorphological variation, variation of central vegetation complex and has a small swallow hole lake.
  Condition: Excellent, large area of primary central ecotope.

  Active peat cutting: low-medium (16%), mostly to the S. This must cease.
  % of bog remaining since the 1840s: 62.0, most cutting has occurred to the S. The N and E edges of the site correspond to the original bog edge.

  Surface drains: (2,132m) A few old drains are seen to the N and E. These should be blocked. S of the till mound more significant drains associated with peat cutting occur. These should also be blocked.

  Weirs may be required in the river to raise the water table. The depth and quality of the regional ground water should be examined. To the W of the site, the mineral mound area should be bought. This has high priority. The land to the S of the site as far as the lake must be purchased also.

  Marginal dams: These are probably not required at this site as the till mound to the S of the bog offers a barrier to water movement to the S. However the deep marginal drains to the W should be blocked as soon as possible as they are affecting the central complex.

  Conclusion: Conservation of the importance of the site probably relatively easy, restoration will be more difficult as work on the river may be necessary.

- *DERRYNABROCK, Co. Mayo* (457)

  This site has been selected for conservation as it represents a range in the variation of central vegetation complex.
  Condition: Good, central primary ecotope and flushes present.

  Active peat cutting: High, mostly at the S and around the E section of the site. This should be stopped, most importantly at the S side of the main section of the site.
  % of bog remaining since the 1840s: 49.0, most peat cutting has been carried out to the E and some to the mid-S. Close to the original bog edge at the W and N of the main section.

  Surface drains: (3,955.8m) Surface drains are seen at the S side of the site and to the E. One deep drain bi-sects the bog. These should all be blocked. Re-wetting should occur, but as

most drains close to the bog edge the effect of damming may be limited. However it should prevent further drying out.

High facebanks at the NE of the Main Lobe could be graded and sods of vegetation placed on top.

The land between the bog and the rivers to the N and S should also be purchased. A vegetation map of the area between the high bog and the rivers should be made. Investigations in the level of the regional ground water table should be made.

Marginal dams: Across the narrow neck of the site a dam may be required (0.25-0.5km).

Conclusion: For restoration the E side of the site could be excluded as it is of little interest and a ridge of mineral material appears to run under a part of the narrow connection between them. A marginal dam may be required here. Otherwise conservation/restoration at this site is relatively simple.

FERBANE, Co. Offaly (575)

This site has been selected for conservation as it represents a range in geomorphological setting.
Condition: is poor, there are no primary ecotopes but there is some secondary central ecotope present in a subsidence area.

Active peat cutting: Low (high facebanks to the N, NW and E) (11.3%). All peat cutting should cease. Most subsidence has probably already occurred.
% of bog remaining since the 1840s: 46.0 Most has been cut-away from the N side.

Surface drains: Pine is invading from the N, E and S. This is associated with extensive surface drains seen in this area (total drains 12, 041m). Blocking of these would cause re-wetting over a large area.

Conservation of the site is still possible. All areas which have been cut should be bought. Restoration of lagg areas may be possible but not to the N of the site.

Marginal dams: To the N, NW and E marginal drainage effects are significant. Marginal dams would be required here if restoration of central vegetation areas was to be achieved (3.0km).

Conclusion: Conservation of the geomorphological importance of the site is possible. From the ecological side, initial surface drain blocking should cause re-wetting. However the marginal drainage effects still remain and restoration work would require considerable effort.

FIRVILLE, Co. Tipperary (645 (647))

This site has been selected for conservation as part of the combined site of Kilcarren/Firville as it represents a range in geomorphological setting, central vegetation variation and has an infiltration lagg area.
Condition: Medium-good , primary and 2^{o} central and some primary marginal.

Active peat cutting: None, high facebanks to the NNW.
% of bog remaining since the 1840s: 60.0, most cutting has occurred to the NNW and SSW of the Main Lobe and N of the N Lobe, otherwise close to the original bog extent.

Surface drains: Network of surface drains to the S which are most infilled. A deep marginal drain is seen along the N, NE and E of the N Lobe between the bog and agricultural land. Blocking of these is required

A main road and drains extend along the W edge and a small famine road extends into the site. In common with Kilcarren the roadside drains should not be deepened.

For lagg restoration along the N side purchase of adjoining land and blocking of marginal drains required.

Between the NW of this site and the NE side of Kilcarren research should be carried out into the possibilities of lagg re-generation. Presently there are significant amounts of groundwater upwelling in both these areas with ECs of 400µS/cm. This would involve flooding the cut-away area, including part of the main road allowing the formation of vegetation mats the precursor to lagg formation. To the S no restoration of lagg is suggested as the cut-away areas are too extensive. However a buffer zone of undrained land is suggested to the S of both sites.

Marginal dams: Not suggested.

Conclusion: The 2^{o} central vegetation is in a subsidence section and may be stable. Conservation of the importance of the site should be relatively easy here. Restoration works will be more difficult and further research is required first.

- *FISHERSTOWN, Co. Longford* (1447 (441))

  This site has been selected as a site to be conserved as part of the combined site of Ballykenny/Fisherstown due to its representation of the range of geomorphological setting.
  Condition: Poor (no central or other primary ecotopes). However a large area of sub-central ecotope is present. This is probably still drying out.

  Active peat cutting: Low at edges (9%) but moss peat production in centre of site.
  % of bog remaining since the 1840s: 63.8 (PC mostly carried out to the W).

  Immediate threat is moss peat production, this and any other peat cutting must cease at once. If the peat cutting continues there is little hope for the site. The remainder of the high bog must be bought soon.

  Surface drains on high bog: (Total drain length 1,310m) New and old surface drains will further the drying out trend. Blocking of surface drains would cause some re-wetting but fundamental drying out problem remains probably due to extent of peat cutting on W side.

  Marginal dams: These are necessary on the W side to halt the effect of peat cutting (2.5km). This site has been chosen for its geomorphological characteristic (floodplain bog) so that the main interest of the site will not disappear if dams are not constructed. However if the site is being conserved, prevention of a deterioration in the vegetation cover should also be an aim.

  Callow protection is also important, re-dredging of the Camlin River should be prevented and a management plant drawn up for maintenance of species diversity. This may involve the use of grazing livestock. Fencing may be required. If some drains were blocked in the callow area mesotrophic peat development may occur.

  Conclusion: This is an important geomorphological site which would retain its essential interest even if further drying out were to occur. Retention of the ecological interest of the site could however be achieved with medium effort. Conservation and restoration of this site is recommended.

- *FLUGHANY, Co. Mayo* (497)

  This site has been selected for conservation as it represents a range in climatic (rainfall) and central vegetation complex variation.
  Condition: Very good, primary central and flushes.

  Active peat cutting: Medium, this should be stopped at once.
  % of bog remaining since the 1840s: 48.0, most cutting has occurred to the S and E.

  This site has been separated into two sections using a ridge of mineral material. The southern section is of higher quality and is thus the area considered for conservation.

  Surface drains: New surface drains are seen to the W. These should be blocked.

  Marginal dams: These may be required at the S.

  Conclusion: Conservation of the representation of climatic variation is easy. The conservation of the southern section of the site, where the central vegetation complex occurs, should also be relatively simple. Restoration would be difficult.

- *GARRISKIL, Co. Westmeath* (679)

  This site has been selected for conservation as it is ecologically important as it represents a range in the variation of presence of plant indicator species.
  Condition: Very good, no primary central but a large area of 2^{O} central and significant amounts of sub-central.

  Active peat cutting: None.
  % of bog remaining since the 1840s: 51.0, most peat cutting has occurred to the W and in a band to the S and E. An area of bog to the NNW is separated by the railway.

  Surface drains: At the NE there is a network of recent drain which have caused some drying out and which will affect the central area in the future. These should be blocked along with other minor surface drains on the site (total drains 11,733m).

  Marginal dams: The gradient at the S of the site is large due to subsidence. This appears to be due to the steepening of slopes in this area due to slumping towards the river. It is felt that the gradient is too large for the use of marginal dams. Perhaps dams could be used further in to the high bog but further research is needed (3.0km).

  Conclusion: Surface drain blocking is important for conservation of the ecological importance of the site but the problem of drying out on the S side of the site remains. Restoration work to prevent further drying out will require medium effort and further research ie necessary first.

- *KILCARREN, Co. Tipperary* (647 (647))

  This site has been selected for conservation as part of the combined site of Kilcarren/Firville as it represents a range in geomorphological setting, central vegetation variation and has an infiltration lagg area.
  Condition: Poor-mediocre, No primary apart from flushes, some 2^{O} central. The central area is located in a subsidence hollow.

  Active peat cutting: Low to medium (High facebanks to the NNE). All peat cutting must cease immediately.
  % of bog remaining since the 1840s: 56.0, most peat cutting has been carried out to the SE and around the N Lobe. Apart from these sections quite close to the original bog edge.

  Surface drains: (3298.7m) These should be blocked. Although some have infilled with *Sphagnum* they probably still act as surface flow focus points. Blocking would result in some re-wetting. A main road and associated surface drains occur along the E edge.

Marginal dams: Not suggested at present. Along the N edge very deep marginal drains need to be blocked. To enable this agricultural land will have to be purchased. A management plan will be required for this area.

Lagg: Restore infiltration lagg to N by blocking drains in order to raise the water-table. Need to own adjacent land to stop cattle poaching in this area.
The road to the E appears to have caused little subsidence but deepening of the drains along the road should be prevented.

Conclusion: Conservation of the importance of the site should be relatively easy here. Restoration works will be more difficult and further research is required first.

- *KILLYCONNY, Cos. Cavan/Meath* (6)
  This site has been selected for conservation as it represents a range in geomorphological setting.
  Condition: (no central or primary ecotopes). However a large area of sub-central ecotope is present.

  Active peat cutting: Medium intensity (high facebanks to the W) (42.0%). If peat cutting continues conservation of this site will not be possible as subsidence will continue.
  % of bog remaining since the 1840s: 37.0, cutting has occurred all around the site.

  Surface drains: (2118.7m) Some surface drains are present, blocking of these would have a limited effect.

  Marginal dams would be required all around this elongate site to protect the site from further drying out or to re-introduce central ecotopes (6.0km).

  Conclusion: This site was chosen for conservation on the basis of its geohydrological interest. If conservation of the peat archive is to be achieved the site must be bought and peat cutting must cease. Restoration of ombrotrophic bog at this site is not recommended but conservation is necessary. This may be possible in the long term in conjunction with regeneration of bog growth in the cut-away.

- *KILSALLAGH, Co. Galway* (285)
  This site has been selected for conservation as it represents a range in central vegetation complex.
  Condition: Medium, primary central and some flushes.

  Active peat cutting: Medium-high (29%), most to the S, E, SW and N. All peat cutting must cease as subsidence may cause further drying out of the wet plateau area.
  % of bog remaining since the 1840s: 53.4, most bog cut-away to the SW but with significant amounts all around the site.

  Surface drains: (8,340.8m) A concentration of recent drains run into a central drain which runs through a swallow hole flush. Short drains are also seen around the bog edge. Drains and roads also occur to the N. All surface drains should be blocked.

  Marginal dams: None suggested.

  Conclusion: The south of the site is sloping and would be expected to be drier than the N section which is on a plateau and thus expected to be wet. If the central drain was blocked and the forestry removed the N section should remain wet. Conservation of the wet plateau area is therefore possible. Restoration work is not suggested.

- *KNOCKACOLLER, Co. Laois* (419)
  This site has not been selected for conservation.
  Condition: Poor, some 2^{O} central in subsidence area.

  Active peat cutting: High, mostly at N and E (high facebanks at N and S). All peat cutting must stop immediately as the marginal areas of the bog are now rather narrow.
  % of bog remaining since the 1840s: 20%, peat cutting has been carried out all around the site in the past, most to the N and SW.

  Surface drains: (131.1m) Very old surface drain leading from central section is probably associated with the subsidence. The end of the drain close to the bog edge should be blocked.

  The marginal areas remain a problem as the facebank edges are quite high. Reshaping of the edges may be required. Investigations into the amount of peat remaining in the immediate area should be undertaken.

  Marginal dams: To protect some of the SC areas marginal dams may be required (3.0-4.0km).

  Conclusion: 2^{O} central area may be protected from drying out. The sub-central area is relatively large, it may also be re-wetting. If this site was left as it is the 2^{O} central area will probably increase in size or at least remain stable due to the effects of subsidence. Conservation is therefore possible.

- *LISNAGEERAGH, Co. Galway* (296)
  This site has been selected for conservation as it represents a range in geomorphological setting.
  Condition: Good, some Primary central, marginal and sub-marginal ecotopes with 2^{O} central and flushes also.

  Active peat cutting: High (high facebanks at the SW, W and very high to the mid-E). This must be halted immediately.
  % of bog remaining since the 1840s: 63.9, significant amounts of cutting have occurred to the W and SSW with small amounts to the E and N. The bog is close to its original edge at the SSE, ESE, NNE and N of the W edge.

  Surface drains: 10,100m. A long drain runs the length of the site. A road and several drains cross the site and there are numerous roads and associated drains in the cut-way to the W. Numerous other drains occur which are mostly at the bog edge. All surface drains should be blocked.

  Marginal dams: None suggested.

  Conclusion: Conservation of the importance of the site is possible with little effort. Restoration would require considerable effort.

- *LOUGH LURGEEN, Co. Galway* (301)
  This site has been selected for conservation as it represents a range in geomorphological setting and has several flush systems, including an 8ha lake.
  Condition: Excellent, some primary central with large flush areas and other primary ecotopes.

  Active peat cutting: low (11%)
  % of bog remaining since the 1840s: 74.5, most cutting has occurred to the S and between the 2 bog lobes.

  Surface drains: short drains are seen in many places around the site. Some long older drains also occur. All of these should be blocked (7,375m).

Marginal dams: These are probably not required but may be needed in the future where peat cutting has occurred between the Main Lobe and the southern section of the site (0.5km). Marginal drains to the N should be infilled and the level in the river which runs between the two lobes of the site should be increased.

An examination of how the lake functions and its links with regional ground water is needed. Paleobotanic and geohydrological research is necessary.

Restoration of infiltration lagg areas around the drumlin at the N of the site should be considered.

Conclusion: Little input is required to conserve the important features of this site, however burning should be prevented.

- *MOANVEANLAGH, Co. Kerry* (374)
  This site has been selected on an ecological basis, namely its representation of the range in presence of plant indicator species.
  Condition: Very poor, No central complex and only a small flush occurs. Invasive species widespread. 2^{o} sub-central area occurs associated with a bog burst.

  Active peat cutting: High (42.0%) (high facebanks to the mid-E and mid-W).
  % of bog remaining since the 1840s: 39.0, most peat cutting has occurred to the N and W but significant amounts all around site.

  Surface drains: Many small surface drains extend from the bog edge (2534.4m). These could be blocked but with little effect.

  Marginal dams: These would be required all around the site if the present condition to be maintained or if central complexes were to be re-introduced (6.9km). Realistically this is not possible.

  Conclusion: The site has been chosen for conservation on the basis of its ecology. As this seems impossible to conserve, the site should be dropped. Conservation/Restoration is therefore not recommended.

- *MONGAN, Co. Offaly* (580)
  This site has been selected for conservation as it one of only two midland sites with numerous open water pools.
  Condition: Excellent, large area of 2^{o} central.

  Active peat cutting: Very low (4.8%) but areas where peat cutting is still occurring should be purchased at once.
  % of bog remaining since the 1840s:40.5, most bog has been cut to the E and W with some to the S. Least cutting has occurred along the N edge.

  Surface drains: (7,737m) Two concentrations of drains are seen at the E and W of the site. These have been partially blocked but need more substantial dams.

  Marginal dams: A deep marginal drain runs along the E side and parts of the N and S. These need to be blocked. Adjoining mineral soil (esker) will have to be bought to the N if marginal drains are to be blocked. Marginal dams are not suggested at present.

  Research on subsidence is required. Cut-away areas should be bought and at the SW there may be some possibilities for lagg restoration but probably limited.

  Conclusion: Surface drain blocking is easy but the marginal works which may be required to halt the drying out occurring to the S of the site may be extensive. Further research is required to determine if marginal dams are required.

- *MONIVEA, Co. Galway* (311)

  This site has not been chosen for conservation.
  Condition: Very good, flushes cover a large area and there is some primary marginal and sub-marginal ecotopes.

  Active peat cutting: Very high (71%), mostly to the N, E and SE. All must be halted otherwise subsidence will continue and the site quality will deteriorate.
  % of bog remaining since the 1840s: 47.3, most cutting has taken place to the S, SE, W and N (broad band). Close to the original bog edge at a small area to the SW.

  Surface drains: (3,875m) Many short drains at the bog edge. Long double drain /road extends to the N with small drains leading out from them. These should all be blocked.

  An examination of how the flush functions from a historical and present day perspective is necessary. A detailed vegetation map of the flush is important.

  Marginal dams: None suggested.

  Conclusion: Conservation of present condition possible. Restoration relatively difficult as the central section may have subsided. Restoration not recommended.

- *MOYCLARE, Co. Offaly* (581)

  This site has been selected for conservation as it represents a range in central vegetation complex.
  Condition: Mediocre, Primary central area and flush present. Large area of sub-central occurs which is probably still drying out. Pines are encroaching from the E and NE and extend into the centre of the site in places.

  Active peat cutting: Low, mostly to the N and SSW (high facebanks at the N side). All must be stopped. BnM should obtain the remainder of the site before the site is purchased by NPWS.
  % of bog remaining since the 1840s: 58.4, most peat cutting has occurred to the N and W, otherwise close to original edge.

  Surface drains: (1180m) Deep drain and road almost crosses the site and there is subsidence associated with this. Old drains occur in places around the edges of the bog. Blocking of these and the road drain would result in some re-wetting.

  Marginal dams: These are not suggested except in areas where fissures occur.

  Conclusion: Blocking of surface drains should cause extensive re-wetting of the site and achieve conservation of the central complex. Restoration works would require medium effort.

- *REDWOOD, Co. Tipperary* (654)

  This site has not been selected for conservation.
  Condition: Good, no Primary central but a large area of 2^{o} central and some flushes.

  Active peat cutting: Medium, concentrated along the W side with some at the N.
  % of bog remaining since the 1840s: 67.9, most cutting has occurred to the W, the site is more or less intact along the N edge.
  Surface drains: (Total 9051.5m). Many surface drains are associated with the peat development on the W side. These should all be blocked.

  Marginal dams: There is a deep marginal drain which runs the length of the E edge, the water level must be raised in this. Dams may be required to the W (4.0km).

Conclusion: This site is part owned by NPWS. The 2^{o} central area may be stable and thus conservation is possible but the remainder of the site is drying out. Restoration is not suggested.

- *SHANKILL WEST, Co. Galway* (326)
  This site has been selected for conservation as it represents a range in geomorphological setting and has a large infiltration and discharge lagg area.
  Condition: Medium, large area of 2^{o} central in a subsidence area.

  Active peat cutting: Medium, one area of moss peat production (high facebanks to the NNW and SSE).This should be stopped straight away.
  % of bog remaining since the 1840s: 62.0 but part of a multi-basin bog. Most peat cutting has occurred to the E and NNE with some to the NNW. The S and SW edges are close to the original bog edge.

  Surface drains: Total surface drains 3620m. Old drainage network extending into the centre of the site probably resulted in central subsidence. New deep drains associated with moss peat production also occur. All these drains should be blocked.

  Marginal dams: These may be required at the NNW and to the E (0.5-1.0km). The marginal drain between the bog and agricultural land at the S and SW of the site should be dammed.

  Conclusion: To protect the infiltration lagg to the N all adjacent land between the bog and the small lake should be purchased or management agreements set up with the existing land owners. Vegetation mapping of this area should be undertaken. To the S at least 100m of mineral soil should be bought and a management agreement set up with local farmers for the catchment area. Conservation of the central area is easy as in a subsidence area.

- *SHARAVOGUE, Co. Offaly* (585)
  This site has been selected for conservation as it represents a range in geomorphological setting and the presence of a large fen area.
  Condition: Poor (No central ecotope and no primary apart from a small flush). This site may never have had a central ecotope as it is very narrow and elongate with a high dome. However the northern section is probably dry due to peat cutting and subsidence.

  Active peat cutting: Very low (5%). All must cease.
  % of bog remaining since the 1840s: 47.7 (Most peat cutting carried out to the N and some to the S and E).

  Surface drains (18,492m) are seen across the centre of the site (high intensity, 22 drains in 22ha) These drains are very recent and may not have been the cause of a lack of central ecotope. Blocking of these should cause quite large scale re-wetting but may not allow central ecotope to develop. All surface drains should be blocked.

  Marginal dams may be required at the N, S and E to reduce marginal effects (2-3km). However the fen to the E may be affected if marginal dams were inserted in this area.

  Repeated burning at this site may be partly responsible for the vegetation cover seen today. As mentioned above the dome of this bog is quite steep and on steep slopes the increase in surface water run-off caused by burning of the vegetation cover is more significant.

  The site has been chosen for conservation due to the fen which occurs along the E side at the base of a limestone bedrock ridge. This area must be bought and a management plan drawn up for the ridge as far as the watershed. Agreements should be reached with farmers on the use of fertilisers or slurry.

  Investigations into the water level in the River to the W should be made; in the past the water level has been lowered. Can the level be increased by inserting weirs. How will the

upstream area be affected? The dredging of the river has probably had little effect on the high bog but further dredging should be prevented. Both sides of the river should be purchased.

Conclusion: Conservation of the high bog to pre-recent drainage state is relatively easy. Development of central ecotope using marginal dams difficult and ecologically questionable. The fen area should be relatively easy to conserve and restore. Total restoration would be difficult due to drainage of the adjacent river.

- *TAWNAGHBEG, Co. Mayo* (547)
  This site has been selected for conservation as it represents a range in central vegetation complex and climatic variation.
  Condition: Very good, primary central and a large flush occur.

  Active peat cutting: Medium (19.2%), mostly to the W. Peat cutting must cease.
  % of bog remaining since the 1840s: 58.0, most peat cutting has occurred to the NNW, mid-E and a band along the N and NNE. Least has occurred to the S where the bog is still close to the original edge.

  Surface drains: These are associated with forestry to the N and one long drain crosses the NNE section. Otherwise the drains are short and seen at the bog edge. Flow is significant in these and they should be blocked (2,413m).

  Marginal dams: These may be required at the deep facebanks to the W (0.5km). Re-shaping of some face bank edges may be possible in some areas.

  The forestry to the N should be removed. To the S and E of the site the area of cut-away bog, as far as the mineral soil, should be purchased as well as the high bog. Some hydrological work is required. A vegetation map of the surrounding vegetation would also be necessary. To the E of the site the site of a former lake is seen. The possibilities of creating a marsh in this area should be examined.

  Conclusion: Conservation of the importance of the site is possible by blocking of surface drains and removal of forestry.

- *TRIEN, Co. Roscommon* (616 (2110))
  This site has been selected for conservation as part of the combined Corliskea/Trien site as it represents a range in central vegetation complex and as it has an area of *Betula* bog woodland.
  Condition: Medium, very limited area of primary central and an extensive flush.

  Active peat cutting: High, mostly in the centre of the bog. All peat cutting must cease immediately if this site is to be conserved.
  % of bog remaining since the 1840s: 59.4, peat cutting has bi-sected the site and has been carried out all around the edges. Least has occurred at the S side of the SE Lobe.

  Surface drains: (9,802m) A series of 6 drains run along the S of the site, a road and drain run through the centre and a road and drain extend into the flush. Many deep drains are seen all around the site. These would all need to be blocked.

  Marginal dams: not suggested.

  Conclusion: The Betula bog woodland is the main feature of interest which may be stable as it is in sunken area. Conservation of the ombrotrophic bog is necessary as the flush is an integral part of the system. This will only be possible if peat cutting ceases immediately. Restoration for ombrotrophic bog not recommended.

TABLE 6.11 Summary of Restoration/Conservation Measures required at Sites visited during the Raised Bog Restoration Project, 1994.

SITE NAME	Block Surface Drains	Block Marginal Drains	Build Marginal Dams	Reshape Edges	Forestry Removal	Invasive Spp. Removal	Lagg Work	Other Margin Work	Manage Agree.	Further Research	Conserve Poss.	Restore. Sugg.
Addergoole	+	+	+									
Monivea	+						+	+	+	+	+	+
Cloonmoylan	+		+							+	+	-
Barroughter	+	+	+							+	+	+
Lough Lurgeen	+	+	+				+	+		+	+	+
Lisnageeragh	+				+	+	+			+	+	+
Kilsallagh	+										+	+
Corliskea	+				+						+ / -	+
Camderry	+				+	+					+	+
Clooncullaun	+				+					+	+	+
Curraghlehanagh	+										+ / -	-
Shankill West	+	+	+		+						+ / -	-
Carrownagappul	+	+					+	+	+	+	+ / -	-
Brown Bog			+			+			+		+	+
Ballykenny	+		+								+	+
Fisherstown	+		+			+		+	+		+	+
Tawnaghbeg	+		+					+	+	+	+	+
Flughany	+				+	+				+	+	+
Derrynabrock	+		+	+							+	+ / -
Mongan	+	+								+	+	+
All Saint's Bog	+		+					+	+	+	+	+
Sharavogue	+		+					+	+	+	+	+
Ferbane	+		+			+	+	+	+	+	+	+
Moyclare	+		+			+	+	+			+	+
Blackcastle	+		+				+	+			+	+
Bellanagare	+										-	-
Cloonshanville	+	+	+		+					+	+	+
Callow	+									+	+	+
Trien	+										-	-
Corbo	+		+								+	-
Cloonchambers	+	+									+	-
Carrowbehy	+	+					+				+	-
Derrinea	+	+		+	+		+	+		+	+	+
Ballyduff	+	+	+							+	+	+
Clonfinane	+	+	+/-					+	+	+	+	+
Redwood	+		+				+	+	+	+	+	+
Firville	+	+									+	+
Kilcarren	+	+					+	+	+	+	+	-
Garriskil	+		+				+	+	+	+	+	+
Ballynafagh	+		+			+					+	+
Crosswood	+	+	+		+						+	+
Moanveanlagh	+		+								+	+
Knockacoller	+		+	+		+					-	-
Killyconny	+		+			+					+	+

6.3.3 Conclusions on Conservation/Restoration

Only one site which was selected as a potential SAC was considered to be technically impossible to conserve for the reason for which it was selected. This was Moanveanlagh Bog, Co. Kerry which was selected on the basis of it representation of the SW variation in plant indicator species. As the importance of the site was considered to be technically impossible to conserve it was not proposed as an SAC.

6. 4 DESIGNATION AS SITES OF COMMUNITY IMPORTANCE (POTENTIAL SPECIAL AREAS OF CONSERVATION (SACs)).

In order to comply with Council Directive 92/43/EEC a NATURA 2000 form was filled in for each site selected for conservation/restoration. Details on each field to be filled are contained in the explanatory notes attached to the standard data entry form. The following are the details which were inserted for each raised bog site. Explanatory notes on the site in question also accompany each form.

Following a consideration of the conservation/restoration possibilities of all sites a total of 31 sites were proposed as SACs, 29 from the original group of sites surveyed as part of the RBRP with the addition of Clara, Raheenmore and Sheheree. The 31 sites proposed as SACs are shown in Table 6.12. This table also shows the area of the site within the NHA boundary, the area (ha) of high bog within the NHA, the % of active raised bog within the NHA and the % of the National raised bog area that it represents (based on a national resource of 20,000ha).

1. Site Identification.

1.2 Site Code
This consists of the country code (Ireland is 8) and the relevant number assigned to the site during the NHA survey.

1.3 Compilation Date
This is the date the form was first filled in.

1.5 Relation with other Nature 2000 Sites.

1.6 Respondents
This is always the National Parks and Wildlife Service, 51, St. Stephen's Green, Dublin 2, Ireland.

1.9 Site Name
This is the name the site is most commonly called (usually based on a townland name) and the county or counties in which it occurs.

2. Site Location.

2.2 Area (ha)
In most cases this area corresponds to the area of the NHA site using the boundaries established during the NHA survey. In some cases, particularly where the site was not visited during the NHA Survey (consult boundary), the boundaries had to be extended (See Section 6.3.1).

2.4 Altitude (m)
This was calculated from bench marks and spot heights on the 1901 6" sheets.

2.5 Administrative Region.
This is the relevant NUTS code and Region Name of the site and the % of the site in each region if it crosses more than one.

TABLE 6.12 List of 31 Proposed Raised Bog SACs (Raised Bog Restoration Project, 2/5/1995)

SITE NAME	COUNTY	NHA No.	Area (Ha) High Bog	NHA Area	% Of Active Bog in NHA	%Nat Area
* Addergoole	Galway	223	171.0	568.0	30.1	0.86
Cloonmoylan	Galway	248	440.0	509.0	86.4	2.20
Barroughter	Galway	231	91.5	167.0	54.8	0.46
Lough Lurgeen	Galway	301	604.0	963.0	62.7	3.02
Lisnageeragh	Galway	296	283.0	396.0	71.5	1.42
Kilsallagh	Galway	285	189.0	255.0	74.1	0.95
Shankill West	Galway	326	70.5	124.0	56.9	0.35
Carrownagappul	Galway	1242	320.0	451.0	71.0	1.60
* *Ballykenny*	Longford	441	282.0	640.0	44.1	1.41
* *Fisherstown*	Longford					
Tawnaghbeg	Mayo	547	78.0	106.0	73.6	0.39
Flughany	Mayo/Sligo	497	170.0	207.0	82.1	0.85
Derrynabrock	Mayo/Roscommon	457	68.0	102.0	66.7	0.34
Mongan	Offaly	580	125.0	173.0	72.3	0.63
All Saint's Bog	Offaly	566	234.0	354.0	66.1	1.17
Sharavogue	Offaly	585	137.0	200.0	68.5	0.69
Ferbane	Offaly	575	117.0	141.0	83.0	0.59
Moyclare	Offaly	581	79.0	120.0	65.8	0.40
Clara	Offaly	572	414.5	827.0	50.1	2.07
Raheenmore	Offaly	582	135.0	182.0	74.2	0.68
Bellanagare	Roscommon	592	741.0	1115.0	66.5	3.71
Cloonshanville	Roscommon	614	152.0	214.0	71.0	0.76
Corliskea	Galway/Roscommon	2110	460.0	657.0	70.0	2.30
Trien	Roscommon					
Cloonfelliv	Roscommon/Galway					
Clooncharnbers	Roscommon	600	193.5	293.0	66.0	0.97
Carrowbehy	Roscommon	597	189.5	314.0	60.4	0.95
Derrinea	Roscommon	604	60.0	79.0	75.9	0.30
Ballyduff	Tipperary	641	245.5	291.0	84.4	1.23
Clonfinane	Tipperary					
Kilcarren	Tipperary	647	373.0	508.0	73.4	1.87
Firville	Tipperary	645				
Garriskil	Westmeath	679	169.0	289.0	58.5	0.85
Ballynafagh	Kildare	391	67.0	144.0	46.5	0.34
Sheheree	Kerry	382	9.0	18.0	50.0	0.05
Killyconny	Cavan/Meath	6	85.0	172.0	49.4	0.43
		TOTAL	6753	10579		33.765

Sites in italics are those which consist of two or more Raised Bog NHAs

* denotes that the Raised Bog section of NHA is a subsite of a larger NHA complex

2.6 Biogeographic Region.
All sites are located in the Atlantic biogeographic region.

3. Ecological Information.

3.1 Habitat types present on the site and site assessment for them.

Representativity
The variation for each site was assessed on the basis of biological variation of central of central vegetation types, flush types and species variation known to be related to climatic conditions. This was supplemented by information on the geomorphological, geological, hydrochemical, altitudinal and climatic variation to ensure that as full a range as possible of the variation was covered. This variation and the way in which sites were selected are detailed in Section 6.1 of this report.

The representativity of the following habitats, when present, is indicated.
Betula bog woodland (91D0).
Active raised bog (7110).

The following habitats when present are also indicated but no details are given.
Turloughs (3180).
Grassland on calcareous substrates (6210).
Degraded raised Bog (7120).

The following habitats were encountered but are assessed with the active raised bog.
Calcareous fen with *Cladium mariscus* (7210)
Alkaline Fens (7230).
Heath (4030)
Natural eutrophic lakes (3150).

Relative Surface
The national area of well developed bog woodland is estimated to be approximately 200ha.
The raised bog resource in Ireland is estimated to be approximately, 20,000ha.
A: >15% of National area.
B: >2% < 15% of National area.
C: < 2% of National area.

National area of other Annex I habitats not available at this time.

Conservation Status
This is based on :

- a. Degree of conservation of structure.
  I: excellent structure.
  II: structure well conserved.
  III: average or partially degraded structure.

- b. Degree of conservation of functions.
  I: excellent prospects.
  II: good prospects.
  III: average or unfavourable prospects.

- c. Restoration possibilities.
  I: restoration easy.
  II: restoration possible with average effort.
  III: restoration difficult or impossible.

For active raised bog the first two gradings are calculated using Tables 6.4 and 6.5 and the third using the restoration notes in Section 6.3.2.

The A (excellent conservation) ranking is given for the combinations aI and bI and aI and bII for the first gradings independent of restoration.

The B ranking (good conservation) is given for the combinations aII and bII independent of the third grading, aII and bII or bIII with cI or cII, aIII and bI and cI or cII and also aIII and bII with cI.

The C ranking (average or reduced conservation) is given for all other combinations.

Global Assessment
Items considered under this heading as well as the results of the representativity and conservation status are.

- Ownership of the site
- Intensity of active peat cutting.
- The intensity of surface drains.
- If marginal drainage effects are significant.
- Legal status of the site.
- Ease of conservation or restoration.
- Any other relevant details.

3.2 Species information
If any details on fauna or additional information on flora were available they were inserted here.

4. Site Description.

4.1 General Site Character
The main habitat divisions within the site are given here as a % of the total site area.
Other site characteristics. Information on geology and geomorphology of the area is given here.

4.2 Quality and Importance
A summary of the % of Annex I habitat and the quality is outlined here.

4.3 Vulnerability
Due to the high water content of peat, all raised bogs are vulnerable to activities which increase water loss and result in subsidence. The most important of these activities are peat cutting, drainage and fire. Details of any particularly threatening activities are given in this section.

4.5 Ownership
Details on ownership of the site are presented here.

4.6 Documentation
Any publications pertaining to the site are listed in this section.

5. Site Protection Status and relation with Corine Biotopes

5.1 Designation types at National and Regional Level
If the site is a National Nature Reserve a code is inserted here.

5.2 Relation of the described site with other sites
If the site is a Ramsar site or a Special Protection Area this is highlighted here.

5.3 Relation of the described site with Corine Biotope Sites
Maps of the Corine Biotope site is not available but the Corine code is given.

6. Impacts and Activities in and around the site

6.1 General impacts and activities and proportion of the surface area of the site affected.

When calculating % of site affected by impacts and activities, only the values for areas directly affected are given (N.B. This is a minimum figure). It is not possible to calculate the areas indirectly affected by negative impacts. Deepening of a river, insertion of drains on the high bog and cut-away, fertiliser application near a water course etc. are activities which affect more than their immediate surroundings.

6.2 Site Management and Plans

The body responsible for site management is the National Parks and Wildlife Service, 51, St. Stephen's Green, Dublin 2, Ireland with one exception Mongan Bog where An Taisce, Taylor's Lane, Dublin 2, Ireland are the body responsible for site management.

7. Map of the Site

Physical map

The number of the 1/2 inch map (scale 1:126,720) is given here.

Map of designated sites described in Section 5

The number of the 6 inch scale (1:10,560) are given here.
A map of the Corine Biotope area is not available.

Aerial Photograph

The photograph has been enlarged to 6 inch scale (1:10,560) to show the site.

8. Slides

Details on slides available for the site are given here.

6.3.1 Further Notes on Site Identification: Modification of NHA Area.

Reasons for modifying some boundaries of Raised Bog NHAs by Raised Bog Restoration team in April 1995. This information is summarised in Table 6.13.

Ballyduff/Clonfinane (641) (Some changes necessary)

These sites were not surveyed as part of the NHA survey. B. Madden drew a consult boundary 28/6/94 but recommends a further check necessary. J. Streefkerk (Staatsbosbeheer) recommends that the *Phragmites* infiltration lagg to the NE of Clonfinane be protected and similarly with the lagg to the NE of Ballyduff. He also recommends establishing a wetland to the N between both bogs. It is necessary to extend the consult boundary into the former peat area in order to protect the laggs and to establish a wetland. A further visit to the site is necessary to define the boundaries.

Ballynafagh (391) (Some changes necessary)

This site was surveyed by T. Doherty (ranger) on 30/6/93 with a boundary, more or less similar to that of O'Connell and Mooney (1983). To the W of the site this is very close to the high bog. The boundary is extended to a bog road at the W of the sited and the site takes in an extra area of cut-away. J. Streefkerk recommends that this area be bought as he thinks it is possible to restore this basin bog.

Bellanagare (592) (Some changes necessary)

An in-house boundary was drawn by SW Murphy in 1994 and this has been modified to the E and NE to include areas of former peat extent. Some boundaries to the SE have been re-drawn closer to the high bog edge. Further work is required to outline and define the boundary.

TABLE 6.13 Changes to NHA boundaries on Raised Bogs surveyed during the Raised Bog Restoration Project, 1995.

SITE NAME	Survey by	Consult	Date	New Bd	Reasons
Addergoole				No	NA
Monivea	Mr. Higgins	S. Keane	23/8/94	Yes	To include some more OPC to S
Cloonmoylan	S. Heery		2/2/94	Yes	To incl OPC to E
Barroughter	S. Heery		28/10/93	No	NA
Lough Lurgeen	S. Heery		28/2/94	Yes	To include part of turlough to W (Goodwillie)
Lisnageeragh	S. Heery		18/2.94	No	NA
Kilsallagh	S. Heery		14/2/94	No	NA
* Corliskea		S.W.Murphy	13/6/94	Yes	To join with each other
* Trien		N. Lockhart	2/6/94	Yes	
* Cloonfelliv		R. Dwyer	17/5/94	Yes	
Camderry	S. Heery		April 94	No	NA
Clooncullaun	S. Heery		2/2/94	No	NA
Curraghlehanagh	S. Heery		18/11/93	No	NA
Shankill West	S. Heery		17/1/94	Yes	To include mineral soil to S and up to lake and river at N
Carrownagappul	S. Heery		11/1/94	No	NA
Brown Bog	P.O'Donnell		28/7/94	No	NA
Bkenny/Fisherstown	E. Laurie		May 94	No	NA
Tawnaghbeg	D. Dunnells		24/6/93	Yes	to include grassland/forestry in OPC to W
Flughany	D. Dunnells		2/6/93	No	NA.
Derrynabrock	D. Dunnells		2/11/93	No	Bd was reduced on NHA map. RBRP site area is greater to E
Mongan	S. Heery		23/3/93	No	J. Streefkerk suggests esker to N + Fin Lough to S be part of SAC
					Keep NHA boundary as is for SAC area (J. Ryan and asterisk the site)
All Saint's Bog	S. Heery		30/9/94	No	NA. Changes to W may be necessary in future
Sharavogue	S. Heery		Sept 93	Yes	Change bd to NE as far as rail line + to SE across the line
					Future study needed on boundary to the W with River Brosna
Ferbane	S. Heery		15/10/93	No	NA
Moyclare	S. Heery		14/10/93	No	NA
Blackcastle	A. Bleasedale		26/11/93	No	NA
* Bellanagare		S.Murphy	1994	Yes	To include some former peat area close to the bog
Cloonshanville	L. van Doorslaer		22/11/93	No	NA
Callow	A.O'Sullivan		Oct 93	Yes	Bd for SAC to be at the river to the NW. Include peat to SW
Corbo	S. Heery		10/2/94	Yes	A small area of OPC to SE is part of BnM. Include it.
Cloonchambers	A.O'Sullivan		22/11/93	No	J. Streefkerk wants to raise water table so boundary to S needs extending
					Research needed as blocking drain could affect ag land to SW
Carrowbehy		S.W.Murphy	14/6/94	Yes	J. Streefkerk wants to raise water table to the W so include
		C. Douglas	9/9/94		this land
Derrinea	L. van Doorslaer		17/11/93	Yes	OPC to SW at mound edge to be included.
* Bduff/Clonflnane		B. Madden	28/6/94		J. Streefkerk wants to restore laggs at N + dev a fen.
					Include land to the N
Redwood				No	Leave as is though there is a lot of high bog included
* Firville/Kilcarren		B. Madden	28/6/94	Yes	to protect laggs at N of both bogs, buffer at S of Firville. Include
					200m mounds to SW of Kilcarren + area at S between 2 bogs
Garriskil	A.O'Sullivan		14/2/94	No	NA
Ballynafagh	T. Doherty		30/6/93	Yes	Bd to W be extended into OPC as far as the road
Crosswood	A.O'Sullivan		Mar 94	No	Perhaps to include BnM to S if nec in the future
Moanveaniagh	T.O'Donoghue		17/2/94	No	NA
Knockacoller	A.O'Sullivan		25/2/94	No	NA
Killyconny	D.O'Higgins	S. Keane	15/8/94	Yes	To include forestry at SW, small area to S?
Clara	Jim Moore	C. Douglas	22/8/94	Yes	To include some esker to N and OPC to S
Raheenmore	A.O' Sullivan		7/3/94	Yes	NA
Sheheree		Jim Ryan	30/6/94	No	NA

Sites highlighted in bold are those where the NHA boundaries have been changed by Raised Bog Project team in 1995
OPC = area of old peat cutting on former peat
* denotes sites where further work is required to describe and define the boundary

Carrowbehy (597) (Some changes necessary)
This site was not visited by an NHA ecologist. An in-house boundary was drawn by S. W. Murphy on 14/6/94 and enlarged by C. Douglas on 9/9/94. J. Streefkerk suggests that as much of the former peat extent as possible be bought especially to the mid W of the site. Raising the water table of the N/S river at the W of the high bog might be necessary and this will flood the surrounding land. It is better that it be included as part of the NHA if this is to be the case.

Clara (572) (Some changes necessary)
There was an in-house boundary drawn by C. Douglas 22/8/94 and another drawn by J. Moore (ranger) in Oct. 94. Both had different boundaries especially to the S of the site. It was decided, on hydrological criteria, to include most of the former peat extent to the S as part of the NHA. In May 1995 it was decided to include a separate piece of woodland to the NW of the site as part of the NHA.

Cloonmoylan (248) (Some changes necessary)
This site was surveyed by S. Heery 2/2/94 and a boundary drawn by him. There is a small patch of cut-away to the NE which has been excluded. This area has been re-included on hydrological grounds and to protect the exit of the flush which flows through the bog.

Clooncharnbers (600) (no changes for the moment)
This site was surveyed by A. O'Sullivan 22/11/93 and the boundary drawn. J. Streefkerk wants to raise the water table of the streams which run through the SW of the high bog but this may have implications on the agricultural land immediately adjacent to the present NHA boundary to the SSW. Further studies are necessary to assess the implications and it may then be necessary to extend the boundary at some future date.

Corliskea/Trien/Cloonfelliv (2110, formerly 219, 616 and 217) (Some changes necessary)
In-house boundaries were drawn for Corliskea by SW Murphy on 13/6/94, for Trien by N. Lockhart on 2/6/94 and for Cloonfelliv by R. Dwyer and SW Murphy in May/June 1994. It was decided to link these adjoining basins as one site. No extensions were made to existing boundaries. There is a mound at the centre of the site/three sites which is excluded.

Crosswood (678) (No change for the moment)
This site was visited by A. O'Sullivan in March 1994 and the boundary drawn by her. For restoration purposes J. Streefkerk recommends NPWS to buy OPC/APC and block the drains on it. 33ha of this bog are owned by BnM but some of their property is excluded from the NHA, to the south of a track which defines the present NHA boundary. It may be necessary to included this as part of the NHA at some future date for restoration purposes but for the moment, J. Ryan has recommended that the boundary be left as it is.

Derrinea (604) (Some changes necessary)
This site was surveyed by L. van Doorslaer on 17/11/93 and a boundary drawn by her. It was felt necessary to include a n extra small area of cut-away to the SW of the site in the vicinity of a mound in order to prevent draining and further deepening of E/W drain.

Kilcarren/Firville (647) (Changes to the boundary required)
These sites were not surveyed as part of the NHA survey. Brian Madden drew a consult boundary 28/6/94 but recommends a further check necessary. J. Streefkerk wants to inundate an area to the N between the two bogs and this is within the original consult boundary. However, the hydrological impacts may be felt outside this boundary. J. Streefkerk also recommends protection of the lagg areas to the N of both bogs and that a buffer zone be established to the S of both bogs in order to minimise loss of water through drainage etc. These areas are not within the original consult boundary and the new consult boundary has been extended to include them. A further visit to the site is necessary to define the boundaries.

Killyconny (6) (Some changes necessary)
This site was visited by ranger D O'Higgins 16/6/93 and a boundary drawn by him. The boundary was redrawn on 15/8/94 by Sinead Keane. She recommends further study. The boundary to be extended to include the forestry in the cut-away on former peat extent. The cut-away of this bog is important for hydrogeological purposes. The extension to the boundary has been made to the revised boundary drawn by S. Keane.

Lough Lurgeen (301) (some changes necessary)
This site was surveyed by S. Heery 28/2/94 and a boundary drawn by him which includes the turlough to the WNW. Excluded from S. Heery's boundary is a very small area to the W of the turlough which consists of peaty grassland and was included within the turlough boundary as drawn by R. Goodwillie (1992). The boundary has now been re-drawn and includes this.

Mongan (580) (No change for the moment but it may be necessary)
This site was surveyed by S. Heery 23/3/93 and the boundary defined by him. Part of this boundary is in common with NHA No 1776 - Pilgrims Road Esker. For restoration purposes J. Streefkerk recommends that land to the N be managed to ensure there is no fertiliser run-off into the bog. He also suggests that Clonfinlough (NHA 576), to the south of the site, be part of Mongan Bog SAC on hydrological grounds. This site is an NNR fully contained within the present NHA boundary.

Shankill West (326) (Some changes necessary)
This site was visited by S. Heery 17/1/94 and boundary drawn by him. J. Streefkerk wants to preserve/conserve the lagg area to the S and to include the species rich wet meadows to the N of the site. the boundary has been revised and extends up to 100m into agricultural land at the S of the site and is enlarged to the N of the site.

Sharavogue (585) (Changes to the boundary required on hydrological grounds)
This site was surveyed by S. Heery in Sept. 1993 and the boundary drawn by him. In order to conserve the fen area to the E of the site it is necessary, on hydrological grounds, to include the former peat extent E of the railway line. Similarly, to the NE of the site, the boundary had been extended as far as the railway line. For conservation/restoration purposes, J. Streefkerk recommends acquisition of the old peat cutting to the E and W of the bog and to devise a management plan for the esker to the E in order to minimise the impacts of nutrient-rich runoff. He also suggests raising the water table in the Little Brosna and for this it would be necessary to carry out a survey of the impacts and to buy land to the W of it which would become inundated. For the moment it is not practical to include these areas in the NHA.

Tawnaghbeg (547) (Some changes necessary)
This site was surveyed by D. Dunnells 24/6/93 and the boundary drawn. There is an area of coniferous forestry and semi-improved grassland on the cut-away to the SW of the site quite close to the bog. There is active peat cutting on-going in the area. It is necessary to include this section of cut-away to prevent further drainage and damage at this side of the bog.

The SAC forms were filled in by hand as the computer soft-ware necessary for the operation of the form lay-out, sent from Brussels, was unavailable before the end of this project.

7. CONCLUSIONS

A number of general conclusions can be made regarding the findings of this project.

1. 32 sites out of the 47 considered represented the range in varition of the various criteria dealt with, namely geomorphology, hydrogeology, vegetation and climate.

2. 31 have been proposed as potential Special Areas of Conservation after a consideration of the conservation/restoration possibilities.

3. Not all of the sites originally suggested by Cross (1990) as being suitable for establishing a National Nature Reserve network were selected by this project as potential SACs, as the information gained from the research at Clara and Raheenmore allowed an evaluation of the technical possibilities of site conservation.

4. To establish a more meaningful relationship between slopes and vegetation more detailed work is required.

5. Detertioration in condition was evident at some sites since the 1980s raised bog survey was undertaken. Major changes are due to commercial peat cutting although arterial drainage effects are also important.

6. Very few sites had more than 60% of the original peat extent (based on the 1840s maps) remining intact and some sites had less than 20% of the original area remaining.

5. Variation in the central vegetation complexes encountered was greater than expected. Adjacent sites often had marked differences in central vegetation cover.

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APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
1	Camderry	3.23				
		1.45				
		1.18				
		3.45				
		4.50	2.76	1.26		
	Shankill West	1.07				
		2.30				
		3.07	2.15	0.82		
	Derrinea	1.19				
		0.28				
		1.41				
		2.81	1.42	0.91		
	Carrowbehy	1.19				
	Curraghlehanagh	3.25				
	Sharavogue	4.05				
	All Saint's	2.05				
		1.50				
		0.68	1.41	0.56		
	Ferbane	2.13				
		1.78				
		0.44				
		0.76				
		2.39	1.50	0.77		
	Ballynafagh	3.40				
		2.42				
		1.68				
		1.68	2.30	0.71		
	Knockacoller	0.29				
	Moyclare	3.25				
	Ballykenny	3.45				
	Fisherstown	2.51				
		3.05				
		0.85				
		3.95	2.59	1.13	2.14	1.15
2 & 2 +Cladonia	Firville	0.90				
		0.48				
		0.65				
		1.15				
		0.82	0.80	0.23		
	Ferbane	2.85				
	Garrishil	0.80				
		0.80				
		0.70	0.77	0.05	1.02	0.67

APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
2/7	Ballynafagh	0.29				
		0.09				
		0.32				
		0.43				
		0.03				
		0.53				
		0.84				
		0.45				
		0.34	0.37	0.23		
	Ferbane	2.13				
		2.40				
		1.34				
		0.44				
		0.47				
		0.64				
		0.23				
		0.41				
		0.52				
		0.06				
		0.76				
		0.02				
		0.58				
		1.66				
		1.05				
		0.44	0.82	0.69		
	Shanvogue	2.63			0.73	0.71
3/2 & 3/2 +Cladonia	Curraghlehanagh	1.26				
		1.02	1.14	0.12		
	Lisnageeragh	1.30				
		0.10				
		0.81				
		0.26				
		1.21				
		0.74				
		0.84				
		0.70				
		0.75				
		0.01				
		0.14				
		0.26				
		0.44				
		0.72				
		0.65				
		0.81				
		0.83				
		0.80				
		0.22				
		0.30				
		0.20	0.58	0.35		
	Camderry	2.40				
		0.13				
		0.74				
		9.00	3.07	3.52		
	Bellanagare	0.92			0.98	1.62

APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
3 & 3 +Cladonia	Cumberry	1.59				
		0.42				
		1.28				
		0.50				
		0.66				
		0.83				
		0.36				
		0.22				
		0.20				
		0.33				
		0.11				
		0.49				
		0.12				
		0.57				
		0.19				
		0.20				
		0.22				
		0.11				
		0.78				
		0.57				
		2.01				
		0.41				
		0.88				
		0.59				
		0.70				
		0.54				
		0.24				
		0.58				
		0.09				
		0.48				
		0.64				
		0.90				
		0.09				
		0.08				
		0.41				
		0.50				
		0.75				
		0.22				
		0.44				
		0.05				
		0.57				
		0.10				
		0.20				
		1.24				
		0.93				
		0.52				
		0.83				
		1.61				
		0.91				
		0.62				
		0.31				
		1.03	0.56	0.42		
	Stanhill West	0.62				
		0.94				
		0.73	0.76	0.13		
	Derrinea	4.21				
		0.53				
		0.45				
		1.25	1.61	1.53		

APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
	Currowbeby	1.38				
		0.63				
		1.93				
		0.95				
		0.43				
		0.27				
		0.52				
		0.19				
		0.46				
		0.55				
		0.79				
		0.48				
		0.12				
		0.41				
		0.45				
		0.28				
		0.53				
		0.63				
		2.37				
		0.47				
		0.75				
		0.43				
		0.05				
		0.54				
		0.28				
		0.21				
		1.04				
		0.10	0.62	0.52		
	Curraghlebarough	0.36				
		0.25				
		0.32				
		0.05				
		0.52				
		0.42				
		0.76				
		0.44				
		1.13				
		0.93				
		3.62				
		0.26				
		0.33				
		0.65				
		0.12	0.68	0.84		
	Ferbane	0.72				
		0.01				
		1.02				
		0.83				
		0.49				
		0.21				
		0.01				
		0.17				
		0.03				
		0.49	0.40	0.35		

APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
	Moogan	2.09				
		0.21				
		1.10				
		1.23				
		0.42				
		0.46				
		0.74				
		0.45				
		0.34				
		0.87				
		1.43				
		0.82				
		0.73	0.84	0.50	0.64	0.61
	Derrinea	1.93				
	All Saint's	0.18				
		0.10				
		0.29				
		0.12				
		0.55				
		0.34				
		0.29				
		0.46				
		0.12				
		0.47				
		0.15				
		0.30				
		0.15				
		1.20	0.34	0.28		
	Derrynabrock	0.78				
	Bellanagare	0.42				
		1.33				
		0.84				
		0.08				
		2.45				
		1.35				
		1.31				
		1.27				
		0.80				
		1.32				
		0.55				
		0.68				
		0.21				
		2.18	1.06	0.66	0.74	0.64
6/3	Curraglebaragh	0.73				
		0.13				
		0.34				
		0.27				
		0.25				
		3.41	0.86	1.16		
	Kilcarren	0.39				
		0.13				
	Derrynabrock	1.12				
		1.37				
		0.48				
		0.54	0.88	0.38	0.77	0.88
2/6	Moyclare	5.95				
		1.00				
		0.50	2.48	2.46		
	Garrishill	1.73			2.30	2.16

APPENDIX A: Marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
3/2/6	Curraghlehanagh	0.45				
		1.06				
		0.67				
		0.25				
		0.04				
		0.33				
		0.24				
		0.42				
		0.40				
		0.13				
		0.48				
		0.87				
		0.46				
		1.33				
		0.03				
		0.22				
		0.20				
		0.60				
		0.58				
		0.60				
		0.30				
		0.63				
		1.04	0.49	0.33		
	Lisnageeragh	0.46			0.49	0.32
2/3 & 2/3 +Cladonia	Clooncullaun	0.01				
		0.06				
		0.37				
		0.59				
		0.13				
		2.98				
		1.90				
		1.88				
		0.78				
		0.11	0.88	0.97		
	Bellanagare	1.32			0.92	0.93
MEAN for all Marginal Complexes		0.90				
	SD	1.01				

APPENDIX B: Sub-marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
6	Knockacolier	0.20				
		0.00				
		0.18				
		0.11				
		0.17				
		0.97				
		0.79				
		0.93				
		0.28				
		0.17	0.38	0.35		
	Kilcarren	0.22				
		0.08				
		0.14				
		0.09				
		0.13				
		0.56				
		0.47				
		0.78				
		0.00				
		0.26				
		0.68				
		0.66				
		0.20				
		0.07				
		0.14				
		0.12				
		0.53				
		0.10				
		0.14				
		0.22				
		0.40				
		0.62				
		0.17				
		0.13				
		0.24				
		0.39				
		0.19				
		0.04				
		0.23				
		0.37				
		0.10				
		0.02				
		0.47				
		0.66	0.28	0.22		
	Firville	0.07				
		0.07				
		0.79				
		0.26				
		0.01				
		0.25				
		0.43				
		0.03				
		0.03				
		0.21				
		0.08				
		0.15				
		0.13				
		0.46	0.21	0.21		
	Garrisktl	0.28				
		0.23				
		0.15				
		0.06				
		0.27				
		0.07				
		0.29				

APPENDIX B: Sub-marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
		0.97				
		0.19				
		0.17				
		0.27				
		0.29				
		0.16				
		0.51				
		0.02				
		0.12				
		0.56				
		0.18				
		0.90				
		0.68				
		0.22	0.31	0.26		
	Derrynabrock	1.37				
		0.29				
		1.29				
		0.63				
		1.44	1.00	0.46		
	Ballybanny	0.64				
		0.34				
		1.20	0.73	0.36	0.35	0.33

APPENDIX B: Sub-marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
3/6	Dernna	0.42				
		0.53				
		0.26				
		0.91				
		1.12				
		0.55				
		2.53	0.90	0.72		
	Corlisha	0.67				
		0.00	0.34	0.34	0.78	0.69
6/3/2	Shanlill West	0.24				
		0.65				
		1.06				
		0.52				
		0.45				
		0.21				
		0.23				
		0.02				
		0.10				
		0.15				
		0.23	0.35	0.28		
	Lismgeeragh	0.15				
		0.02				
		0.20				
		0.09				
		0.03				
		0.01				
		0.05				
		0.02				
		0.05				
		0.07				
		0.14				
		0.08				
		0.18				
		0.05				
		0.10				
		0.13				
		0.06				
		0.05				
		0.06				
		0.11				
		0.08	0.08	0.05		
	Cloonsillaun	0.08				
		0.07				
		0.55				
		1.10				
		1.20				
		0.88				
		0.00				
		0.27	0.52	0.46	0.24	0.31
6/7	Ballynafagh	0.09				
		0.75				
		1.31				
		0.74				
		0.87				
		0.96				
		0.32				
		0.55	0.70	0.36		
	Moyclare	0.03				
		0.34				
		0.33				
		0.70	0.35	0.24	0.58	0.36

APPENDIX B: Sub-marginal Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
9/7 & 9/7 + Cladonia	Shankill West	0.09				
		0.05				
		0.00				
		0.08				
		0.19				
		0.69				
		0.36				
		0.13				
		0.58				
		0.80	0.30	0.28		
	Garrykil	0.15				
		0.07				
		0.75				
		0.48				
		0.29				
		0.61				
		0.75	0.44	0.26		
	Ballintogue	0.06				
	Cloonsharville	0.11				
		0.21				
		0.14				
		0.58	0.26	0.19	0.33	0.27
6/2	Shravogue	0.04				
		0.08	0.06	0.02		
	Knockacolier	0.45				
		0.35				
		0.11				
		0.91	0.46	0.29	0.32	0.30
6/3 & 6/3 +Cladonia	Trien	0.12				
	Brown Bog	0.40				
		0.00				
		0.19				
		1.94	0.63	0.77	0.53	0.72
MEAN for all Sub-marginalComplexes		0.36				
	SD	0.38				

APPENDIX C: Sub-central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
6/10	Kilcarren	0.06				
		0.22				
		0.07				
		0.08				
		0.30				
		0.40				
		0.30				
		0.30				
		0.28				
		0.08				
		0.02				
		0.03				
		0.40				
		0.03				
		0.06				
		0.07				
		0.40				
		0.26				
		0.04	0.18	0.14		
	Moyclare	0.16				
		0.04				
		0.23				
		0.06				
		0.18				
		0.20				
		0.07				
		0.10				
		0.45				
		0.35				
		0.66	0.23	0.18	0.20	0.16
9/10	Ballymaligh	0.43				
		0.52				
		0.13				
		0.29				
		0.19				
		0.16				
		0.14				
		0.41				
		0.66				
		0.15				
		0.33				
		0.09				
		0.03				
		0.53				
		0.08				
		0.14				
		0.12				
		0.26				
		0.66				
		0.58	0.30	0.20		
	Kilcarren	0.09				
		0.07	0.08	0.01	0.28	0.20

APPENDIX C: Sub-central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
10/6 & 10/6 + Cladonia	All Saint's	0.20				
		0.50				
		0.16				
		0.17				
		0.11				
		0.10				
		0.04				
		0.06				
		0.38				
		0.96				
		0.13				
		0.31				
		0.30				
		0.29				
		0.07				
		0.21				
		0.14				
		0.16				
		0.43				
		0.34	0.25	0.20		
	Ballykenny	0.98				
		0.43				
		0.32				
		0.18				
		0.12				
		0.20				
		0.64				
		0.14				
		0.05				
		0.34				
		0.32				
		0.33				
		0.21				
		0.56				
		0.40				
		0.70				
		0.66				
		0.94	0.42	0.27	**0.33**	**0.25**
9/7/6 & 9/7/6 + Cladonia	Garristil	0.79				
		0.29	0.54	0.25		
	Clooneburville	0.86				
		0.78				
		0.00				
		0.12				
		0.13				
		0.29				
		0.11				
		0.21				
		0.14				
		0.58	0.32	0.29	**0.32**	**0.29**

APPENDIX C: Sub-central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
10 &10 + Cladonia	Knockacollar	0.14				
		0.01				
		0.22				
		0.22				
		0.21				
		0.21				
		0.05				
		0.28				
		0.36				
		0.38				
		0.43	0.23	0.12		
	Ferbane	0.05				
		0.13				
		0.35				
		0.08				
		0.25				
		0.21				
		0.06				
		0.00				
		0.00				
		0.25				
		0.30				
		0.10				
		0.46				
		0.47				
		0.00				
		0.52				
		0.54				
		0.32				
		0.78				
		0.36				
		0.24				
		0.35				
		0.05	0.05	0.20		
	Moyclare	0.12				
		0.17				
		0.07				
		0.38				
		0.14				
		0.10	0.16	0.10		

APPENDIX C: Sub-central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
	Fisherstown	0.15				
		0.19				
		0.13				
		0.09				
		0.09				
		0.08				
		0.05				
		0.04				
		0.02				
		0.03				
		0.00				
		0.03				
		0.01				
		0.02				
		0.00				
		0.03				
		0.03				
		0.08				
		0.03				
		0.02				
		0.01				
		0.01				
		0.02				
		0.02				
		0.01				
		0.01				
		0.02				
		0.02				
		0.01				
		0.12				
		0.29				
		0.02				
		0.01				
		0.09				
		0.04				
		0.13				
		0.21				
		0.25	0.06	0.07	**0.15**	**0.16**
6/3 +Pools	Derrinea	0.27				
		0.64	0.46	0.19		
	Corlisha	0.70				
		0.90				
		0.19				
		2.00	0.95	0.66	**0.78**	**0.60**
6 +Pools	Garristil	0.38				
		1.18				
		0.24				
		0.64	0.61	0.36		
	Trien	0.32				
		0.33				
		0.05				
		0.08				
		0.40	0.40	0.32	**0.40**	**0.32**

APPENDIX C: Sub-central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
9/7 +Myrica	Addergoole	0.32				
		0.58				
		0.51				
		0.43	0.46	0.10		
	Bellanagare	0.84				
		0.92				
		1.09				
		0.80				
		0.99				
		1.16				
		0.96	0.97	0.12	0.78	0.27
MEAN for all Central Complexes		**0.28**				
	SD	**0.29**				

APPENDIX D: Central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
15& 15+Cl	Shankill West	0.13				
		0.21				
		0.28	0.21	0.06		
	Morgan	0.52				
		0.39				
		0.36				
		0.28				
		0.38				
		0.01				
		0.16				
		0.21				
		0.27				
		0.48				
		0.19				
		0.02				
		0.30				
		0.21				
		0.15				
		0.23				
		0.06				
		0.01				
		0.52				
		0.07				
		0.23				
		0.58				
		1.06				
		0.03				
		0.29				
		0.21				
		0.01				
		0.97				
		1.00				
		0.86				
		0.92				
		0.34				
		0.11				
		0.21				
		0.03				
		0.23				
		0.05				
		0.01				
		0.04				
		0.83				
		0.03				
		0.01				
		0.08				
		0.84				
		0.39	0.32	0.30		
	Brown Bog	0.55				
		0.48				
		0.45				
		0.85				
		0.23				
		0.92				
		0.40				
		0.50				
		0.44				
		0.29				
		1.15				
		0.58	0.57	0.26	0.36	0.31

APPENDIX D: Central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
6/35	Dernree	0.33				
		0.05				
		0.08				
		0.10				
		0.37				
		0.49				
		0.57				
		0.33				
		0.21				
		0.05	0.26	0.18		
	Garrahil	0.57				
		0.06				
		0.22				
		0.06				
		0.06				
		0.25				
		0.21				
		0.16				
		0.31				
		0.31				
		0.10				
		0.28				
		0.42				
		0.40				
		0.02				
		0.06				
		0.30				
		0.21				
		0.05				
		0.11				
		0.14				
		0.09				
		0.01				
		0.13				
		0.18				
		0.07				
		0.23				
		0.15				
		0.19				
		0.88				
		0.32				
		0.93				
		1.29	0.27	0.28		
	Derrynabrock	0.15				
		0.00	0.08	0.08	0.26	0.26

APPENDIX D: Central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
35	Dernuea	0.29				
		0.15				
		0.06				
		0.04				
		0.01	0.11	0.10		
	Carrowbeby	0.32				
		0.12				
		0.55				
		0.81				
		0.46				
		0.77				
		1.17				
		0.34				
		0.10				
		0.01				
		0.64				
		0.77				
		0.39				
		0.05				
		0.17				
		0.50				
		0.57				
		0.70				
		0.37				
		0.09				
		0.02				
		0.02				
		0.37				
		0.34				
		0.29				
		0.24				
		0.43				
		0.41				
		0.46				
		0.19				
		0.52	0.39	0.27	0.35	0.27
14	Firville	0.04				
		0.12	0.08	0.04		
	Ferbane	0.22				
		0.40				
		0.14				
		0.40	0.29	0.11		
	Carrowbeby	0.45				
		1.40	0.93	0.48	0.40	0.40

APPENDIX D: Central Vegetation Complexes and Slopes

COMPLEX	SITES	SLOPES	MEAN	SD	OVERALL MEAN	OVERALL SD
10/15	Knockacolla	0.04				
		0.38	0.21	0.17		
	Moyclare	0.06				
		0.01				
		0.16				
		0.06				
		0.05				
		0.14				
		0.43				
		0.24	0.14	0.13		
	Ballynafagh	0.35				
		0.10				
		0.02				
		0.13				
		0.41				
		0.62				
		0.23				
		0.12				
		0.04				
		0.10	0.21	0.18	0.18	0.16
MEAN for all Central Complexes		**0.31**				
	SD	**0.29**				