An Foras
Forbartha
Teoranta
**The National
Institute
for Physical
Planning and
Construction
Research**

CONSERVATION AND AMENITY
ADVISORY SERVICE

A PRELIMINARY REPORT ON AREAS OF SCIENTIFIC INTEREST IN COUNTY CAVAN

L. Farrell,
Research Assistant,
An Foras Forbartha.

July, 1972.

Teach Mháirtín
Bóthar Waterloo
Áth Cliath 4
Telefón 64211
**St. Martin's House
Waterloo Road
Dublin 4**

CONTENTS

FOREWORD

This report is based on data abstracted from the files of the Conservation and Amenity Section, Planning Division, An Foras Forbartha, from the published literature, and several periods of field work between May 24th and June 15th, 1972. It is a preliminary survey upon which it is hoped further research will be based.

The help of Dr. J.S. Jackson, and Miss Scannell of the National Herbarium is gratefully acknowledged. The maps which appear in this report are reproduced from the Ordnance Survey by permission of the Government. (Licence No. 121/72).

SECTION A.

Preface

The abundance of open countryside in Ireland is immediately apparent to anyone visiting the island. Although much of the land is artifically fertilized, a large percentage is used as pasture, and even though the natural composition of the grassland has been modified, it has not been ploughed and destroyed. Vast areas of upland blanket bog and the red raised bogs of the Midlands still exist and many miles of hedgerows border the small fields.

One habitat which has been decimated over the centuries is woodland. Many of the original deciduous woods have been felled and not replaced. Planting of coniferous species on marginal land has compensated for the loss in numbers, but not in ecological interest.

Ireland is rich in archaeological and geological sites also, and it is this environmental and aesthetic diversity which is our national heritage - a heritage which requires and demands the full attention of our intellect if we are to continue to exist in harmony with it and to ensure its survival.

This particular report is concerned with county planning in relation to sites of scientific interest. Often these areas are of educational importance and of recreational value. What we are concerned with at the present time is the integration of these various interests with the actual physical nature of the countryside.

At the moment the Conservation and Amenity Advisory Service is attempting to visit, describe and record areas of natural and semi-natural habitats throughout the country. Localities of specific importance i.e. noted for the occurrence of a rare species or rare natural phenomenon, are also listed. Once representative examples have been delimited, the development of the area of interest and that of the surroundings has to be considered as a whole unit. For example, if an area of marshland is considered to be of particular

scientific interest, then a drainage scheme in the neighbourhood could destroy the habitat.

Having previously stated that Ireland has a wealth of natural phenomena, is it possible to define the value in concrete terms? The key to the situation is that of diversity. The intricate network of grassland, mountains, lakes and woods provides an ever-changing vista for us to enjoy. Because of the diversity too, of human nature, there are many different ways in which we enjoy the countryside. In order to rationalize the situation, four categories may be distinguished - one particular area may be important for amenity, recreational, scientific or educational reasons, or a combination of all four. The present problem is how to combine all these interests in that area, and it is at this stage that the work of the local authorities becomes important. Robert Boote summarizes this importance in a statement issued at the 7th session of the European Conference of Local Authorities -

'Local authorities hold the key to the success of conservation in Europe. They carry out a wide range of functions which have a direct impact upon the physical environment. Planning and education - two of the most formative aspects of modern society - are of prime importance here. Local authorities can also develop and manage considerable areas of land and water and most have powers to create new amenities and landscapes. In these and numerous other ways, they are well equipped to conserve and enhance those qualities of the environment that contribute so much to the life and heritage of European man'.

(Reference : Conservation - The Human Environment
Published by An Foras Forbartha, December 1971)

SECTION B.

Vulnerability of Habitats

Areas of scientific interest can be damaged in many ways. They can be completely destroyed by scrub or tree clearance, by turf cutting or by arterial drainage, or they can suffer insidiously through pollution, fertilization, grazing or overuse for recreation.

Woodland in Co. Cavan is very much scattered and found chiefly on the periphery. As early as 1612 during the plantation, it was claimed that there was no timber in Cavan for necessary building and application was made to bring in timber. In the extreme west the Shannon valley was wooded where the river enters Lough Allen, and so also was the southern shore of Lough Macnean Upper and the valley of the Swanlin. From the border north of Belturbet, woods stretched at least to Ballinagh. The northern and eastern shores of Lough Sheelin and around Kingscourt carried timber, while south of Cootehill were woods of oak, birch and alder. Remnants of these woodlands still exist, but there is no extensive stand of deciduous woodland. On Slieve Russell, in the north west, forestry plantations cover the lower slopes, but these are of little ecological value as the dense growth allows the passage of little light through the canopy and the ground flora is virtually non-existent. Several areas of deciduous woodland are mentioned in this report and it is hoped that they will remain so, to act as ecological examples and to provide sheltered walks for our leisure time.

Extensive areas of upland peat spread over the north-western mountains. These are cut for turf by the local farmers, but no real danger of loosing this habitat exists because of the locality and the vast resources. Afforestation of large areas would be a more economical form of land-use, but, as previously stated, this detracts from the ecological value.

Very few lowland bogs are to be found in the county. Kilconny Bog on the eastern boundary is the largest raised bog. The threat here is that of

burning. Occasional burning keeps the coarse heather from becoming a complete dominant and so enables more plant species to come into the community. Frequent burning, however, destroys many species and the botanical diversity is lost.

Drainage schemes for Co. Cavan are not proposed in the immediate future. But the main ecological interest of the county lies in and around the numerous lakes and marshes, and the value of these should be considered when inaugurating such schemes.

Closely connected with drainage is the problem of water pollution. Our attention has been focused on the effluent entering Lough Sheelin, causing organic enrichment of the water producing dense algal blooms, manifested as a thick green scum, and seriously depleting the oxygen content. One very noticeable result is that the fish populations cannot breathe properly. This happened only two years ago when hundreds of dead fish were washed up onto the shoreline. Control of sewage disposal and other pollutants must be restricted in all areas, not just those in the immediate vicinity of a lake. Upstream development is as important in the life of a river as is the surrounding development.

Intensive grazing of an area of grassland can produce a 'species-poor' turf. The grazing animal selects the finer-leaved species and the more robust species spread at the expense of the former, resulting in a coarse grassland. This is of little value to the farmer and is not of any ecological value. But controlled stocking of an area often helps in the maintenance of a rich grassland area, preventing the dominance of any one species and the invasion of scrub.

Overuse of areas for recreation is not a problem in Co. Cavan today. The only areas where it may become a destructive influence are those scenic areas around the larger lakes, where picnicers' excessive trampling of the vegetation destroys the plant cover. Opening up of, or drawing attention

to sites of rare species may damage the species but usually some individuals survive so that the species is not eliminated. Careful planning and disclosure of information is needed in such cases.

SECTION C

General Introduction

Cavan is one of the largest counties in Ireland having an acreage of 467,200, it is interesting ecologically because of the many different habitats and its geological diversity. The main areas of note are centred around the hundreds of small lakes.

Geologically and geographically, the county can be divided into two: the long north-westerly arm is composed entirely of Carboniferous rocks - shales, limestones and sandstones - whilst the large, almost square eastern portion is made up of Silurian rocks with a few outcrops of the Carboniferous sandstones and a granite block. Around the many small lakes are alluvial deposits on top of the Silurian and it is these patches which yield the interesting species, as well as the limestone outcrops in the north-west.

The north-west also provides much of the geological interest because of the visual manifestation of the stratification of the Yoredale series on top of the Lower and Middle Limestones, and the narrow bands of outcropping Upper Limestone. The Bala beds of thinly-bedded shales contain many fossils, especially Goniatites, and are exposed in the deep mountain streams. The Upper Limestones is a network of underground caverns and streams - at least 17 caves are mentioned in J.C. Coleman's 'Caves of Ireland'. Perhaps the best known of the swallow holes is the Shannon-Pot - the traditional birthplace of the River Shannon. On the surface there are small patches of limestone pavement and many small cliffs.

Botanically speaking, the greater interest lies in the aquatic and semi-aquatic habitats. Cavan is renowned as being a rather wet county so it is not surprising that the Careces, or sedges, abound. Several of the rarer Irish species are to be found here including Carex aquatilis, C. elongata, and C. strigosa.

The rivers Erne, Shannon and Blackwater drain the area. Of these, the Erne system with its 'crazy-paving' structure of lakes and peninsulas is the most fascinating and ecologically important. Around the lakes, pockets of woodland add to the scenic and botanical value. The area is also important as a wildfowl refuge holding vast numbers of winter duck and, in particular, large populations of the Great Crested Grebe.

The larger bodies of water - Loughs Macnean Upper, Lough Gowna, Lough Sheelin, Lough Ramor and Lough Kinale - provide items of ornithological interest. With the exception of Lough Kinale, all have small wooded islands which are ideal roosting places for the wildfowl. Around the shoreline are reed beds, marshes and borders of scrubland which add to the ecological diversity and range of habitats for the different species, both ornithological and botanical.

Once again returning to the north-west, another habitat not previously mentioned is the vast acreage of blanket bog covering the Cuilcagh mountains, Benbrack to the south and the range on the western boundary. Although there are several areas of similar dimensions in Ireland, this one is worthy of note because of its proximity to the outcropping Upper Limestone. The different vegetation communities meet on the Corratirrim hillside, resulting in one of the most visually attractive and botanical interesting areas in the region.

REFERENCES

The following is by no means an exhaustive list of references concerning Co. Cavan, but these listed below provided an excellent basis for this report.

CARPENTER G.H.	1907	Lathraea squamaria in Co. Cavan. I.N. XVI 132
CHARLESWORTH		The Historical Geology of Ireland
COLE J.M.G.	1938	Royal and Parsley Ferns in Co. Cavan I.N.J. VII 54
COLEMAN J.C.	1965	The Caves of Ireland
FARIS R.C.	1949	Carex elongata in Co. Cavan I.N.J. IX 247
McCRACKEN E.	1971	The Irish woods since Tudor times. David & Charles, Newton Abbot
PRAEGER R.L.	1896	The field clubs of Cavan I.N. V 193
PRAEGER R.L.	1905	Plants of the Cavan lakes I.N. XIV 260
PRAEGER R.L.	1934	The Botanist in Ireland
STEWART S.A.	1882	Report on the botany of the mountainous portion of Co. Fermanagh to the west of Lough Erne and the adjoining district of Cavan. Proc. R.I.A. Ser. 2 III 531 - 44

SECTION D

RATING OF AREAS OF SCIENTIFIC IMPORTANCE

This is a measure of the relative importance of areas of scientific importance.

The importance of each area is indicated in terms of the following categories:

International Importance

1. Only area of its type in Europe.
2. One of the few such localities in Europe.
3. One of a natural series in Europe.
4. Recognised international importance.
5. Specialised educational importance.

National Importance

1. Only area of its type in Ireland.
2. One of a few such localities in Ireland.
3. One of a natural series in Ireland.
4. Recognised national importance.
5. General or specialised educational importance.

Regional Importance

1. Only area of its type in province.
2. One of a few localities in Ireland.
3. One of a natural series in region.
4. Fine example of its kind.
5. General or specialised educational importance.

Local Importance

1. Only area of its type in county.
2. One of a few localities in province.
3. Fine example of its kind.
4. General educational importance.

PRIORITY OF AREAS OF SCIENTIFIC INTEREST

This is a measure of the relative urgency necessary for protection of the areas of scientific importance.

Each site is given a priority rating of A, B or C.

The rating of any area is based on a combination of the following criteria:-

a) the importance of the area

b) the vulnerability of the area

c) the nature and imminence of any threats to the area.

TABLE SUMMARISING SITES OF SCIENTIFIC INTEREST IN COUNTY CAVAN

Site	Page No.	Grid Ref.	Rating	Priority	Interest
1. Lough Oughter	15.	H.350,060	National	B	Botanical, Ornithological, Ecological.
2. Farnham and Coalpit Loughs	18.	H.397,078	Regional	B	Botanical, Ornithological, Ecological.
3. Corratirrim	20.	H.078,372	Regional	C	Botanical, Geomorphological, Ecological.
4. Cuilcagh	24.	H.095,207	Regional	C	Botanical, Geological, Ecological.
5. Kilconny Bog	27.	N.680,382	Local	B	Botanical, Ecological.
6. Shannon Pot	29.	H.269,320	Local	C	Geomorphological.
7. Cordonaghy Bog	32.	N.310,946	Local	C	Botanical, Ecological.
8. Bruse Hill	35.	N.317,982	Local	C	Botanical, Geological, Ecological.
9. Woods near Drumkeen House	38.	H.416,077	Local	C	Botanical, Ecological.
10. Lough Kinale	40.	N.392,820	Local	C	Botanical, Ornithological.

Site		Page No.	Grid Ref.	Rating	Priority	Interest
11.	Blackrocks Cross	43.	H.152,238	Local	C	Botanical, Ecological.
12.	Lough Sheelin	46.	N.427,849	Local	C	Botanical.
13.	Marsh near Madabawn Bridge	50.	H.643,091	Local	C	Botanical, Ecological.
14.	Marshland at Blackwater Bridge	52.	N.632,833	Local	C	Botanical.
15.	Hazel scrub north of Corratirrim	54.	H.082,376	Local	C	Botanical, Ecological.
16.	Swan Lough	57.	N.314,912	Local	C	Botanical.
17.	Lough Ramor	59.	N.616,838 N.578,852	Local	C	Botanical, Ornithological, Ecological
18.	Lough Gowna	63.	N.290,920	Local	C	Ornithological, Ecological
19.	Commons Lough	66.	H.380,151	Local	C	Botanical, Ecological
20.	Glasshouse Lough	68.	H.280,068	Local	C	Botanical, Ecological

Site	Page No.	Grid Ref.	Rating	Priority	Interest
21. Farren Connell Estate	71.	N.490,820	Local	C	Botanical, Ornithological, Ecological
22. Lough Macnean Upper	73.	H.065,380	Local	C	Botanical, Ecological
23. Annagh Lough	76.	H.395,125	Local	C	Botanical, Ecological

SECTION F.

Name of area	LOUGH OUGHTER
Acreage	2,500 (See map)
Grid reference	H. 345, 055
Scientific interest	Ornithological, Botanical, Ecological
Rating	National
Priority	C

Description of site

Lough Oughter can be considered a refuge area. Because of its diverse topographical structure - the numerous islands, peninsulas and interwoven lakes - secluded areas remain much as they were hundreds of years ago. The southern part of the lough, in particular, is fairly well wooded and provides ideal habitats for many bird species. The reeded bays especially are important wildfowl feeding areas, and the largest Irish population of Great Crested Grebes breeds here.

Farnham and Coalpit Loughs in the N. Easterly part of the system are examples of the type of country to be found and a separate discussion of their specific interest follows this more general description.

The area is too complex to enable a thorough ecological survey to be carried out in a short period of time, but it is recommended that such a project should be undertaken in the near future.

Some of the more interesting plant species recorded by Praeger earlier in the century are listed below to give an indication of the botanical importance.

Call itriche autumnalis	(Starwort)
Cardamine amara	(Large Bitter Cress)
Carex acuta	(Slender-tufted Sedge)
C. elata	(Tufted Sedge)
C. pseudocyperus	(Cyperus Sedge)

Chara aculeolata	(Alga)
Cladium mariscus	(Saw Sedge)
Cicuta virosa	(Cowbane)
Crepis paludosa	(Marsh Hawk's-beard)
Hydrocharis morsus-ranae	(Frog-bit)
Isoetes lacustris	(Quill-wort)
Juncus diffusus	(Rush) — hybrid!
Lastraea montana	(Mountain Fern)
Lastrea thelypteris	(Marsh Fern) Thelypteris p.d.
Lemna gibba	(Gibbous Duckweed)
Melittis melissophyllum	(naturalised) (Bastard Balm)
Polygonum laxiflorum	(Lax-flowered Persicaria)
P. minus	(Lesser Persicaria)
Potamogeton angustifolius	(Pondweed)
Rhamnus catharticus	(Buckthorn)
Sium latifolium	(Water Parsnip)
Utricularia intermedia	(Intermediate Bladderwort)

Threats to the area

No immediate threats

Recommendations

A more detailed survey of the whole area is needed in order to assess its importance more accurately. General planning control for the region should be considered.

Name of Site	FARNHAM AND COALPIT LOUGHS
Grid Reference	H. 397,078
Acreage	193
Scientific Interest	Botanical, Ecological, Ornithological
Rating	Regional
Priority	B

Description of Site

These two loughs are very similar botanically in that they are surrounded by Phragmites communis (Common Reed) and scrub - mainly composed of Alder, Hazel, Birch and Sycamore. At the southern end of each of the loughs is an area of marshy, reeded ground with numerous willow trees near the lake margin. It is under the shelter of the trees that the rare Summer Snowflake (Leucojum aestivalis) is found. It is thought to be introduced in County Cavan and is recorded as being naturalized only in the south of Ireland.

The woodlands surrounding Farnham House extend around the loughs and it is here that Carex strigosa (Thin-spiked Wood Sedge) and Lathraea squamaria, (Toothwort) are found. These are uncommon species and represent new post-1930 records.

Threats to the Area

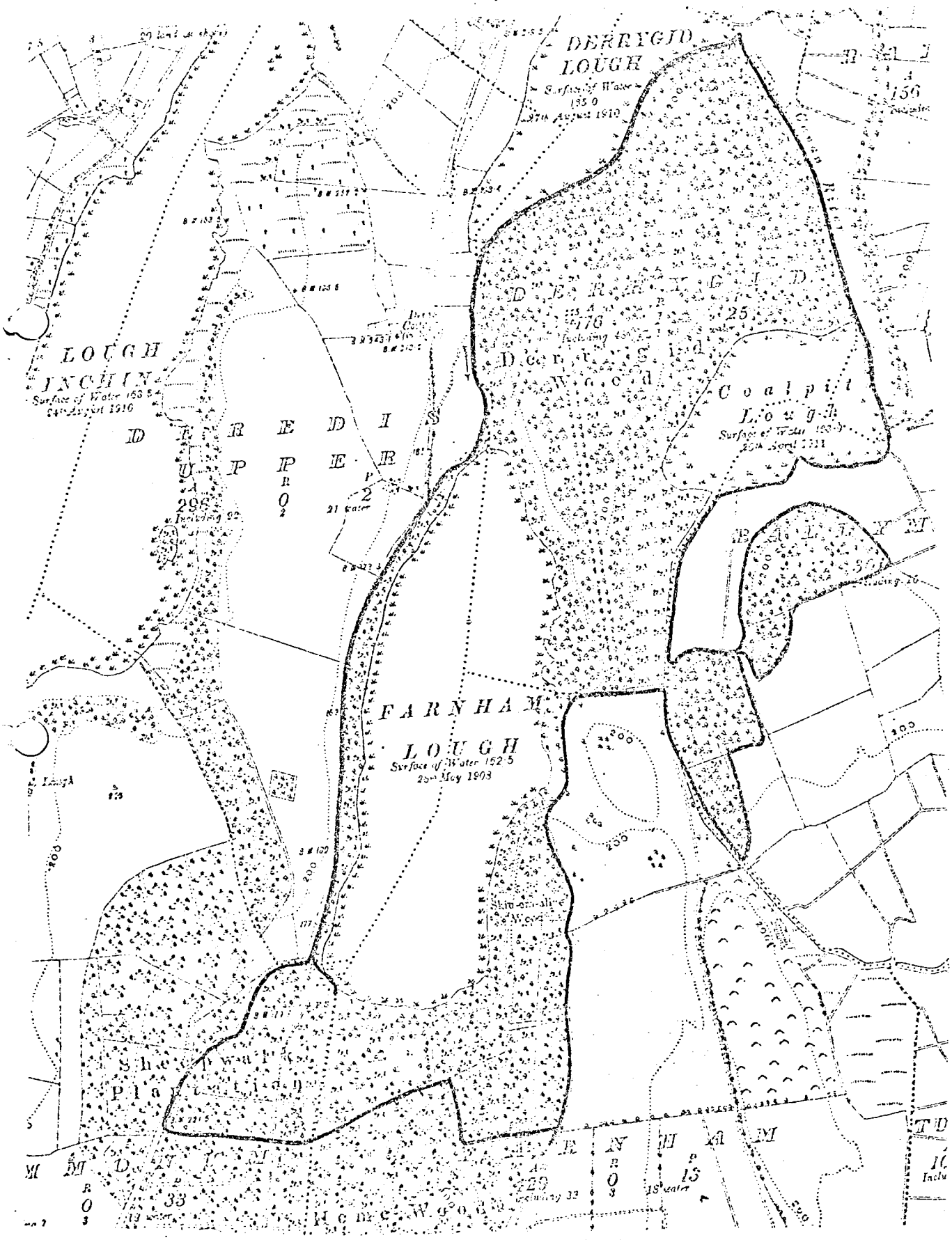
None apparent.

Recommendations

The area is off the main road and most of the visitors are fishermen. Because of its relative inaccessibility it is probably not necessary to issue a Conservation Order but general planning control should be considered.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 2

Scale: 6 Inches to 1 Mile



Name of area	CORRATIRRIM
Acreage	269
Grid reference	H. 078, 372
Scientific interest	Botanical, Geomorphological, Ecological
Rating	Regional
Priority	C

Description of site

The Upper Carboniferous Limestone outcrops in narrow bands in several areas in the north-western arm of the county. The best example of limestone vegetation and formations is the district around Corratirrim. Numerous caves are located to the west and south and many restricted patches of limestone pavement are to be found. The fact that there are peaty, acidic areas interspersed among the limestone adds to the ecological interest.

On the steep slopes and small limestone cliffs Sesleria caerulea (Blue Moor Grass) is almost completely dominant. In the flatter, grassland areas a typical species list is comprised of the following herbaceous species :-

Bellis perennis	(Daisy)
Cerastium vulgatum	(Common Chickweed)
Galium verum	(Lady's Bedstraw)
Hieracium pilosella	(Mouse-Ear Hawkweed)
Lotus corniculatus	(Bird's-foot Trefoil)
Plantago lanceolata	(Ribwort Plantain)
Polygala vulgaris	(Milkwort)
Potentilla erecta	(Common Tormentil)
Prunella vulgaris	(Self-Heal)
Succisa pratensis	(Field Scabious)
Thymus drucei	(Wild Thyme)

The grassland itself is of a fairly open nature in that it is comprised of 7 grass

species, none of which is a dominant. Several sedges add to the diversity.

Grasses	Sedges
Anthoxanthum odoratum (Sweet Vernal Grass)	Carex caryophyllea (Spring Sedge)
Briza media (Quaking Grass)	C. flacca (Glaucous Sedge)
Festuca ovina (Sheep's Fescue)	C. pulicaris (Flea Sedge)
Helictotrichon pubescens (Hairy Oat Grass)	
Keoleria cristata (Crested Hair Grass)	
Sieglingia decumbens (Heath Grass)	
Sesleria caerulea (Blue Moor Grass)	

The small patches of limestone 'pavement' harbour several fern and moss species in the grikes (hollows), but there is a very restricted flora in these areas as the soil is very shallow.

Sheep graze the mountain side and basic slag was being applied by hand near the summit.

The following is a list of caves already explored in this area (The Caves of Ireland by J.C. Coleman).

1. Shannon Pot - due west of the pot is a cavern. 1/3 mile N.E. of the pot is a stream sink
2. Pollboy - sink of water flowing north from Eden Lough.
3. Pollnaowen - (Pollnaswen) Sink of water flowing from Garvagh Lough
4. Caverns - ½ mile south of Garvagh Lough
5. Pollnagossan - stream from Tallyboggan Lough sinks here
6. Pollnaskeoge - No exploration possible
7. Pollahuna - Stream from Tittinbane (1713 ft.) flows north for 2 miles to sink here

Threats to the area

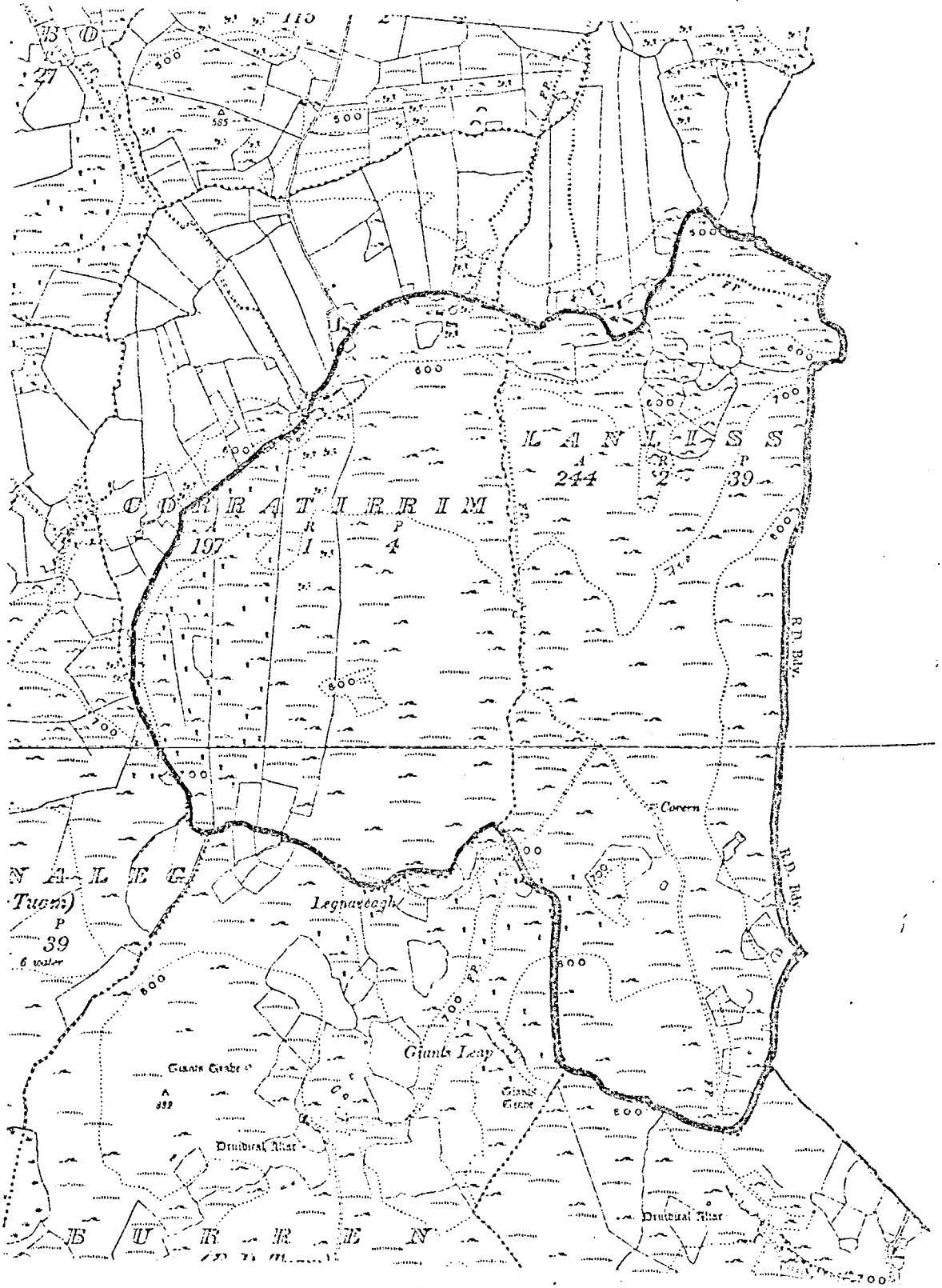
None apparent. The present form of land use is likely to continue.

Recommendations

No action needed

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 3

Scale: 6 Inches to 1 Mile



Name of area	CUILCAGH MOUNTAIN
Acreage	1,269
Grid reference	H. 095, 207
Scientific interest	Botanical, Geological, Ecological
Rating	Regional
Priority	C

Description of site (See 1" Map).

Above the 1000-foot contour line is continuous blanket peat dominated by Calluna vulgaris (Ling). The lower slopes have a swallower layer of peat and are colonized by six co-dominant species :-

Calluna vulgaris	(Ling)
Eriophorum vaginatum	(Bog Cotton)
Narthecium ossifragum	(Bog Asphodel)
Rhacomitrium lanuginosum	(Woolly Moss)
Sphagnum acutifolium	(Moss)
Trichophorum caespitosum	(Deer Grass)

The zonation is fairly distinctive. It follows the topographical and geological boundaries very closely. Above 1000 ft. are the shales of the Yoredale Series and below are the Carboniferous Sandstones. Cuilcagh mountain has yielded numerous fossils, the most interesting being Goniatites.

Because of the visible geological changes reflected by the vegetation zoning, this area is of educational value.

Threats to the area

Slieve Russell to the West and the N.W. of Cuilcagh have been afforested, but it seems unlikely that all the upland areas in this district will be planted.

Recommendations

Benbrack, to the south of Cuilcagh, is of similar construction and should be included in the general area. Afforestation of the whole area should be prevented.

Name of Site	KILCONNY BOG
Grid Reference	N. 680,832
Acreage	355
Scientific Interest	Botanical, Ecological
Rating	Local
Priority	B

Description of Area

This is a fairly extensive area of raised bog on the borders of counties Cavan and Meath. There are very few areas of bog in County Cavan.

The Calluna vulgaris (Ling) covering much of the bog is about 18 inches in height and may possibly be burnt periodically. Much of the bog is very wet and of a 'pool and hummock' nature. Other parts are covered profusely with the lichen Cladonia impexa and there are many small patches of bare peat. Andromeda polifolia (Bog Andromeda) was recorded during this visit, representing a new post-1930 record for the county.

Threats to the Area

The bog is planted with conifers in several places around the edge but it is unlikely that the whole bog will be planted.

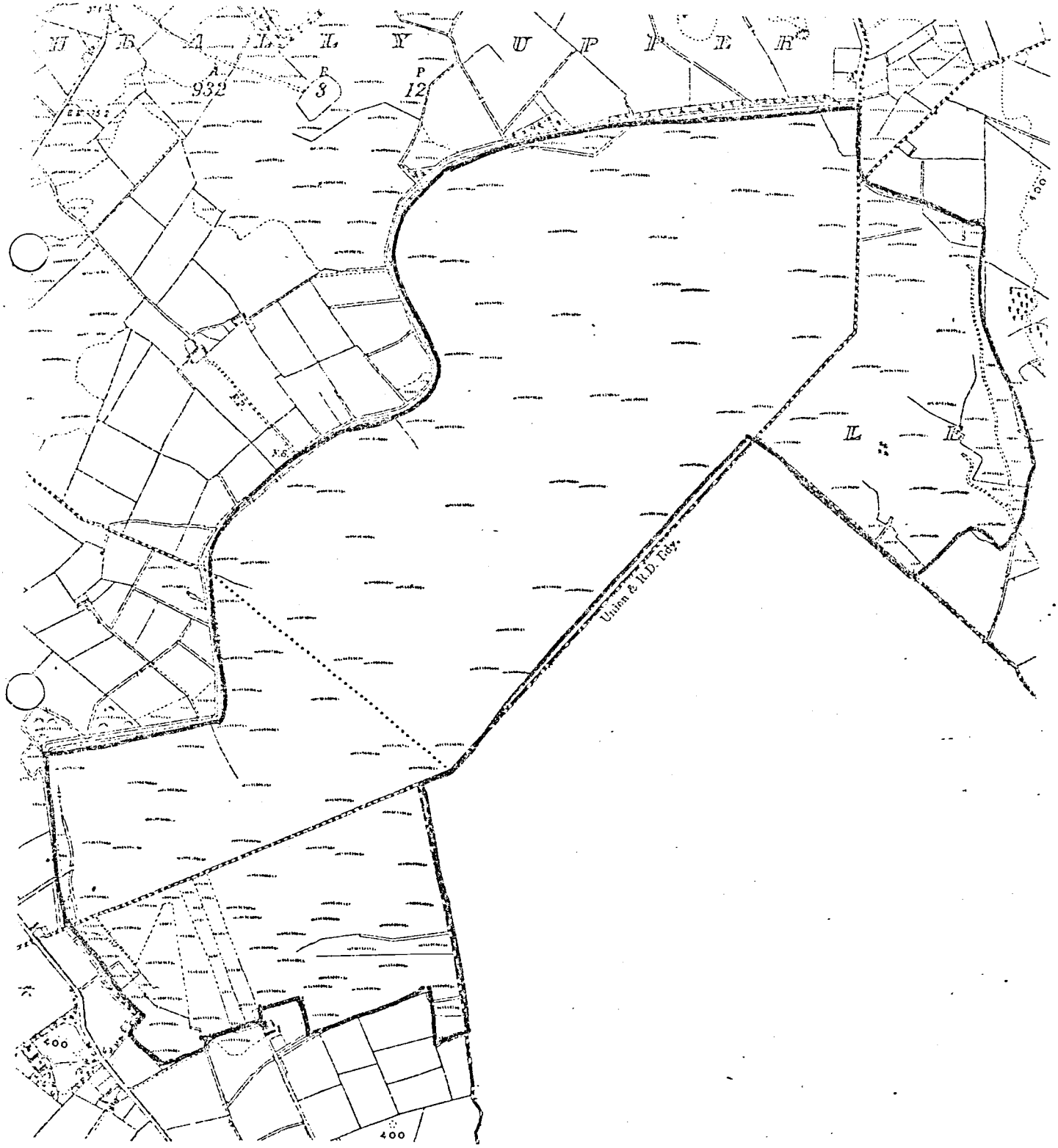
The short vegetation may be a result of burning but it may simply be a reflection of the wetness of the peat. Frequent burning destroys the natural communities but occasional burning does not have any prolonged affect.

Recommendations

This area should certainly be conserved as a raised bog and not planted with conifers. A Conservation Order is not thought necessary but general planning control should be considered.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 5

Scale: 6 Inches to 1 Mile



Name of area	SHANNON POT
Acreage	10
Grid reference	H. 269, 320
Scientific interest	Geomorphological, Ecological
Rating	Local
Priority	C

Description of site

This is the traditional birthplace of the River Shannon. Numerous streamlets flow from a nearby bog and converge at the 'pot', which is a circular pool surrounded by trees. A fairly fast-flowing stream emerges to the south.

The wet meadows surrounding the pot contain many spikes of the Common Spotted Orchid, (Dactylorhiza fuchsii). The main vegetation type is wet grassland on the lower mountain slopes. A thin layer of peat overlies the Carboniferous Sandstone with the result that sedges dominate the short turf. Four species of sedge are present :-

Carex hostiana
C. nigra
C. panicea
C. pulicaris

Only 9 other species were found, these being the 3 grasses Anthoxanthum odoratum (Sweet Vernal Grass), Cynosurus cristatus (Crested Dog's Tail) and Nardus stricta (Mat Grass) ; the Sharp-flowered Rush (Juncus acutiflorus) ; and the herbs :-

Bellis perennis	(Daisy)
Cirsium dissectum	(Meadow Thistle)
Prunella vulgaris	(Self-heal)
Ranunculus acris	(Meadow Buttercup)
Succisa pratensis	(Field Scabious)

The Shannon Pot is well signposted from Dowra and Blacklion and a footpath leads from the road to a deserted cottage nearby the pool. It is included in the report mainly for the aesthetic value but it is also of geomorphological interest as one of a series of swallow holes and caves in this region.

Threats to the area

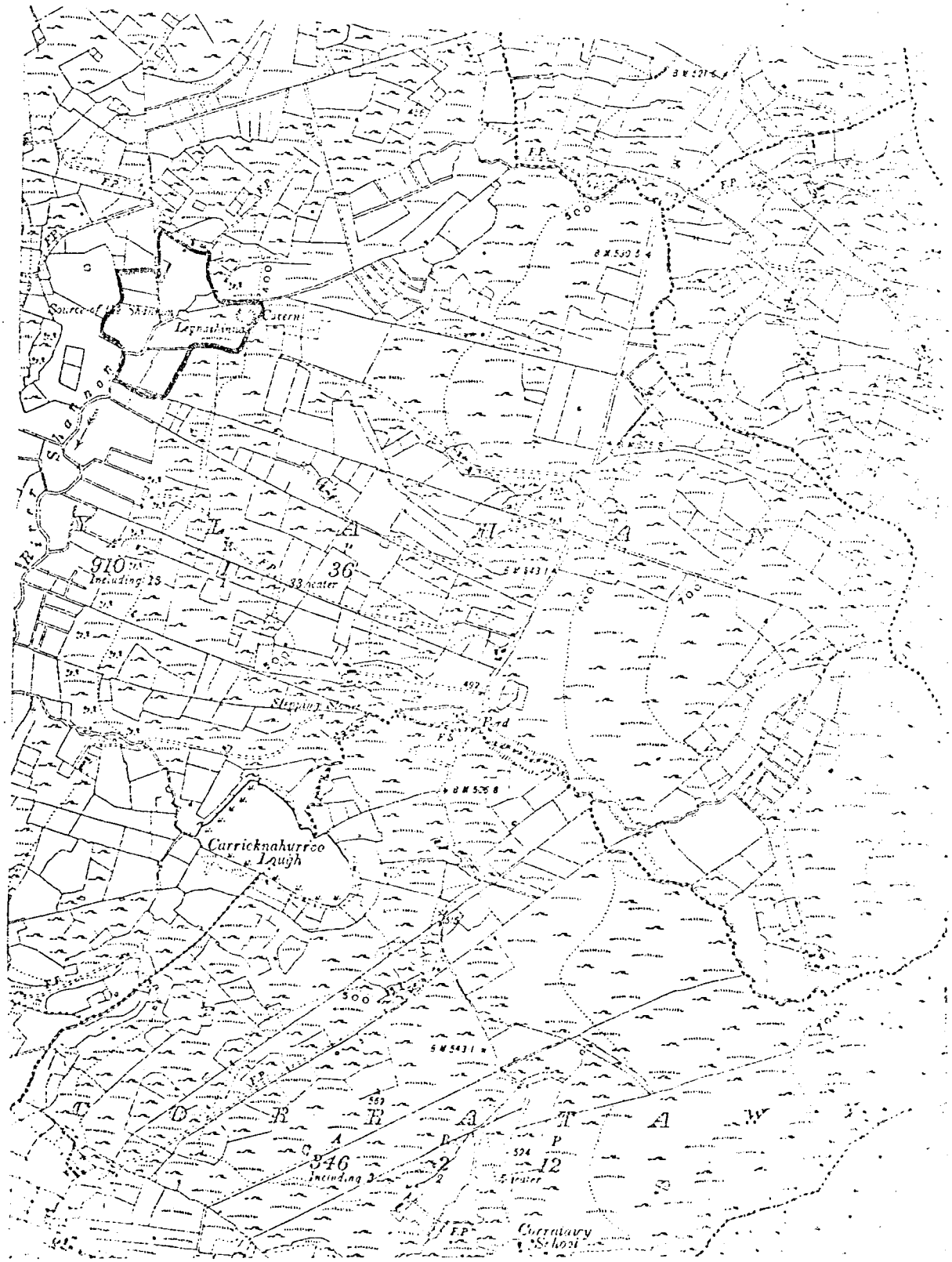
The number of visitors is not known, but unless the pressure is very heavy the area is likely to remain unaffected.

Recommendations

No action needed.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 6

Scale: 6 Inches to 1 Mile



Name of area	CORDONAGHY BOG
Acreage	198
Grid reference	N. 310, 946
Scientific interest	Botanical; Ecological
Rating	Local
Priority	C

Description of site

This is a small area of cutover peat with numerous rectangular hollows which were peat cuttings and are now colonized almost completely by sedges. The raised areas between the hollows are sparsely covered with vegetation, the main species being Potentilla erecta (Tormentil), Calluna vulgaris (Ling), Erica tetralix (Cross-leaved Heath), Molinia caerulea (Purple Moor Grass) and Anthoxanthum odoratum (Sweet Vernal Grass).

A virtually stagnant stream corsses the bog and several stagnant pools are associated with it, containing Menyanthes trifoliata (Bog Bean) and Viola palustris (Marsh Violet).

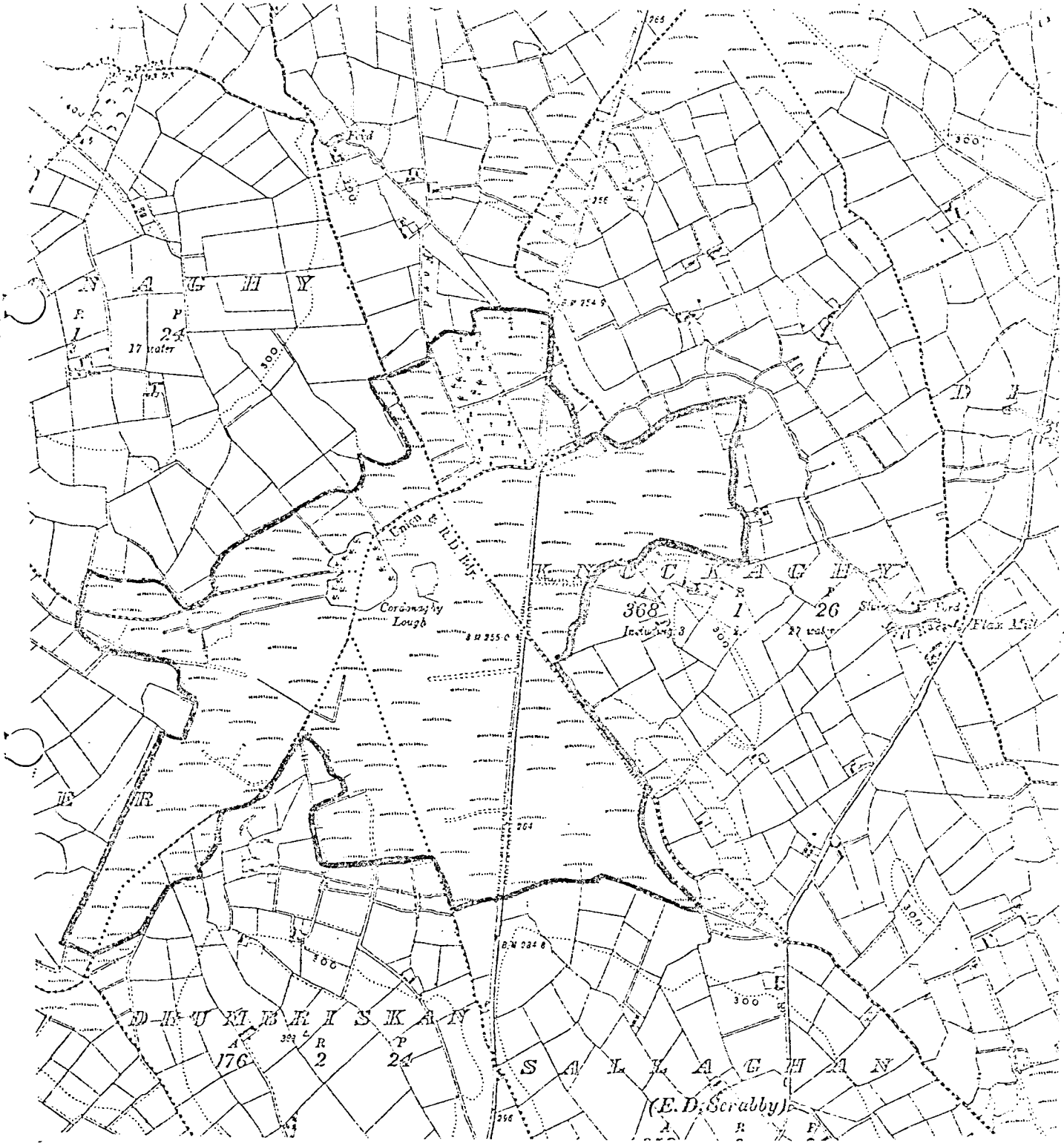
Several variants in the vegetation pattern exist. In some areas Eriophorum vaginatum (Cotton Grass) is the dominant, whereas Pteridium aquilinum (Bracken) covers other patches, and yet other parts have many small Salix (Willow) bushes.

During a visit in 1968 the Botancial Society of the British Isles recorded Carex limosa (Mud Sedge) Carex dioica (Dioecious Sedge) Hypericum elodes (Bog St. John's Wort) and Thelypteris phegopteris (Beech Fern). These are some of the more interesting species.

The area as a whole is not of great botanical importance, but the diversity of communities found here make it of educational value.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 7

Scale: 6 Inches to 1 Mile



Name of area	BRUSE HILL
Acreage	170
Grid reference	N. 317, 982
Scientific interest	Botanical, Geological, Ecological
Rating	Local
Priority	C

Description of site

Bruse Hill shows clearly different vegetation zones. On the Western slopes three associations can be distinguished. For the most part small flushes alternate with heather patches. The flushes are the richer habitat in terms of species diversity, the main species being :-

Carex panicea	(Carnation Sedge)
Carex demissa	(Common Yellow Sedge)
Carex pulicaris	(Flea Sedge)
Pinguicula vulgaris	(Butterwort)
Succisa pratensis	(Field Scabious)
Nardus stricta	(Mat Grass)
Cirsium dissectum	(Meadow Thistle)

The species to be found in the 'grassland' association are :-

Anthoxanthum odoratum	(Sweet Vernal Grass)
Potentilla erecta	(Tormentil)
Calluna vulgaris	(Ling)
Erica tetralix	(Cross-leaved Heath)

Near the top of the hill is the three association. The vegetation cover is sparse and the greater percentage is bare rock and bare peat patches. Species include :-

Carex binervis	(Green-ribbed Sedge)
Calluna vulgaris	(Ling)

Anthoxanthum odoratum	(Sweet Vernal Grass)
Polygala vulgaris	(Milkwort)
Vaccinium myrtilis	(Bilberry)
Juncus squarrosus	(Heath Rush)
Trichophorum caespitosum	(Deer Grass)

The eastern slope is almost completely dominated by heather. Further down areas of Ulex europaeus (Gorse) scrub and Salix (Willow) scrub are found scattered throughout a grassland community.

The skeleton bushes of Ulex and Calluna indicate that the area is burnt.

Much of the north slope has been quarried for granite by Roadstone Clondalkin Cement. The pink granite is very attractive and hence in demand.

The main interest of the hill is the ecological diversity offered by the different habitats. Two uncommon ferns Thelypteris phegopleris (Beech Fern) and Thelypteris limbosperma (Mountain Fern) have been recently recorded from the area.

Threats to the area

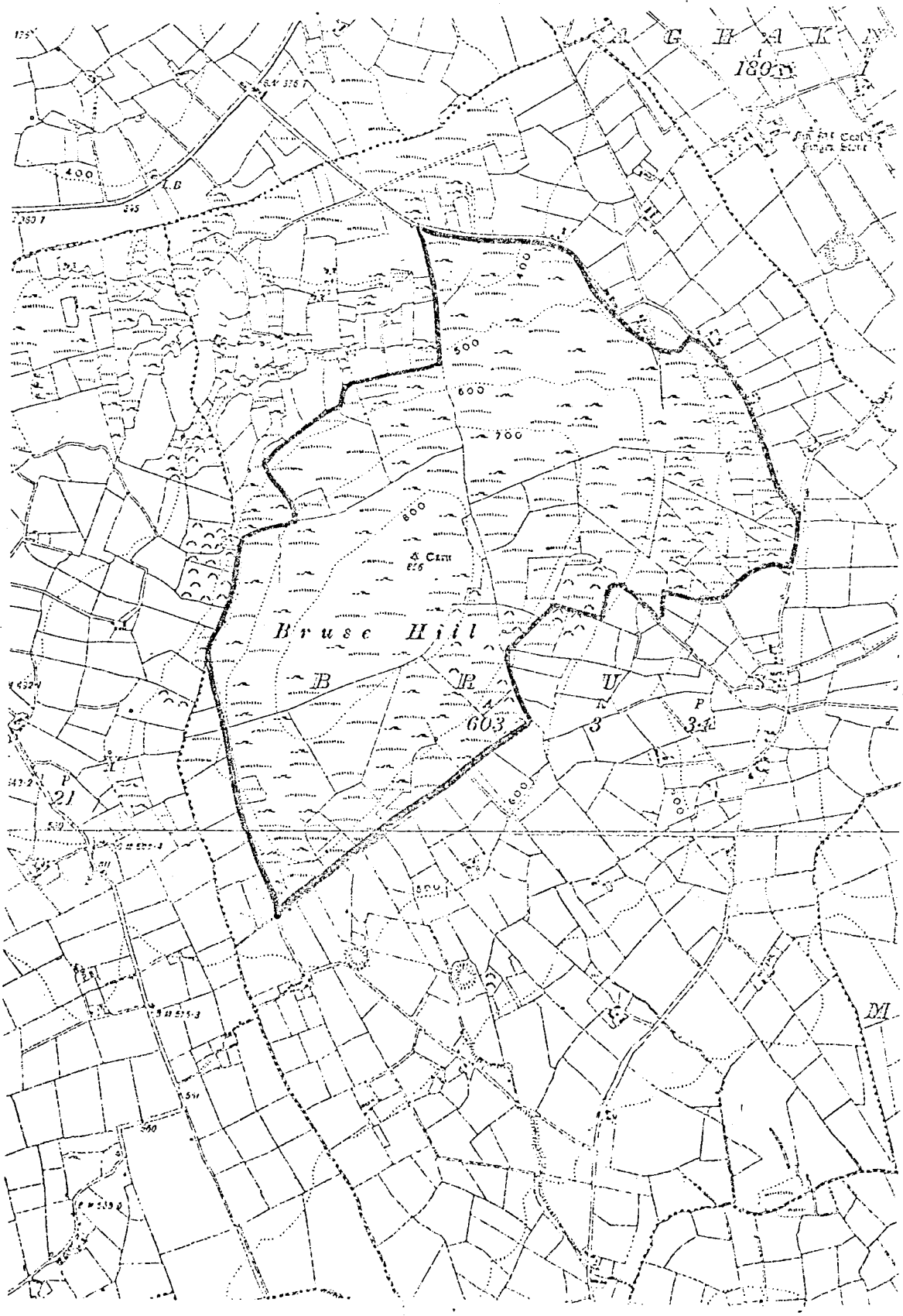
Continued quarrying would exhaust the supply of granite and deplete the botanical interest.

Recommendations

That future quarrying should be restricted.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 8

Scale: 6 Inches to 1 Mile



Name of area	WOODLANDS NEAR DRUMKEEN HOUSE
Acreage	42
Grid reference	N. 416, 077
Scientific interest	Botanical : Ecological
Rating	Local
Priority	C

Description of site

Surrounding Drumkeen House, which is now a Loreto Convent, are mixed deciduous woods on either side of the Cavan-Bultersbridge road. The main species is beech although some sycamore and elm are interspersed throughout the area. The occasional young oak tree occurs.

The ground flora consists entirely of Endymion non-scriptus (Bluebell) on the slopes, whereas the flatter areas are colonized by Galium aparine (Goosegrass), Heracleum sphondylium (Hogweed), Stachys sylvatica (Wood Woundwort), Geranium robertianum (Herb Robert), Allium ursinum (Wild Garlic), Rubus fruticosus (Blackberry). A small stream flows through the woodland and this is covered by a carpet of Ranunculus repens (Creeping Buttercup) with alder trees at the edge.

Although this is not an extensive area of woodland, it is of botanical interest because of its mixed deciduous nature and the different ground flora communities.

Threats to the area

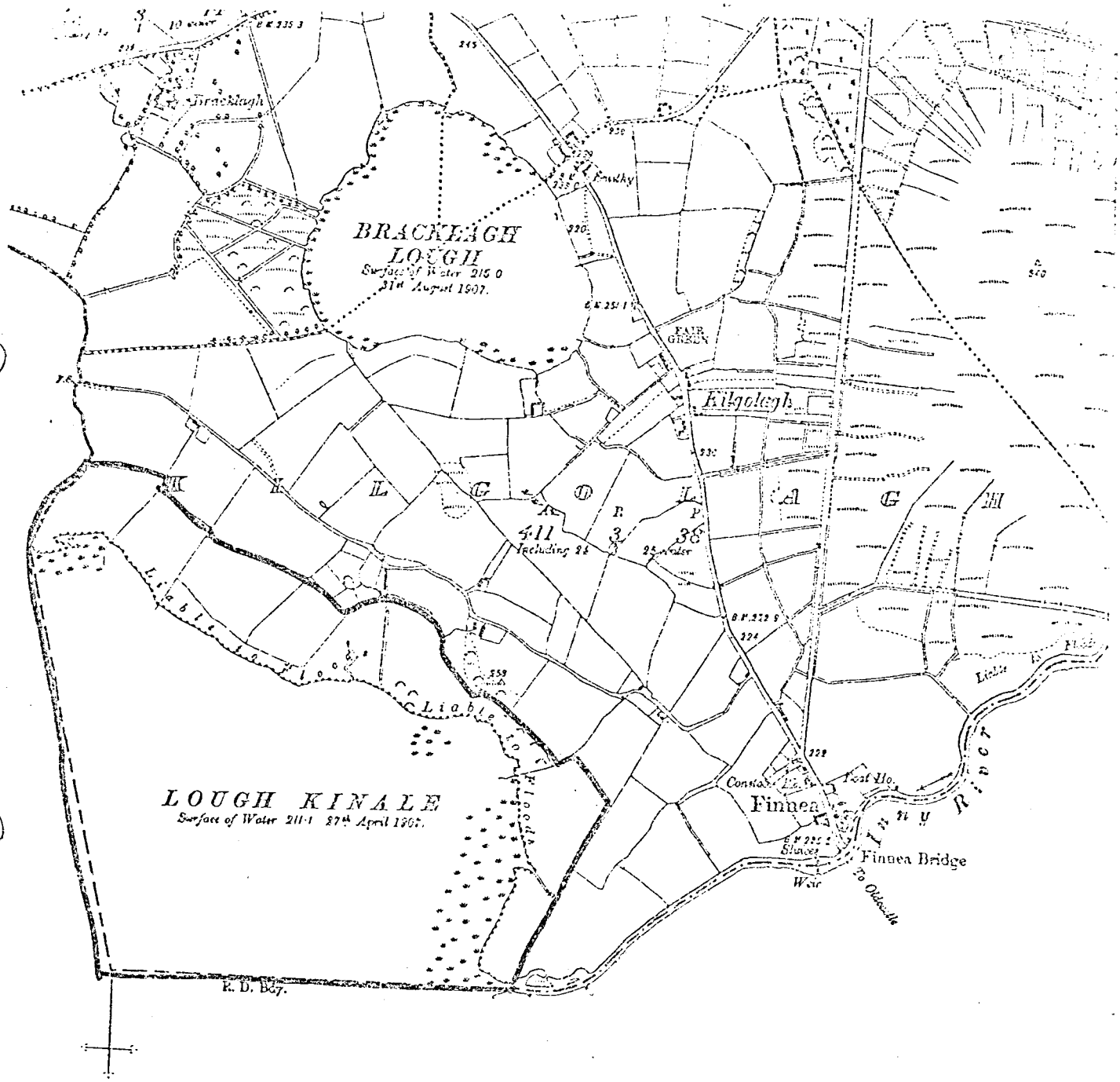
There is some dumping along the roadside, but it is not extensive.

Recommendations

No action needed

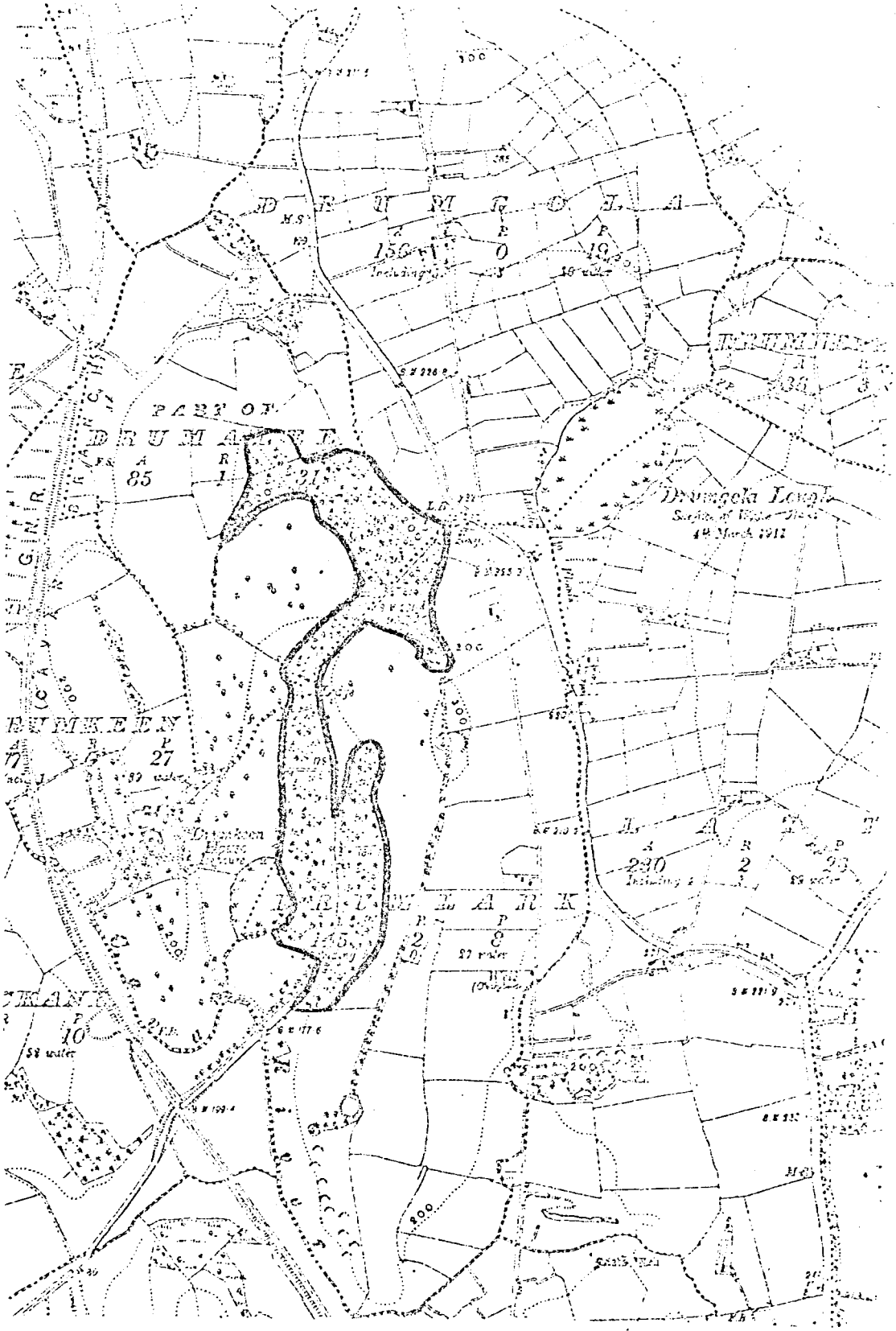
MAP SHOWING AREA OF SCIENTIFIC INTEREST — 10

Scale: 6 Inches to 1 Mile



MAP SHOWING AREA OF SCIENTIFIC INTEREST — 9

Scale: 6 Inches to 1 Mile



Name of area	LOUGH KINALE
Acreage	163 (Co. Cavan)
Grid reference	N. 392, 820
Scientific interest	Botanical, Ornithological
Rating	Local
Priority	C

Description of site

The greater portion of Lough Kinale comes within the Co. Longford boundary and a detailed description is included in the report for that county. The rest of the lough is divided between Co. Cavan and Co. Westmeath. Although the part in Cavan is relatively small the ecological value of the lough must be considered as a whole unit and hence the importance of the lesser area is discussed here.

The main interest lies in the marshland surrounding the loughshore. The reed beds provide suitable nesting places for many species of wildfowl and are also of botanical importance. As association dominated by Phragmites communis (Common Reed) and Carex elata (Tufted Sedge) is the most frequently occurring plant community. Other species in this association include :-

Acrocladium cuspidatum	(Moss)
Carex lepidocarpa	(Long-stalked Yellow Sedge)
Equisetum fluviatile	(Water Horsetail)
Hydrocotyle vulgaris	(Pennywort)
Hypnum cupressiforme	(Moss)
Mentha aquatica	(Water Mint)
Pedicularis palustris	(Red-rattle)
Ranunculus flammula	(Lesser Spearwort)
Samolus valerandi	(Brookweed)

In winter the lough holds large numbers of Tufted Duck and Pochard. Wildfowl

counts give the following figures :-

	12 January 1969	23 March 1971
Mallard	12	2
Mute Swan	6	38
Pochard	2425	-
Teal	25	2
Tufted Duck	2160	500
Whooper Swan	3	8

Threats to the area

None apparent for the area in Co. Cavan

Recommendations

General planning control for the whole lough area is recommended

Name of area	BLACKROCKS CROSS
Acreage	30
Grid reference	H. 152, 238
Scientific interest	Botanical, ecological
Rating	Local
Priority	C

Description of site

The land surrounding Blackrocks Cross can be considered representative of the various ecological habitats to be found in the valleys of the Cuilcagh Mountains. A blanket bog of about 1,000 ft. covers the mountains and below is a wet, acidic grassland community with Juncus squarrosius (Heath Rush), Trichophorum caespitosum (Deer Grass), Calluna vulgaris (Ling), Vaccinium myrtilis (Bilberry) and several Sphagnum species (Moss) being the main colonizers.

The most interesting habitats are the valley stream and the boulders on the neighbouring slopes. At Blackrocks Cross itself the valley sides are covered with developing scrub - Elm, Rowan, Sallow, Oak and Birch. In between the trees grow patches of Luzula sylvatica (Great Wood-rush), Endymion non-scriptus (Bluebell) Vaccinium myrtilis (Bilberry), Calluna vulgaris (Ling) and Pteridium aquilinum (Bracken). Under the boulders and around those in the stream are numberous bryophytes. A rare fern, Hymenophyllum tunbrigense is abundant in the rock crevices, and a small Willow-herb, Epilobium nerterioides, a local species, creeps along the damp rocks.

The stream itself has cut through the rock to reveal thin-bedded fossil shales separated by slate bands.

Threats to the area

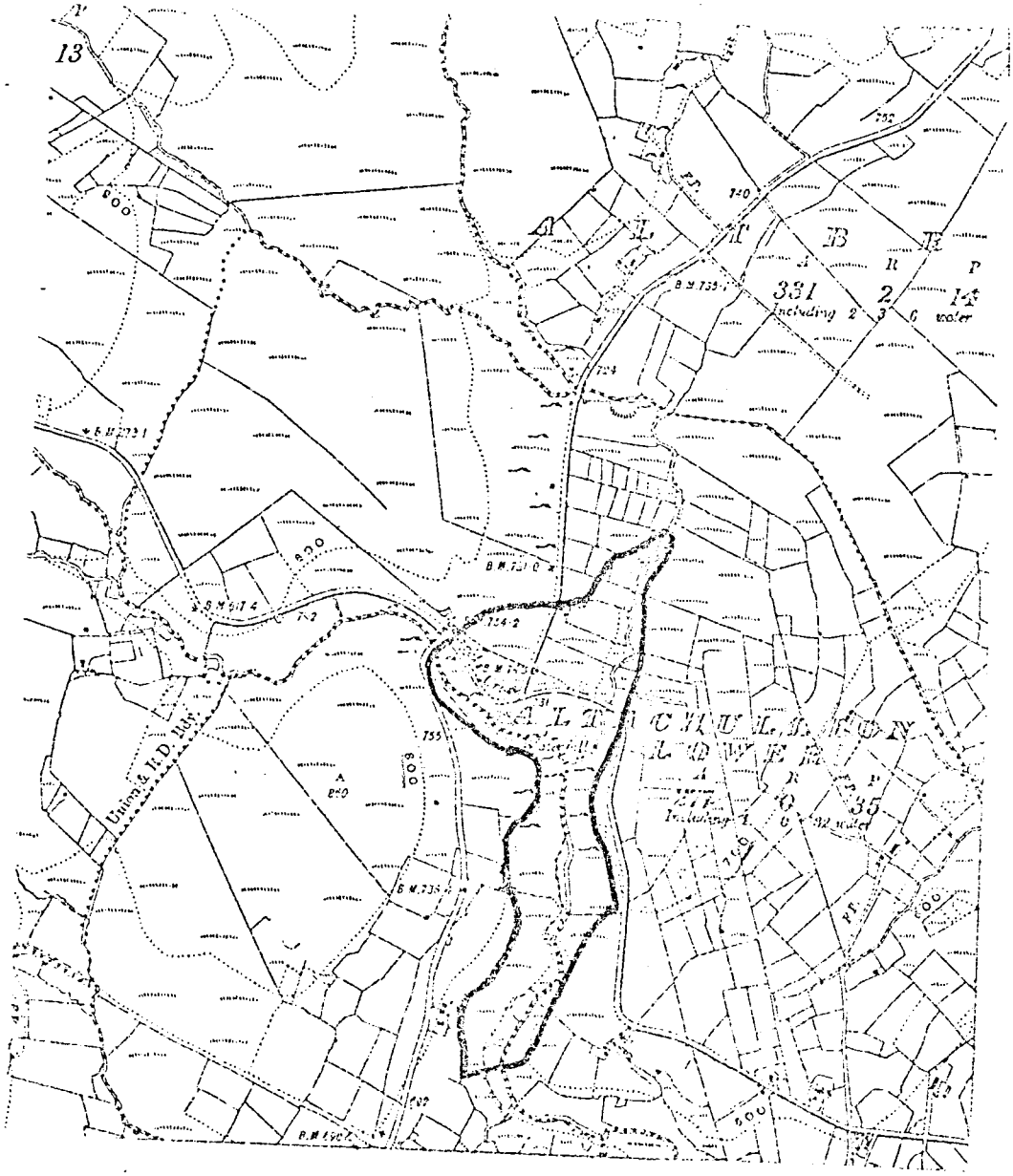
None apparent

Recommendations

No action needed. The grasslands are grazed by sheep and the peat cut for fuel, but these forms of land use will not adversely affect the vast resources of the lowland grassland or blanket peat in the near future.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 11

Scale: 6 Inches to 1 Mile



AFF 1972

Name of area	LOUGH SHEELIN
Acreage	23 (area visited)
Grid reference	N. 427, 849
Scientific interest	Botanical
Rating	Local
Priority	C

Description of site

Although a large lake, Lough Sheelin does not provide a great deal of ecological interest. Access to the shore is restricted as much of the land surrounding the lough is privately owned.

An area visited near Summerville had numerous offshore islands fringed by Phragmites communis (Common Reed) and Scirpus lacustris (Bulrush). In the shallow water between the islands and shoreline beds of Carex rostrata (Bottle Sedge) grow. Associated with this species are Carex nigra (Common Sedge) Hippuris vulgaris (Mare's Tail), Hydrocotyle vulgaris (Pennywort), Mentha aquatica (Water Mint), Ranunculus flammula (Lesser Spearwort) and Rorippa islandica (Marsh Yellow-cress).

There are several areas of scrubland around the lough, but very few are extensive.

Further investigation at different points along the shoreline is needed.

Threats to the area

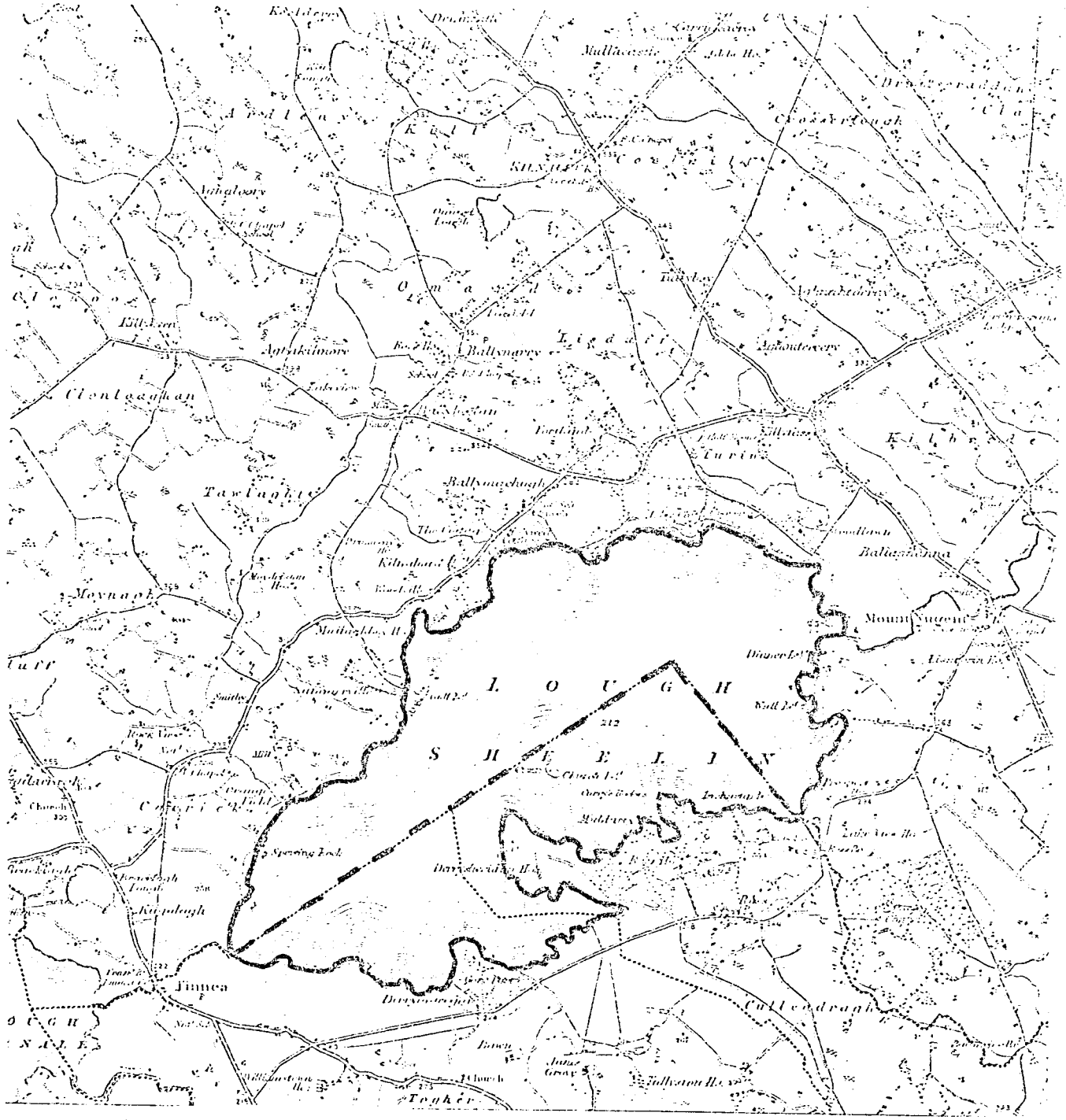
There are several car park and picnic areas located at points on the north shore, but many of the small roads leading down to the water's edge are private. Because of the limited ecological interest it seems possible to combine all the various interests without adversely affecting the area, provided that thoughtful planning is implemented.

Recommendations

A further investigation of the shoreline is required. General planning control is needed particularly in view of the recent pollution problems.

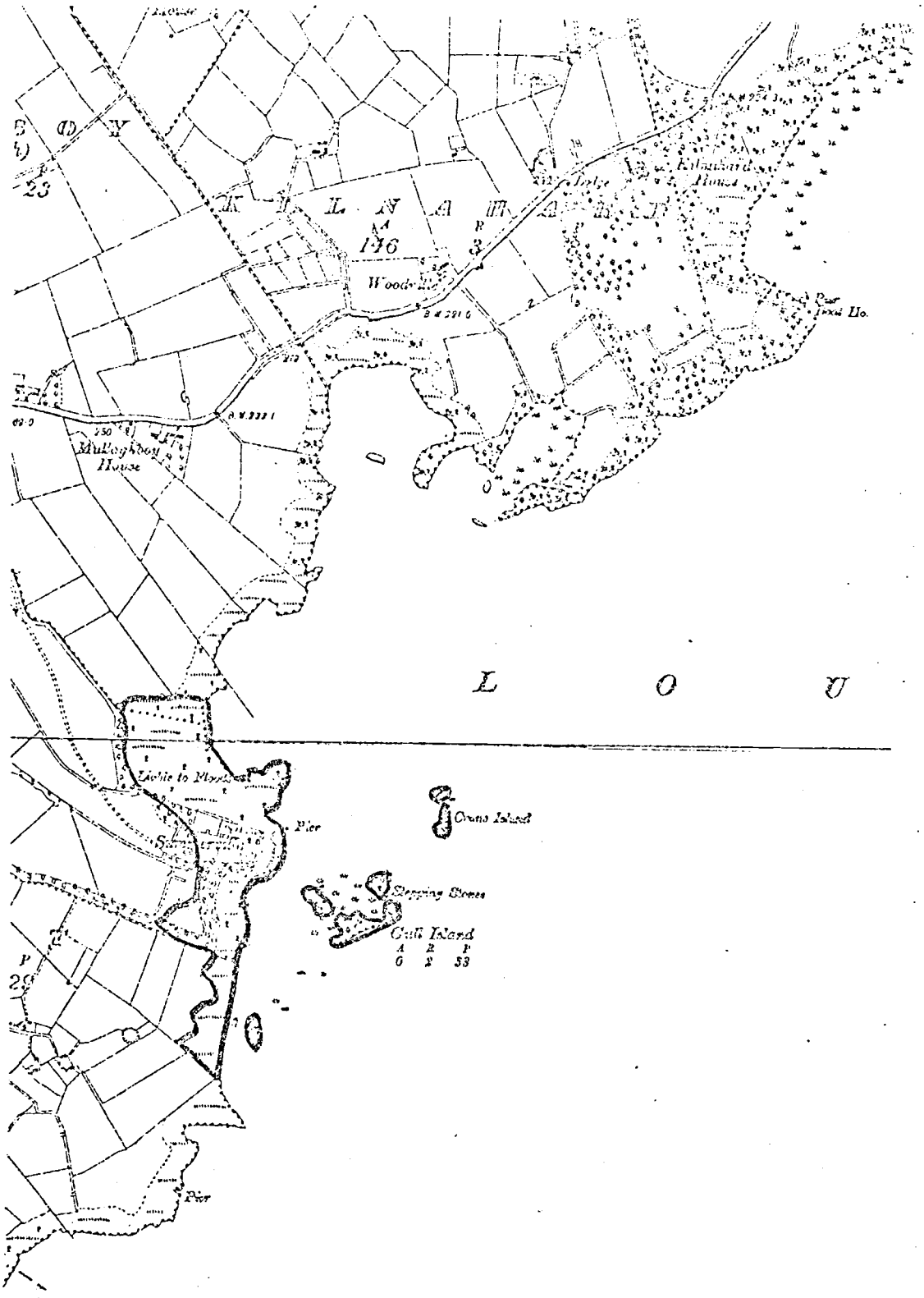
MAP SHOWING AREA OF SCIENTIFIC INTEREST — 12

Scale: 1 Inch to 1 Mile



MAP SHOWING AREA OF SCIENTIFIC INTEREST — 13

Scale: 6 Inches to 1 Mile



Name of area	MARSH NEAR MADABAWN BRIDGE
Acreage	32
Grid reference	H. 643, 091
Scientific interest	Botanical
Rating	Local
Priority	C

Description of site

This is a small area of very wet marshland. It is interesting because no particular species is dominant and so that a fairly open and diverse community results. The main species are Menyanthes trifoliata (Bog Bean), Equisetum fluviatile (Water Horsetail), Galium palustre (Marsh Bedstraw) and Carex acuta (Slender-tufted Sedge). Altogether 20 species were recorded which is good for this type of habitat.

Threats to the area

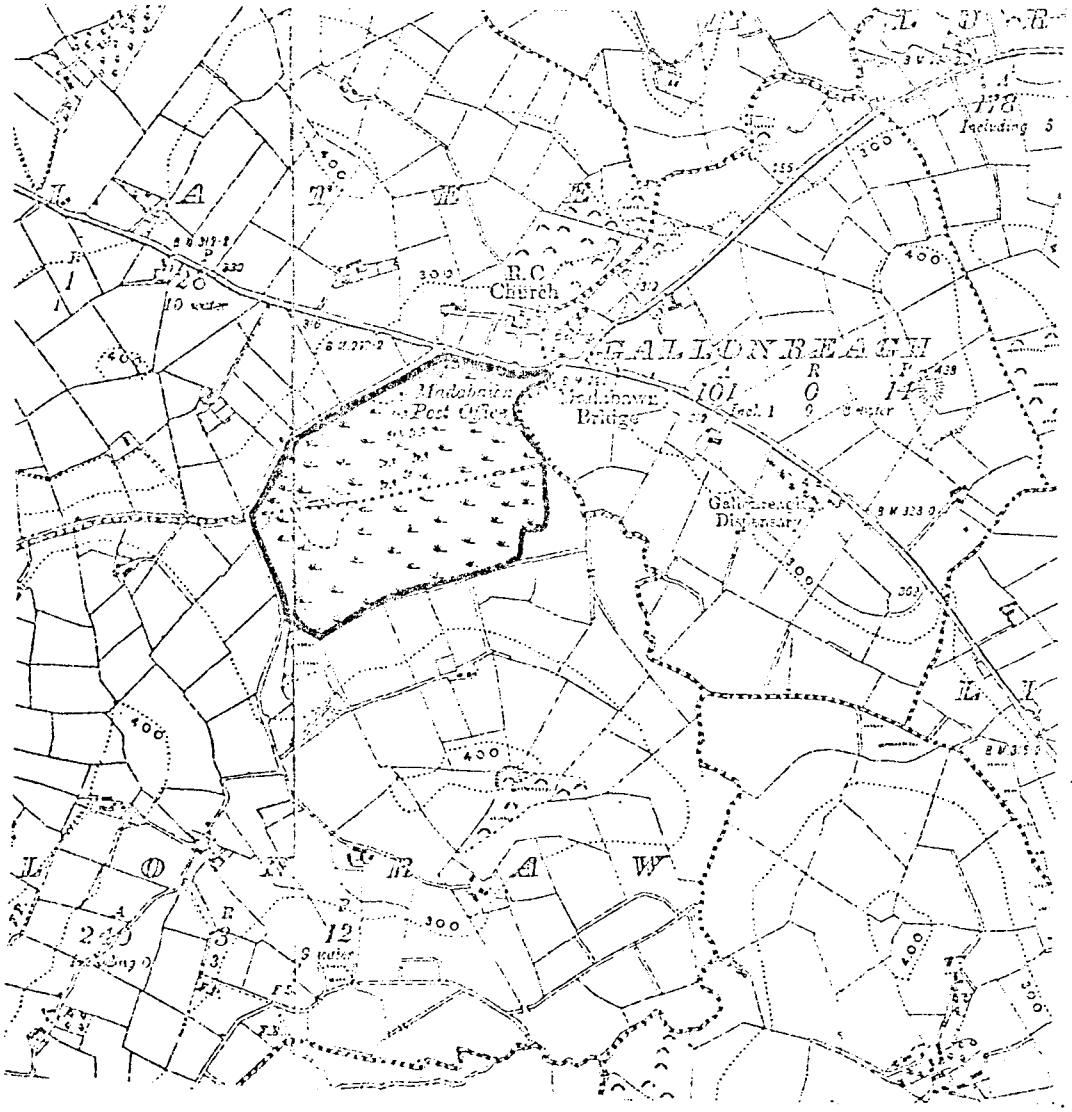
None apparent

Recommendations

No action needed

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 14

Scale: 6 Inches to 1 Mile



Name of Site	MARSHLAND AT RIVER BLACKWATER BRIDGE, S. END OF L. RAMOR
Grid. Reference	N. 631,833
Acreage	73
Scientific Interest	Botanical
Rating	Local
Priority	C

Description of Area

To the south of the bridge at the southern end of Lough Ramor, are wet meadows bordered by the River Blackwater. On the left bank is a small very wet area dominated by the grass Alopecurus pratensis (Common Fox-tail) with Viola palustris (Marsh Violet) in the hollows. Caltha palustris (Marsh Marigold), Ranunculus repens (Creeping Buttercup), Cardamine pratensis, (Lady's Smock) and Ranunculus lingua (Great Spearwort) are abundant.

On the right bank is a wet meadow dominated by the grasses Alopecurus pratensis and Anthoxanthum odoratum (Sweet Vernal Grass) with some Lolium perenne (Perennial Rye-grass). Cardamine pratensis is very abundant and the flowers formed a 'sea of pink'. Spergularia arvensis (Corn Spurrey) and other species, more common in drier habitats, are present, indicating that this area may have been sown at some time.

Another meadow has much Juncus articulatus (Jointed Rush), Poa pratensis, (Smooth Meadow Grass) and Filipendula ulmaria (Meadowsweet) which is the more typical type of community of marshy areas.

Threats to the Area

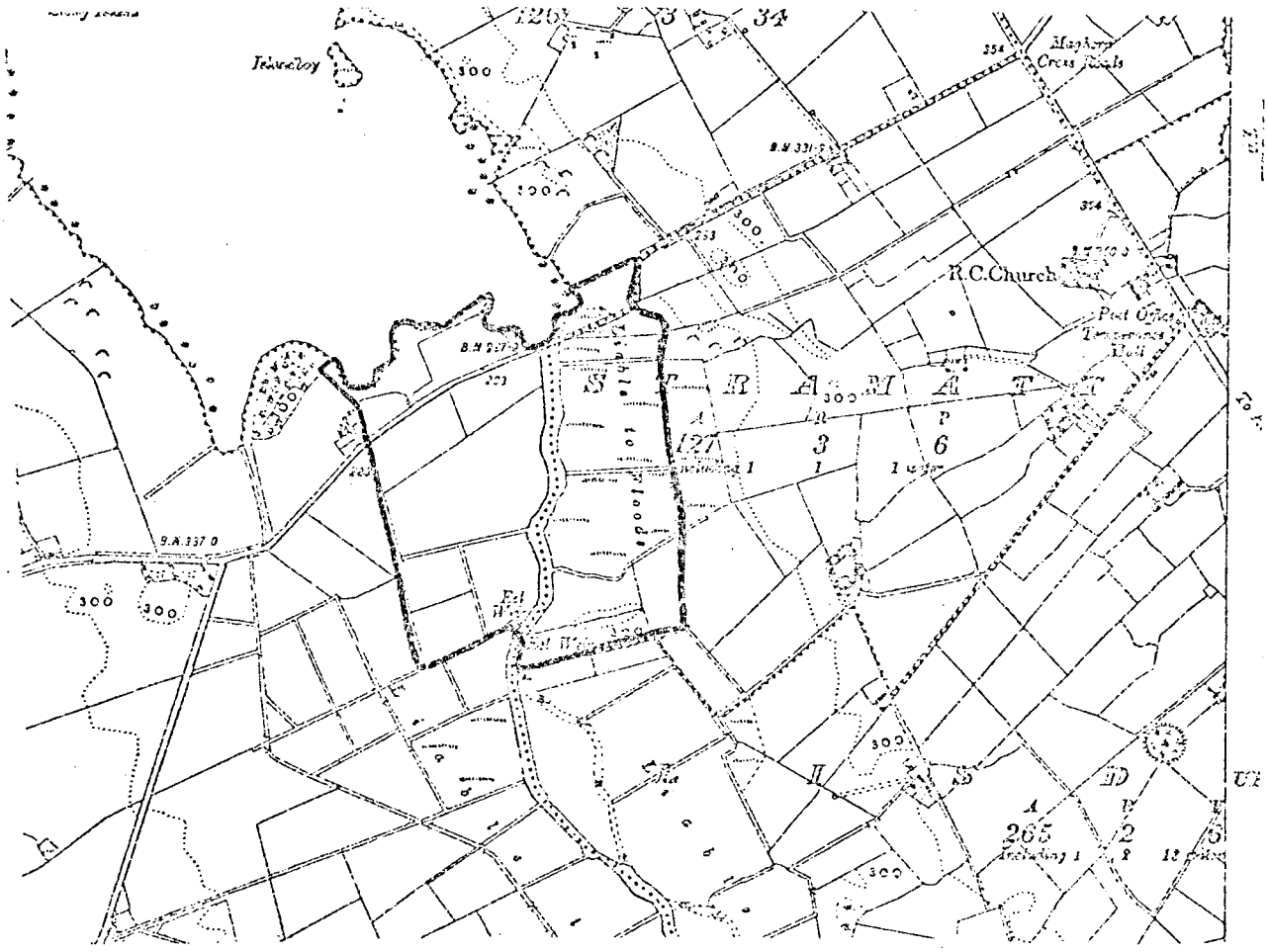
None apparent.

Recommendations

The area is grazed by cattle at the present and a change in management seems unlikely, therefore no specific action is required.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 15

Scale: 6 Inches to 1 Mile



Name of area	HAZEL SCRUB NORTH OF CORRATIRRIM
Acreage	47
Grid reference	H. 082, 376
Scientific interest	Botanical, Ecological
Rating	Local
Priority	C

Description of site

There are many small areas of scrubland in Co. Cavan. This particular one is chosen because of its fairly rich ground flora and because it is an example of scrub on the limestone outcrop of Corratirrim mountain. This whole area is noteworthy.

Other tree species in the scrubland include Prunus spinosa (Blackthorn), Ilex aquifolium (Holly), Crataegus monogyna (Hawthorn) and Fraxinus excelsior (Ash).

Usually the ground is covered to a large extent by mosses - here Mnium and Eurynchium formed only a small part of the lower storey, enabling at least 20 other plant species to add to the diversity.

The herbaceous species include :-

Anemone nemorosa	(Wood Anemone)
Cardamine flexuosa	(Greater Bitter Cress)
Chrysosplenium oppositifolium	(Golden Saxifrage)
Conopodium majus	(Pignut)
Endymion non-scriptus	(Bluebell)
Geum urbanum	(Wood Aven)
Geranium robertianum	(Herb Robert)
Oxalis acetosella	(Wood Sorrel)

Lysimachia nemorum	(Yellow Pimpernel)
Orchis mascula	(Early Purple Orchid)
Primula vulgaris	(Primrose)
Ranunculus ficaria	(Lesser Celandine)
Urtica dioica	(Stinging Nettle)
Viola reichenbachiana	(Woodland Viola)

Threats to the area

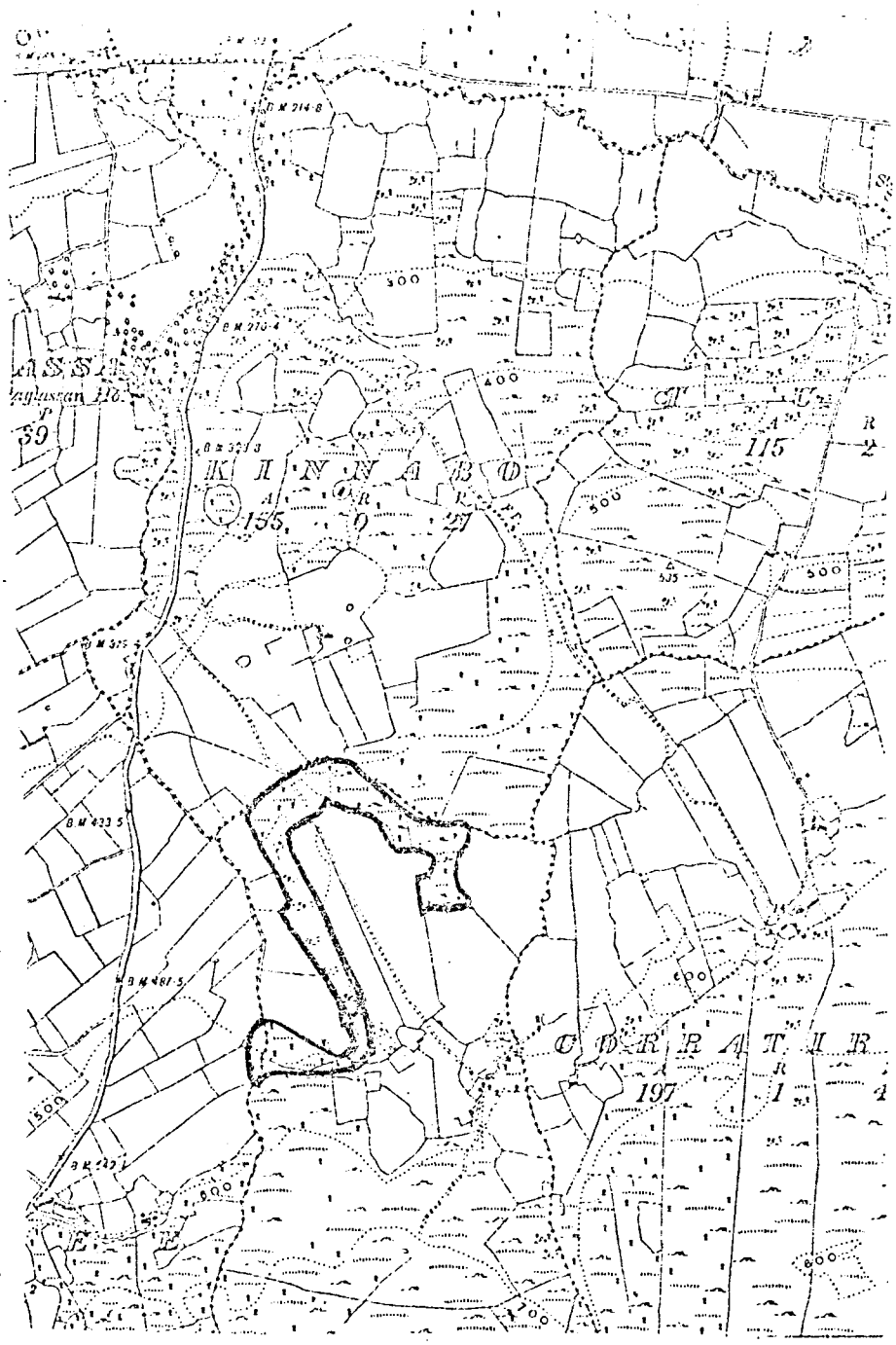
A smaller area of hazel scrub to the west is being felled, but it seems unlikely that all the scrubland in the area will be removed.

Recommendations

No action needed

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 16

Scale: 6 Inches to 1 Mile



Name of Site	SWAN LOUGH
Grid Reference.	N. 314,912
Acreage	134
Scientific Interest	Botanical
Rating	Local
Priority	C

Description of Area

The semi-aquatic vegetation surrounding the lough produces several interesting species - these include Ranunculus lingua (Great Spearwort) and Carex aquatilis (Northern Sedge). C. aquatilis is not a common species in Ireland, but it is found around many of the lough shores in this county. Nothing else of particular note is found here, but 43 species were recorded showing a fairly diverse community.

Threats to the Area

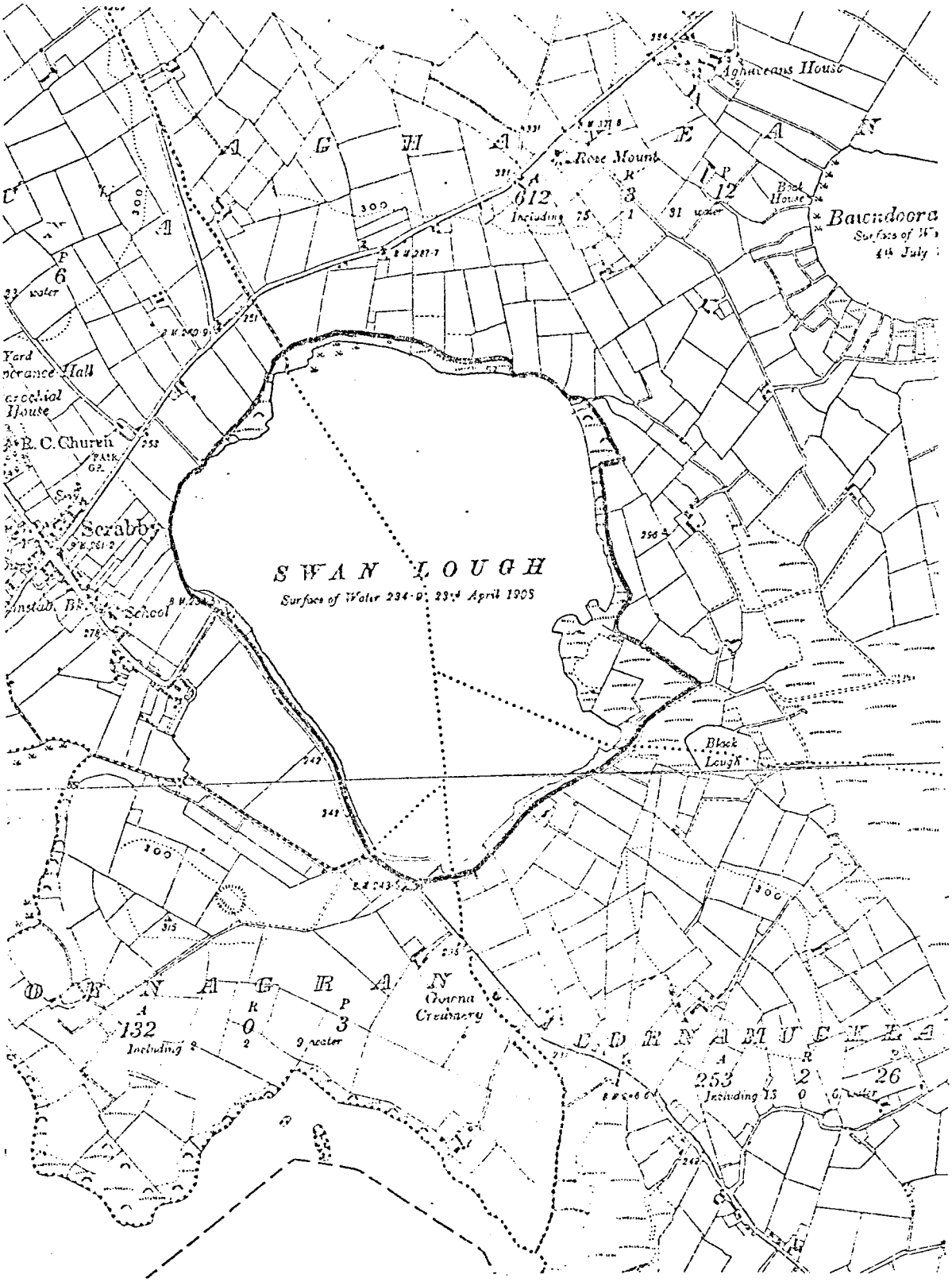
Sewage from nearby farmhouses flowed into the lough discolouring it in several places, but this would not unduly affect the plant communities.

Recommendations

No action needed.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 17

Scale: 6 Inches to 1 Mile



Name of area	LOUGH RAMOR
Acreage	59 and 67
Grid reference	N. 616, 838 and N. 578, 852
Scientific interest	Botanical, ornithological, ecological
Rating	Local
Priority	C

Description of site

Lough Ramor is fringed around much of its perimeter by hazel and hawthorn scrub. This is an important habitat for Blackcaps. At the western end are several areas of forestry plantations, surrounded by a narrow belt of deciduous trees.

Many of the small islands are wooded also and these must be considered important refuges for many birds. The lake is also a refuge for wintering wildfowl.

At several points around the southern shore are marshes, dominated by sedges.

The first marsh is dissected by many small streams which are colonized by Menyanthes trifoliata (Bog Bean) Sparganium sp. (Bur reed) and several species of Carex (sedge). About 20 Mallard were in the bay and 2 Mute Swans are nesting in the reeds. The marshland is dominated by Juncus effusus (Soft Rush) and various sedges.

The second area is a completely sedge-dominated community; Carex rostrata (Bottle sedge) and Carex nigra (Common Sedge) being the more frequent species. Caltha palustris (Marsh Marigold), Potentilla palustris (Marsh cuinquefoil) and Equisetum fluviatile (Water Horsetail) are other common species in the association. Some of the less common sedges include :-

Carex curta	(White Sedge)
Carex vesicaria	(Bladder Sedge)
Carex elata	(Slender-tufted Sedge)

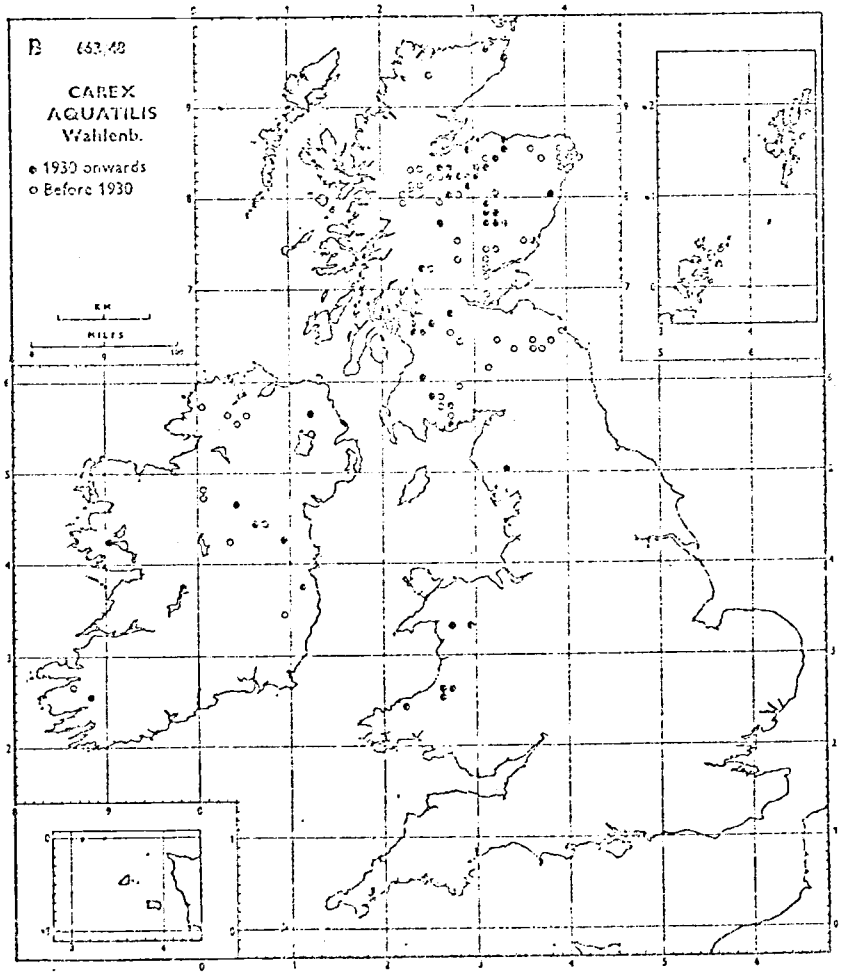
A rare sedge species (Carex aquatilis) is to be found on the north shore - the exact locality is withheld as a protection measure but a distribution map indicates the importance of this site. It is the presence of the scrub and small areas of woodland around the lake, and also the wooded islands and pockets of reedy areas that make the lough interesting both from an ornithological and botanical aspect.

Threats to the area

None apparent

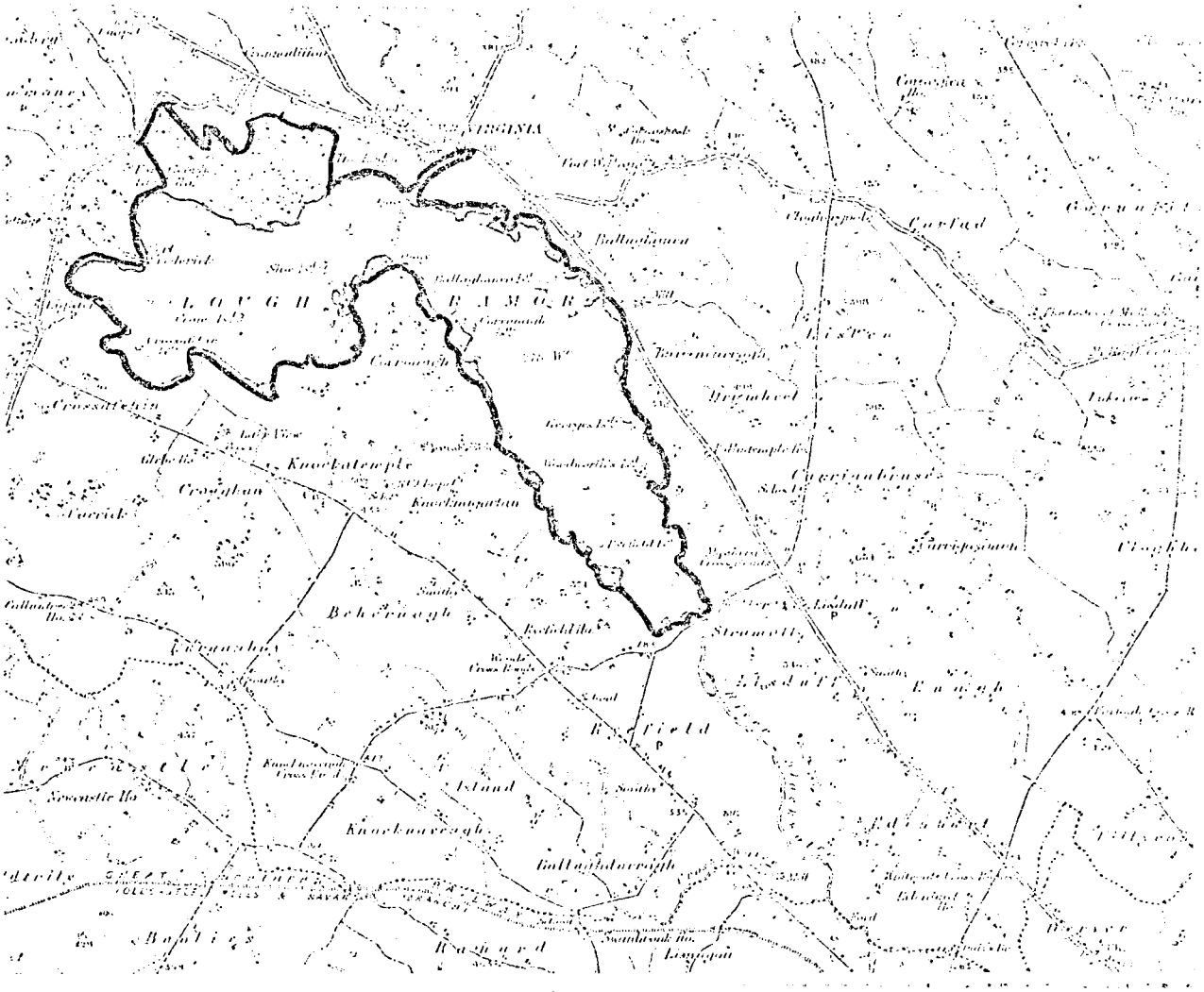
Recommendations

The wooded islands and lake shores should be preserved and general planning control for the whole region should be considered.



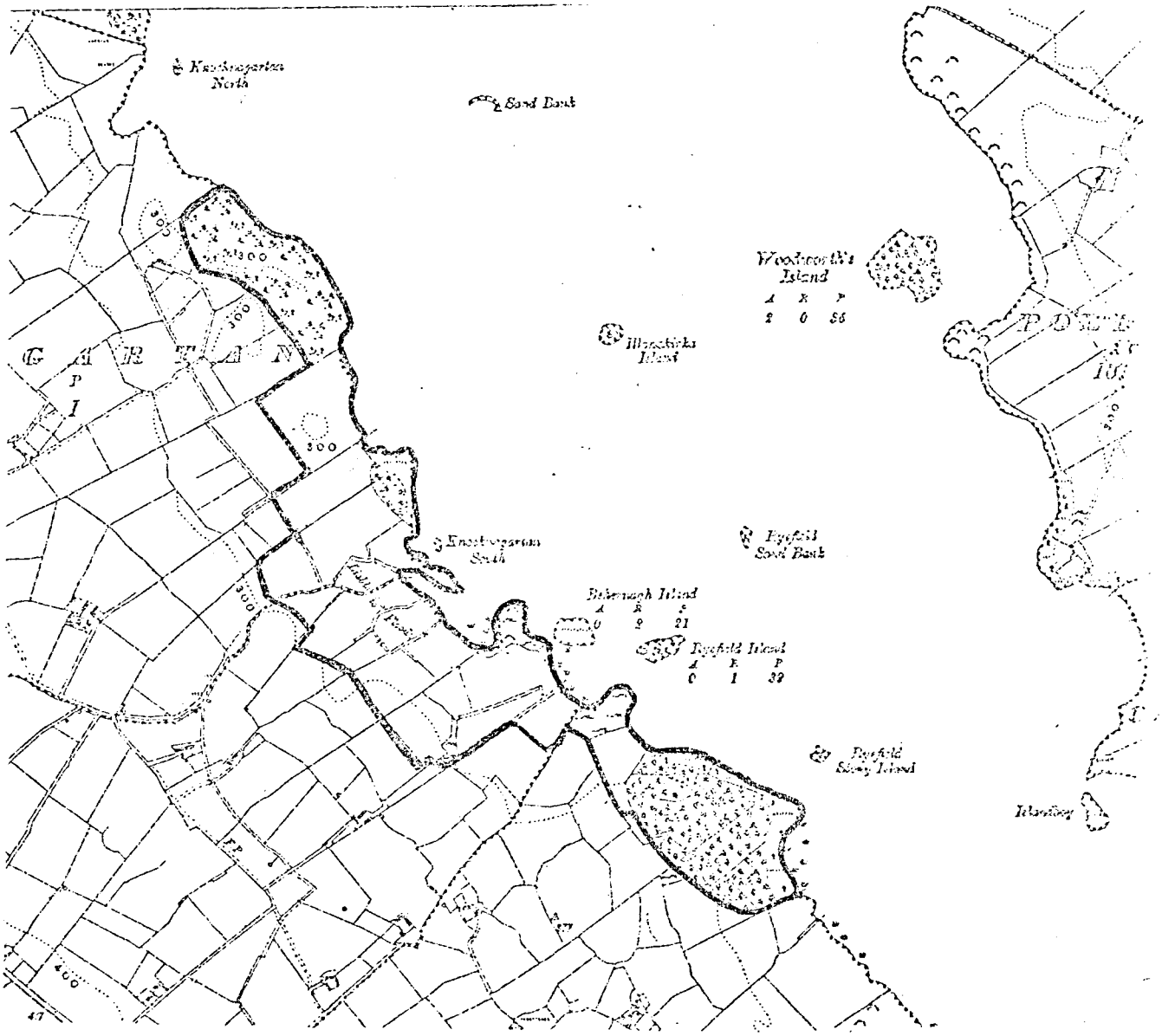
MAP SHOWING AREA OF SCIENTIFIC INTEREST — 18

Scale: 1 Inch to 1 Mile



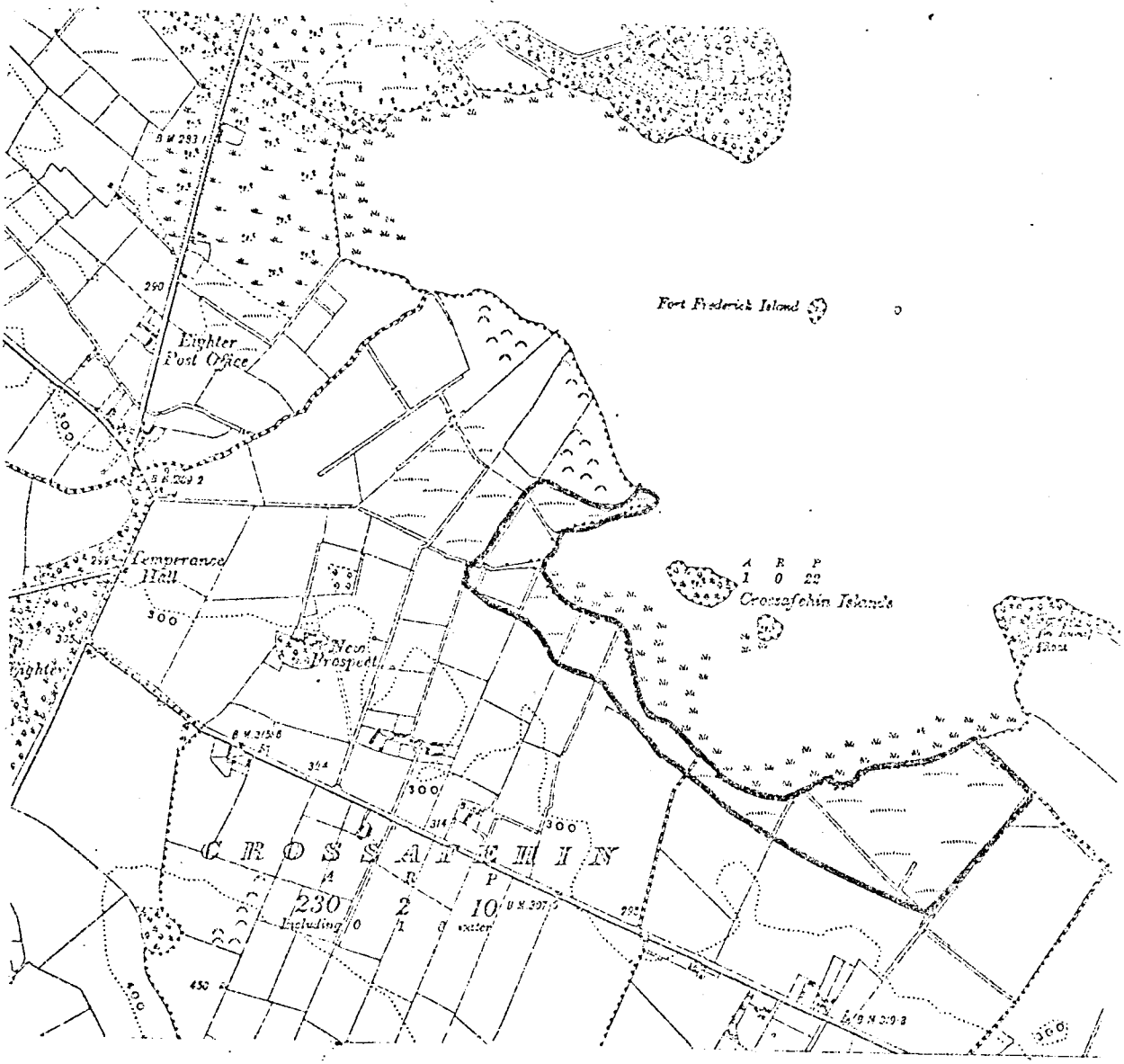
MAP SHOWING AREA OF SCIENTIFIC INTEREST — 19

Scale: 6 Inches to 1 Mile



MAP SHOWING AREA OF SCIENTIFIC INTEREST — 20

Scale: 6 Inches to 1 Mile



Name of area	LOUGH GOWNA
Acreage	230 approx. (Co. Cavan)
Grid reference	N. 290, 920
Scientific interest	Ornithological, Ecological
Rating	Local
Priority	C

Description of site

The numerous small islands and many peninsulas of Lough Gowna make this an ideal overwintering ground for wildfowl. There is very little of botanical interest, however, small pockets of marshland in the N.E. part being the only areas worth noting.

A wildfowl count during the winter period gave these figures :-

Goldeneye	50	17th January, 1967
Mallard	400	
Mute Swan	150	
Pintail	10	
Pochard	20	
Shelduck	36	
Shoveler	80	
Teal	70	
Tufted Duck	250	
Whooper Swan	80	
Widgeon	200	

Threats to the area

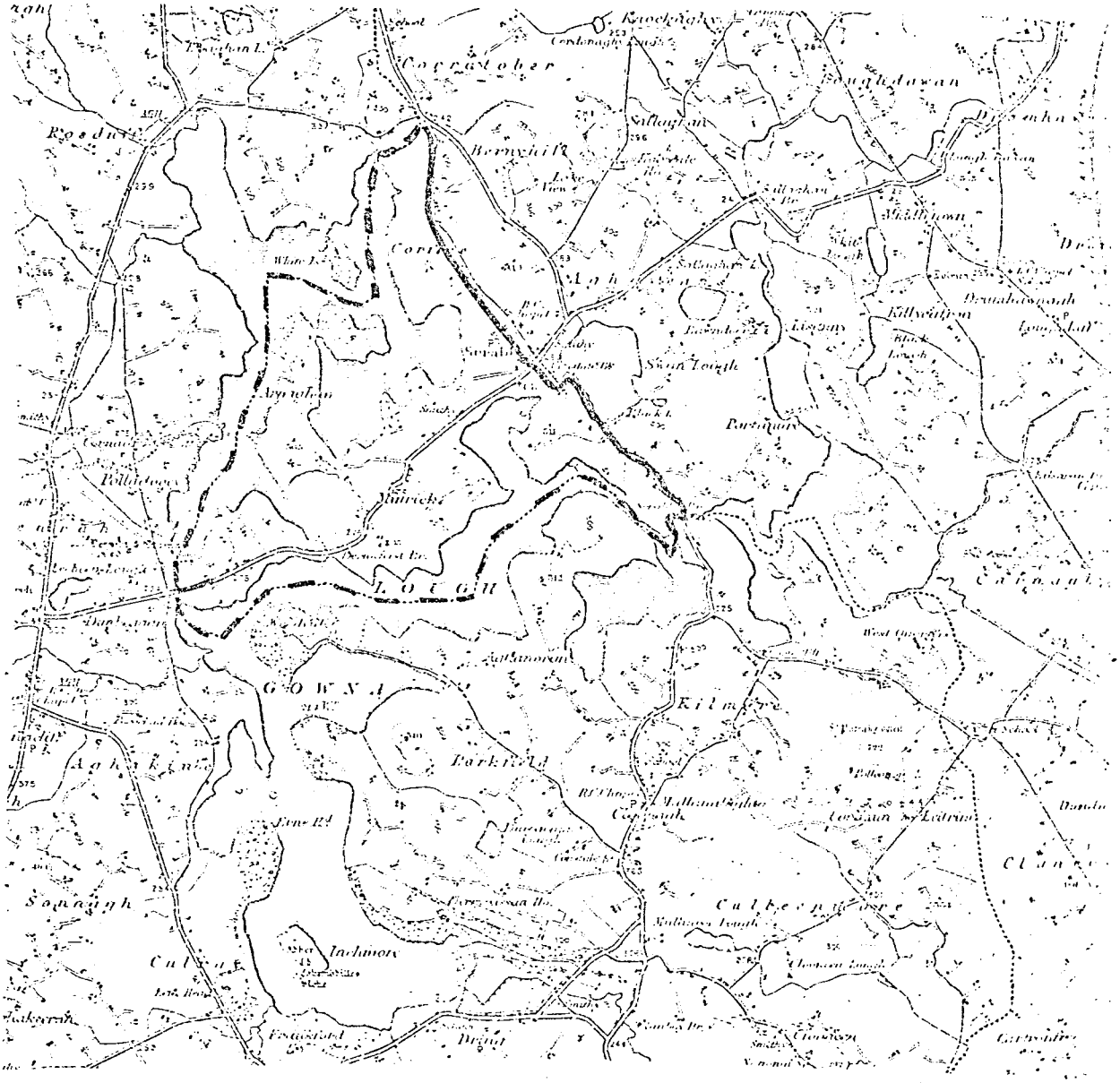
None apparent

Recommendations

The scrub and woodland around the lough should be preserved

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 21

Scale: 1 Inch to 1 Mile



Name of area	COMMONS LOUGH
Acreage	92
Grid reference	H. 380, 151
Scientific interest	Botanical : Ecological
Rating	Local
Priority	C

Description of site

This is one of many similar loughs around Belturbet but it has the added interest of old peat cuttings which provide several interesting aquatic species.

At the southern end of the lough is a reeded area with willow trees backed by a wet area in which are old peat cuttings. Narrow bridges between the pools are colonized by Carex paniculata (Tussock Sedge). The aquatic vegetation includes :-

Hydrochaeris morsus-ranae (Frog-bit) which is not a common species; Utricularia sp. (Bladderwort), Potentilla palustris (Marsh Cinquefoil), Carex nigra (Common Sedge), Lemna triscula (Ivy-leaved duckweed) an occasional species, Equisetum fluviatile (Water Horsetail), Lythrum salicaria (Purple Loosestrife) and 2 species of Potamogeton (Pondweed). The Royal Fern (Osmunda regalis), which is uncommon in the eastern part of the country, grows around the edges of the pools.

Other areas around the lough may be of value but further investigation is needed to assess them.

Threats to the area

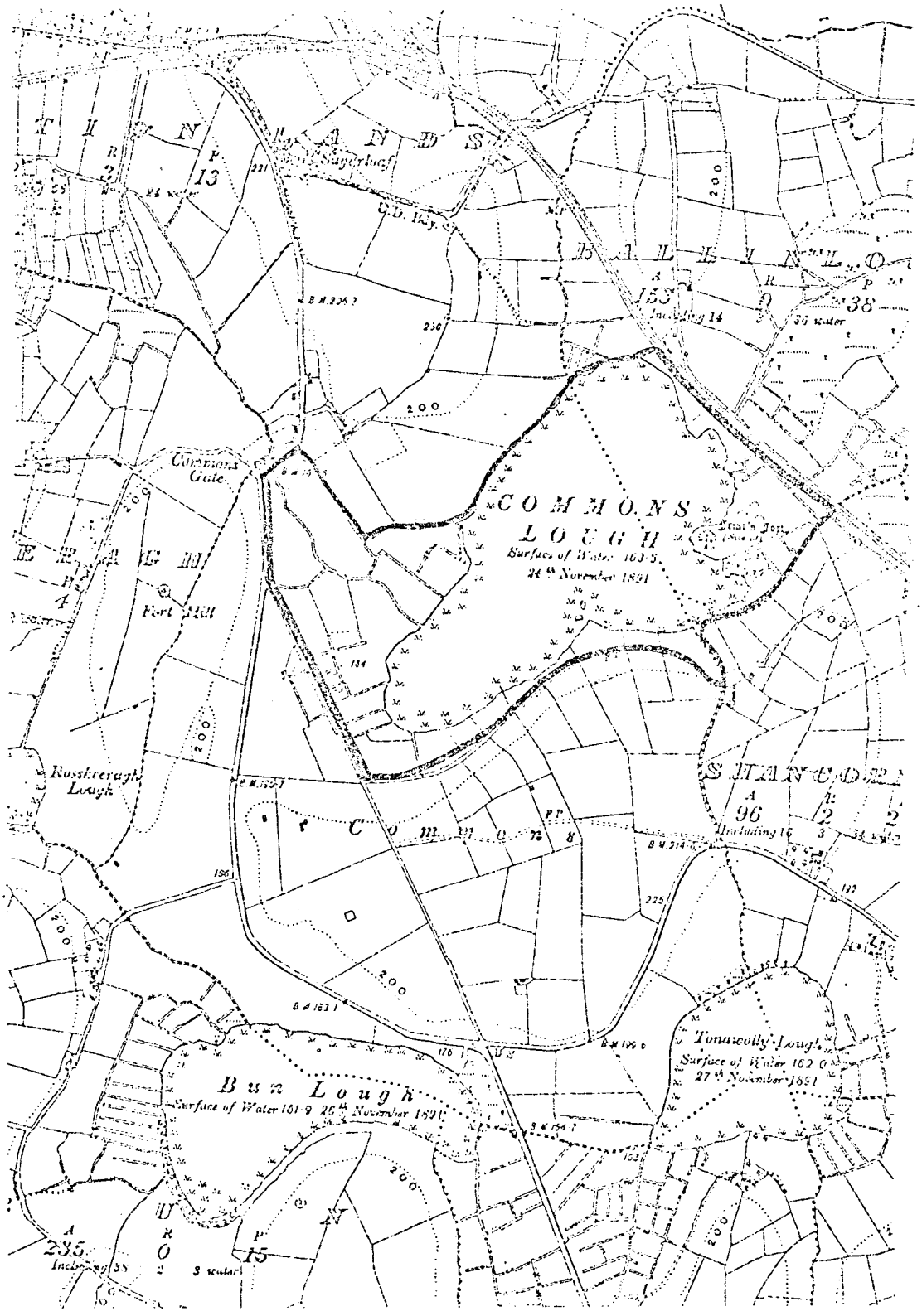
None apparent

Recommendations

No action needed

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 22

Scale: 6 Inches to 1 Mile



Name of area	GLASSHOUSE LOUGH
Acreage	168
Grid reference	H. 280, 068
Scientific interest	Ecological : Botanical
Rating	Local
Priority	C

Description of site

Situated on the borders of Leitrim and Cavan, Glasshouse Lough has several areas of woodland coming down to the shoreline. At the eastern end is a beech wood on a small hillock, bordered by ash and sycamore. The beech trees are about 50 feet high and there is an understorey of holly. The woodland is fairly open and as a result the ground flora is fairly diverse. Melica uniflora (Wood Melick), an uncommon grass species, grows at the edge of the wood.

Between the wood and the lake margin is a flat stony area approximately 30 feet wide. Much of this is bare ground and the dominant plant group is the sedge family.

Carex panicea	(Carnation Sedge)
Carex flacca	(Glaucous Sedge)
Carex caryophyllea	(Spring Sedge)
Carex lepidocarpa	(Long-stalked Yellow Sedge)
Carex demissa	(Common Yellow Sedge)
Carex pulicaris	(Flea Sedge)

Because of the open nature of this habitat no one species is dominant and hence a species rich community exists.

Most of the lakes in the region are surrounded by reed and small marshy areas but this is a different type of habitat and is therefore of ecological and botanical interest.

Threats to the area

None apparent

Recommendations

General planning control should be considered.

Name of Site	FARREN CONNELL ESTATE
Grid Reference	N. 490,820
Acreage	338
Scientific Interest	Botanical, Ornithological, Ecological
Rating	Local
Priority	C

Description of Area

The woodland on the estate consists mainly of mixed deciduous species - Beech, Oak, Sycamore, Lime and Horsechestnut. These are all mature trees, some attained a height of 100 feet. Along the boundaries are Scots Pines, 70 feet high, in which herons are known to nest. The driveway is fringed by firs and evergreens.

At the edge of the woodland to the north is an area of bogland and some old peat cuttings with a small Birch/Willow woodland. Drosera rotundifolia (Sundew) and Drosera intermedia (Long-leaved Sundew) are to be found in abundance in both the cuttings and on the bog. Utricularia sp. (Bladderwort) grows in the pools, while Lycopodium selago (Clubmoss) is found on bare peat patches on the bog. Andromeda polifolia (Bog Andromeda) is also present - another new post-1930 record for this species. One of the five cavan heronries is situated here, but there are only four pairs of birds.

Threats to the Area

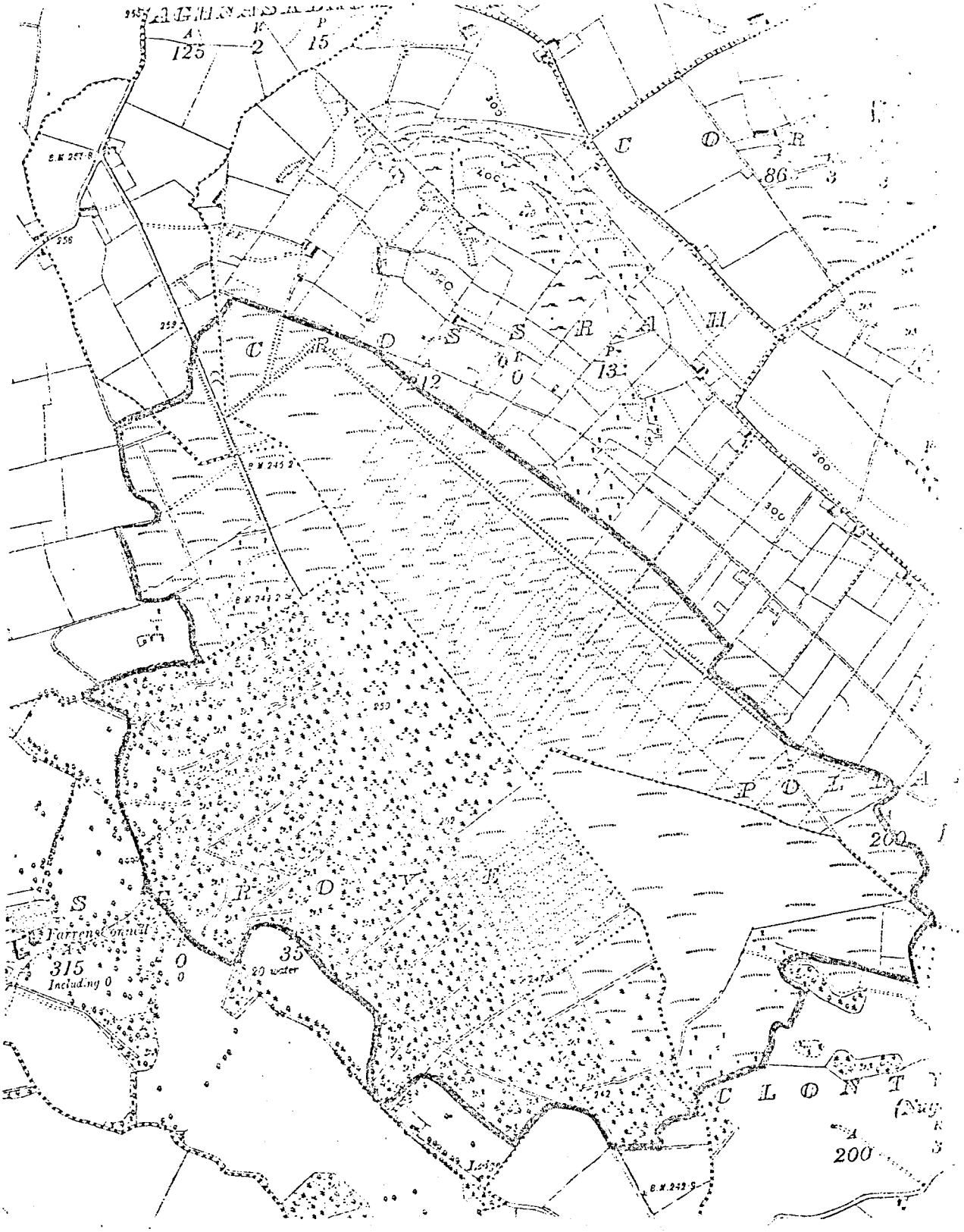
None apparent.

Recommendations

The mixed woodland and the bog and peat cuttings nearby provide excellent examples of different ecological communities and as such have an educational value. General planning control for the area is recommended.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 24

Scale: 6 Inches to 1 Mile



Name of area	LOUGH MACNEAN UPPER
Acreage	25 (grassland area)
Grid reference	H. 065, 380
Scientific interest	Botanical, Ecological
Rating	Local
Priority	C

Description of site

The greater part of Lough Macnean Upper is in Co. Fermanagh, while the western shore is within the boundaries of Leitrim. The Upper Carboniferous Limestone outcrops along the Cavan shore and the wet grassland around the southern shore is of considerable botanical interest.

The grassland is an open community with no one species dominating. The fine-leaved Red Fescue grass (Festuca rubra) is abundant and 7 species of Carex (sedge) are mingled throughout the area.

The most frequent association is between Carex nigra (Common Sedge), Anthoxanthum odoratum (Sweet Vernal Grass), Caltha palustris (Marsh Marigold), Ranunculus repens (Creeping Buttercup) with the moss Acrocladium cuspidatum. Wetter areas are covered by Eriophorum vaginatum (Bog Cotton) with Carex panicea (Carnation Sedge), Ranunculus flammula (Lesser Spearwort), Mentha aquatica (Water Mint) and Menanythes trifoliata (Bog Bean).

Altogether 48 species were recorded showing the diversity of this relatively small area.

Threats to the area

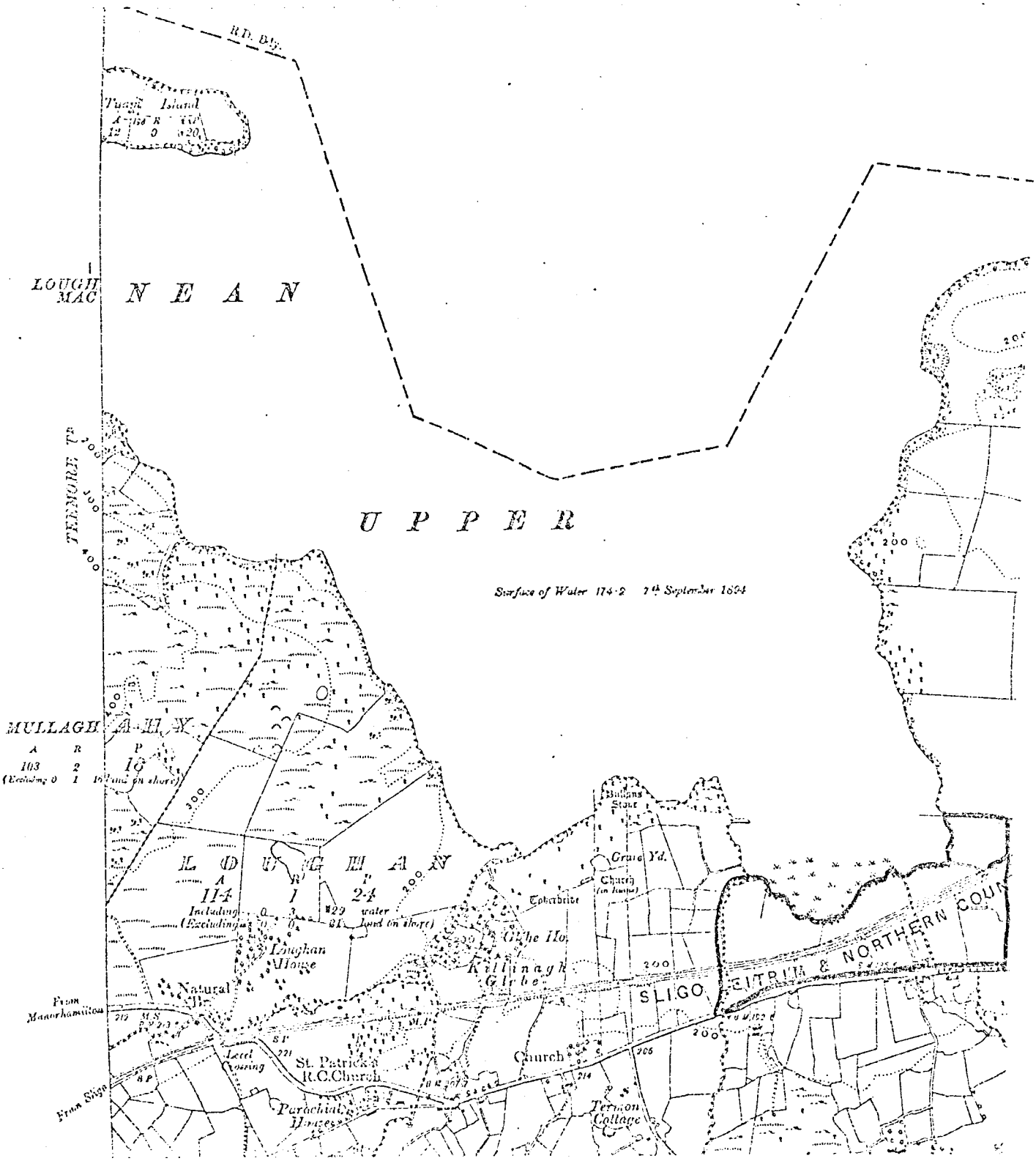
There is a newly constructed quay down to the lough shore where boats are moored and a small car park exists nearby. These facilities are presumably used mainly by anglers. It seems unlikely that further areas will be opened up in this way however.

Recommendations

General planning control for the whole lake should be considered. The grassland along the southern shore is of particular interest and should be conserved.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 25.

Scale: 6 Inches to 1 Mile



Name of area	ANNAGH LOUGH (DRUMSILLAGH)
Acreage	247
Grid reference	H. 395, 125
Scientific interest	Botanical
Rating	Local
Priority	C

Description of site

The lake is surrounded by a fringe of Phragmites communis (Common Reed) backed by trees. A rare sedge species is to be found in abundance around the shoreline and extending back into the meadows, where it grows in a much weaker form. As this particular species is know from only 2 more localities in the whole of Ireland, this area is of specific importance, but the flora as a whole is not remarkable.

Threats to the area

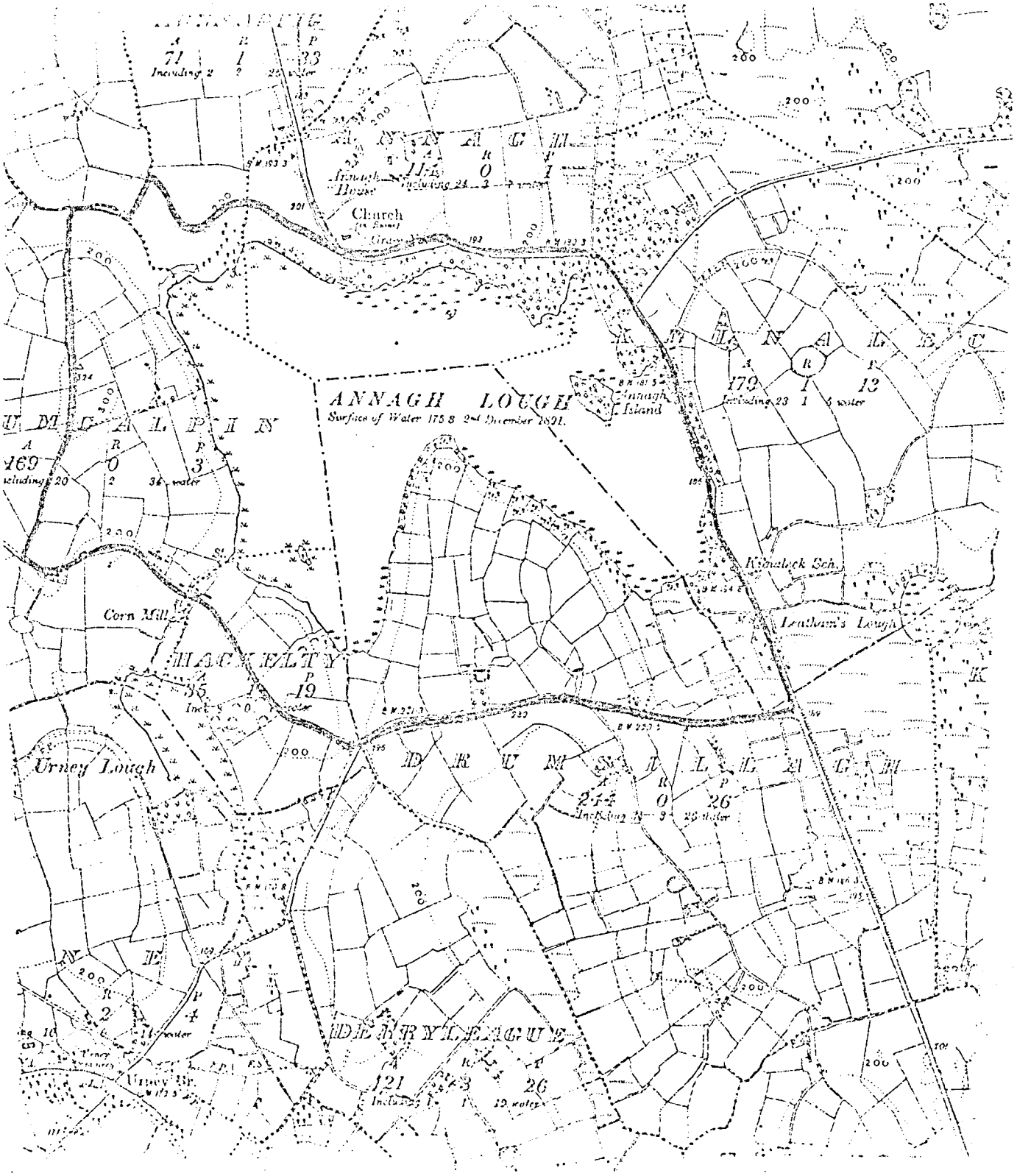
The lake is owned by the Inland Fisheries Trust and most of the visitors are anglers who are unlikely to cause much damage. Along the eastern shore a lay-by has been constructed but the number of visitors is probably not great and they would be unlikely to trample the area.

Recommendations

General planning control of the lake shore is needed if the species is to remain undisturbed.

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 26.

Scale: 6 Inches to 1 Mile



The distribution of Carex elongata in Great Britain and Ireland

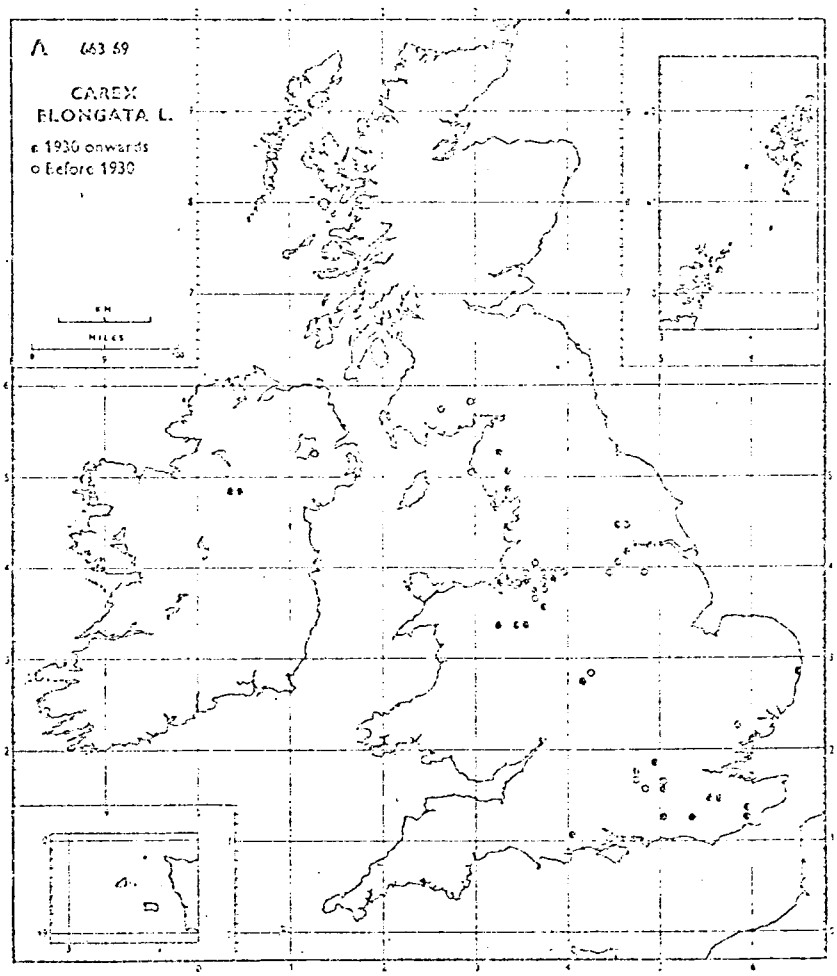


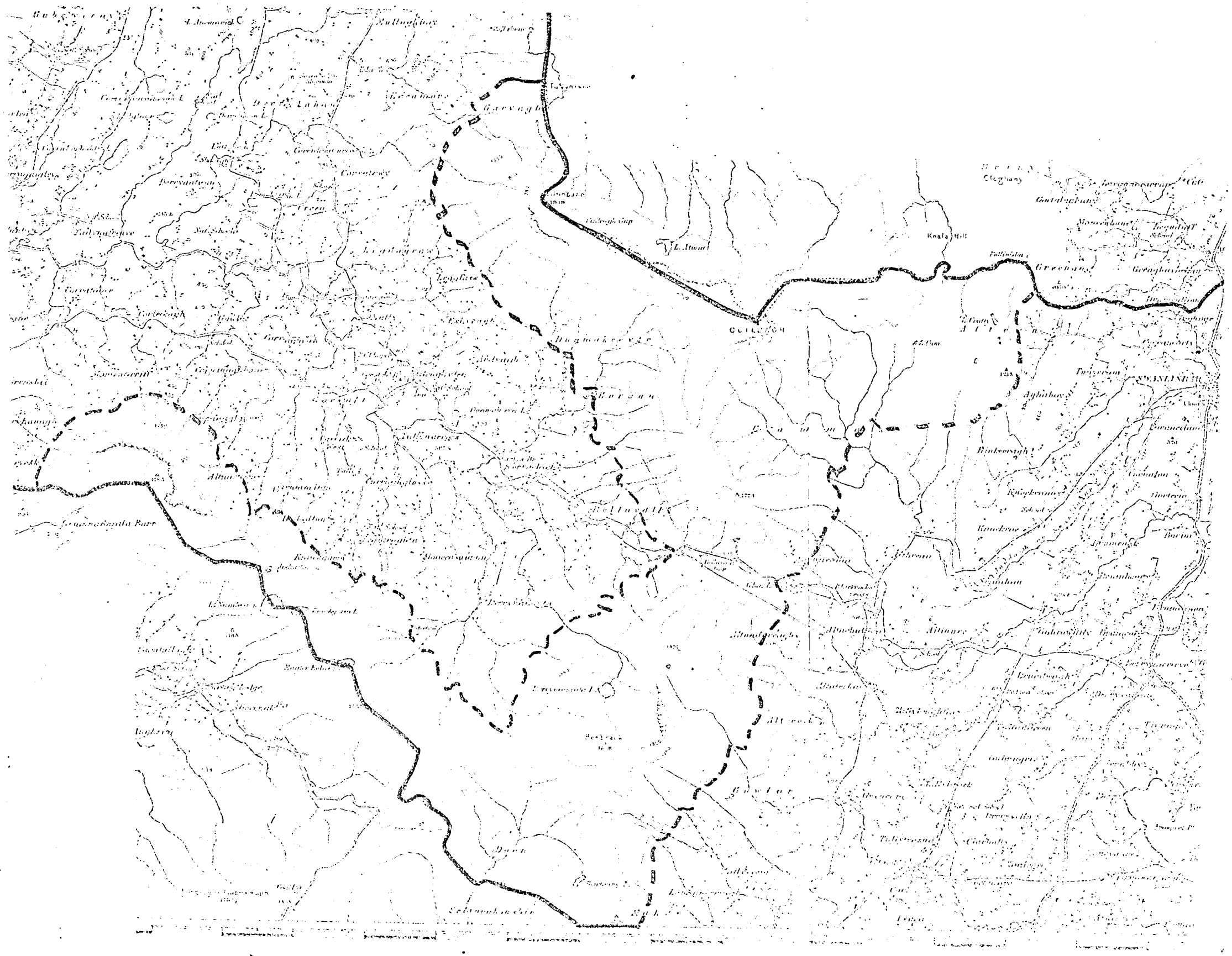
TABLE SUMMARISING THE PRIORITY OF THE SITES
AND RECOMMENDATIONS FOR THEIR PROTECTION

Site	No Protection Necessary	General Planning Control	Special Amenity Order	Conservation Order	Tree Preservation Order
Lough Oughter		*			
Farnham and Coalpit Loughs				*	
Corratirrim	*				
Cuilcagh	*				
Kilconny Bog		*			
Shannon Pot	*				
Cordonaghy Bog		*			
Bruse Hill		*			
Woods near Drumkeen House		*			
Lough Kinale		*			
Blackrocks Cross	*				

Site	No Protection Necessary	General Planning Control	Special Amenity Order	Conservation Order	Tree Preservation Order
Lough Sheelin		*			
Marsh near Madabawn Bridge	*				
Marshland at Blackwater Bridge	*				
Hazel scrub north of Corratirrim	*				
Swan Lough		*			
Lough Ramor		*			
Commons Lough	*				
Glasshouse Lough		*			
Farren Connell Estate		*			
Lough Macnean Upper		*			
Annagh Lough		*			
Lough Gowna		*			

MAP SHOWING AREA OF SCIENTIFIC INTEREST — 4

Scale: 1 Inch to 1 Mile



MAP SHOWING AREA OF SCIENTIFIC INTEREST — 1

Scale: 1 Inch to 1 Mile