The Vegetation of Irish Rivers

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Contents

ABSTRACT

Fifty-six river stretches throughout the country were examined botanically in order to provide a base-line against which the conservation value of other rivers could be assessed. The vascular plants, the bryophytes and the attached algal assemblages were examined. A field methodology was developed and forteen niche types were described. Thirty-nine macrophyte communities were recorded of which seven were previously unrecorded for Ireland and probably new to science. From the communities of riffles, glides and vertical banks it was possible to identify the following ten types of river stretches: 1. Glycerio-Sparganion x Apion nodiflori stretches, 2. Callitricho-Batrachion stretches, 2a. with Conocephaletum, 2b. with Pellietum epiphyllae 3. Wooded calcareous intermittant stretches, 4. Community of Cladophora stretches, 5. Scapanietum undulatae stretches, 6. Zygogonium stretches, 7. Littorellion stretches, 8. Tufa producing stretches, 8a. nutrient poor, 8b. nutrient rich. The major ecological factors thought to determine the stretch type are substrate size, Calcium content and nutrient status. The calcium rich tufa producing stretches are rare in Ireland and Europe.

It is recommended:
That a list of rivers of international importance for conservation is drawn up by means of a national inventory;
That a programme of active nature conservation of rivers is initiated, so that a full range of river types is conserved, either through a nature reserve approach or, in the majority of cases, through planning control and management agreements within the catchment, in liaison with the bodies responsible in these areas, including drainage boards, inland fisheries etc.

AWKNOWLEDGMENT

Thanks are due to Jackey Davey, Jim Ryan, Catherine Duff and Eddy Wymer for assisting during the survey period in 1981 and to Tagh O'Mathuna for assistance during the remaining survey years. Neill Lockhart and Grace O'Donovan are thanked for identification of the bryophytes, and Clare Mc Quad for printing of the photographs. Helen Mahr and Clare Mc Quade are thanked for carrying out the water analysis. Thanks are also due to Proffesor Victor Westhoff for discussions and advice on the vegetation classification.

INTRODUCTION

Rivers consist of two main components: the water and the substate that the water flows over. The quality of the water is mainly determined by the geology and ecology of the catchment of the river, in which human factors play an important role, e.g. agricultural pollution etc.. The conditions of the substrate are determined by the geology of the catchment, and by the hydrological characteristics of the drainage basin, as well as by the patterns of precipitation, which determine flow speeds, range of substate sizes and its distribution and other physical characteristics. Human factors play an important role here also, e.g. drainage works, gravel extraction.

The plants living in such a longitudinal dynamic system must be firmly attached to the bottom of the river, or else live suspended in the water (phytoplankton) and be continuously transported to the sea. This survey deals with the attached plants of shallow areas of the river, including vascular plants, bryophytes and macroscopic algal assemblages. The phytoplankton of shallow and/or relatively short rivers is of minor importance, and has not been considered here. Deep river stretches have been omitted through lack of resources. The quality of the physical and chemical environment determines which combinations of plant species occur in the different rivers. It can be expected that certain combinations of plant species will occur in several rivers of a similar type.

The objective of this survey is to describe a sufficient number of rivers in order to establish which river types occur in Ireland. This information is intended to be used as a base-line against which the ecological status of any individual river can be measured in order to establish the potential conservation value of such a river. The survey is intended to be followed by a national inventory, so that a complete list of rivers of international importance can be drawn up. These rivers should be given conservation status and be protected from detrimental influences taking place in the catchments or affecting the channels, e.g. agricultural pollution, drainage works etc..

This report describes a number of river stretches of international importance and recommends certain rivers for conservation, but can not, by its nature, claim to be comprehensive in this respect. It is of the utmost importance that a complete list be drawn up, and that steps are taken to conserve the unique nature of these internationally important rivers.

In the past few systematical botanical descriptions of Irish rivers were published (Heuff,H. & Horkan,K., 1984) and these are not sufficient for the construction of a national base-line as described above. This survey was carried out during the summers of 1981, 1984 and 1985. The field methodology was developed during 1980 and early 1981, and had to be revised in 1984 because of a scaling down of the survey through lack of funds. Floodplains, marshes, deep stretches and lichens were omitted at this stage. The river bed in its strictest sense, up to just above normal summer water level, and wadable stretches only, are included and reported on here. Data could not be computer processed, so mathematical treatment was not possible. All original records are available for consultation.

AIMS AND SCOPE OF THE SURVEY

The objective of this survey is to provide a botanical base-line against which the ecological status of any individual river stretch can be assessed, in order to decide on its potential for conservation. This survey does not specifically aim to draw up a comprehensive list of sites worthy of conservation. This can only be done after a proper national inventory is carried out. The present survey is a necessary preliminary to such a national inventory. The results are intended to be used as a guide to the field methodology of such an inventory, and to the evaluation of the conservation value of individual river stretches. Guidelines as to which river types are presumably rare and/or most endangered are given. With the urgency in mind which is so often required to safeguard certain places, a-by its nature incomplete-list of sites worthy of conservation is added.

In order to achieve the aims of the survey the following questions need to be anwsered:

1. What are the major aquatic or semi-aquatic vegetation types typically associated with Irish rivers?

2. Can the rivers or stretches thereof be classified into types using any or all of its botanical components?

3. Is it likely that the full range of variation present in Ireland was sampled and that a sufficient number of representatives of each type are described, to cover the variation within each type?

4. What field methodology could be used most efficiently to describe stretches of river botanically, in order to assess their value for conservation?

METHODOLOGY

Site selection

A river is a longitudinal system, usually of considerable length. To investigate the whole length of each river is unnecessary for the purpose of this survey. Stretches of river of 500 meter in length are considered representative of longer lengths (Holmes, 1983) and these units are surveyed.

Rivers are chosen according to the main geology of the catchment above each site. This factor is assumed to have a major influence on river ecology and hence it is expected that by choosing stretches with different catchment geology the ecological variation present in the country is sampled. The geology of each catchment above a study site is as much as possible of one of the following types:

1. Schizt, gneiss and granite
2. Quarzite
3. Sandstones
4. Shales
5. Limestones
6. Mixtures

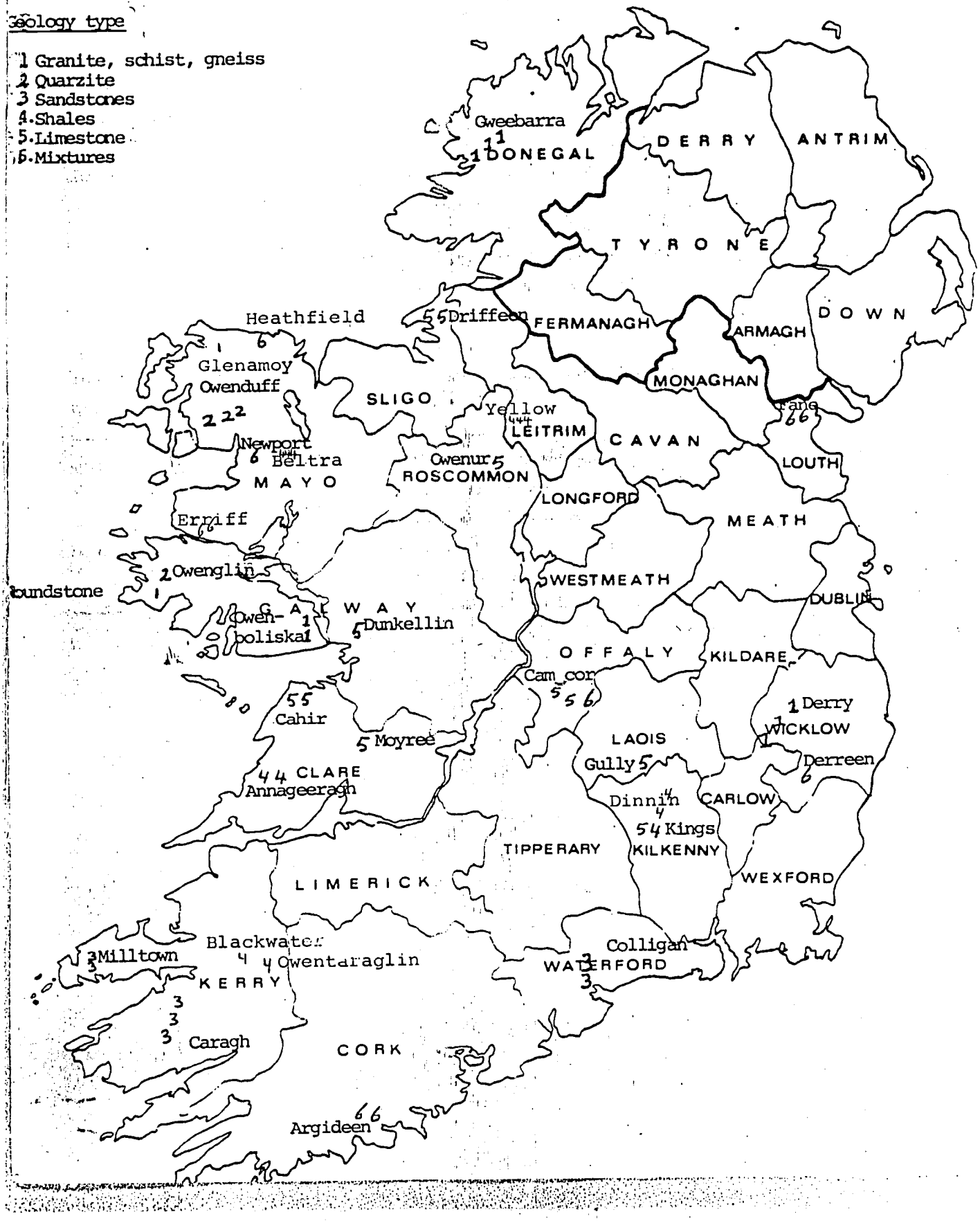
Fig. 1. shows location, geology and geographical spread of the survey sites.

Within each catchment altitude is also known to be an important factor, and within it river size. In each catchment a mountain site (above 330 m), an upland site (between 100 and 330 m) and a lowland site (below 100 m) are included, and generally each site increases in size going down stream.

Table 13 of Part 2 of this report lists the survey sites in alphabetical order, and gives altitude and size for each one.

Rivers known to be much affected by man through drainage or pollution are excluded as much as possible.

Figure 1: Geographical spread of sites visited during 80, 81, 84 and 85 River Survey. Figures indicate geology type.



In 1981 it was succesfully attempted to choose the more natural river stretches with the aid of aerial photographs. It is recommended that this procedure be followed when a complete national list of rivers of conservation interest is drawn up, as a preliminary to survey work. In 1984 and 1985 the examination of aerial photographs was abandonned through lack of funds and therefor samples of these years may give a better impression of the overall state of 'naturalness' of Ireland's river channels.

Field procedure and data processing.

A 500 meter stretch of river, starting from a re-identifiable reference point, is walked either in the bed or on the bank where deep water exists. Physical features are recorded: average width, average slope and heigth of banks, land use of immediate catchment, water level, flow, channel shading, average depth of the shallow areas, substrate structure and its percentage cover over the stretch, geology, altitude. For definitions of these variables see Part 2 of this report. A general description, including a comment on its conservation value is made, supported by a photograph.

All attached vascular plants, bryophytes and macroscopic algal assemblages growing in the river bed up to a level frequently flooded in summer are recorded or collected for identification in the laboratory and their abundance is estimated over the whole stretch. Algae are preserved in 4% formaldehyde solution and identified by the author from fresh and preserved material, using the following taxonomic works: Geitler (1932), Hudstedt (1930), Bourrelly (1966, 1968, 1970). Bryophytes were identified by Dr. G. O'Donovan and Mr. N. Lockhart using Smidt (1978).

For each site water is collected for analysis of the following parameters: conductivity, pH, alkalinity, total Phosphorus, total dissolved Phosphorus, ortho-phosphate, total hardness, Ca-hardness, NH_4^+, NO_3^-, SO_4^{2-}, Ca^{2+}, Mg^{2+}, Na^+, K^+, Cl^-. Methods of analysis are those in use at the Wildlife Service Research Laboratory at Newtown Mount Kennedy.

Sofar this procedure was followed in all three survey years.

In all rivers the environment is moulded by the water, giving rise to a finite number of niches, each with its typical suite of plants. The riverine habitat is a complex one, and it is difficult to compare rivers by means of a long list of plants derived from all the different niches within a river.

In 1984 and 1985 the different niches of the river were noted for each stretch: e.g. riffles and glides, steep sides, pools, waterfalls, etc.. The percentage cover of each niche type over the whole stretch is estimated and its physical features and plant assemblages described in general terms.

To describe each stretch as a whole a macro-relevé was taken, in which the attributes are the different niches that support the typical communuties of each niche, instead of individual species. The sample area is the whole stretch, including banks up to a level frequently flooded in summer.

However, a more defined record is also necessary, and a phyto-sociological relevé supplies this. In this way, when different rivers are compared, like is compared with like. Because taking relevés is a time consuming business, it was decided to concentrate on the most typically riverine habitats: i.e. the shallow easily accessable areas always covered in flowing water (niche type 1 and 2) and the frequently flooded steep edges, just above summer water level (niche type 4). The vegetation of these two niche types are recorded in the tradition of Braun-Blanquet and Tüxen (1934). The usual semi-quantitative scale of abundance of +R12345 was applied to the vascular plants, as well as to the macroscopic algae and the bryophytes.

When time allowed relevés were also taken of communities growing in any of the other niches, and brief descriptions were made and dominant species listed as much as possible. For example the gravel banks (niche type 5), left dry at low water level, support a variety of weed communities perhaps not so typically riverine. The vegetation of the gently sloping edges (niche type 6) can be

considered as an intermediate on the pioneer - climax vegetation gradient of the gravel bed communities and the pasture, heathland, marshes, wet meadows, and ultimately natural wet woodland vegetations, higher up on the banks of our rivers and on islands.
Other niches are perhaps only present in some rivers, like waterfalls (niche type 9), or beds of tall emergents (niche type 10). These provide some information on the diversity of a particular stretch, or can be used to compare all river stretches that have waterfalls or tall emergents.

The relevés from riffles and glides and those from steep sides are each combined into vegetation tables and classified according to the Braun-Blanquet system of vegetation classification, by hand in the traditional manner. Relevés from other niche types are classified as much as possible, using previous experience of these type of vegetations.

The phyto-sociological communities of riffles, glides and steep sides are used to classify the river stretches.

RESULTS AND DISCUSSION

Description of the individual river stretches

Site descriptions for 56 river stretches can be found in Part 2 of this report. Table 13 lists the sites alphabetically and from source to mouth for each catchment. Included are for each site: a map with re-locatable reference point, a photograph, information on river substrate and other channel characteristics, water chemistry, vegetation and macro-relevé. Vegetation descriptions include percentage plant cover over the whole stretch, as well as percentage niche cover over the whole stretch and percentage bed and bank cover. Bed and bank are considered as one unit for these percentages. Dominant species and vegetation classification units are listed for each plant type (e.g. emergents, submerse bryophytes) and for each niche type.

A comment on the conservation value of each site is added, as discussed earlier this can not cleam to be nationally comprehensive although certain sites are without a doubt of international importance.

Description of niche types

Fig. 2. is a rough representation of the cross-section through a hypotetical river, showing the major niche types. The vertical scale has been expanded.

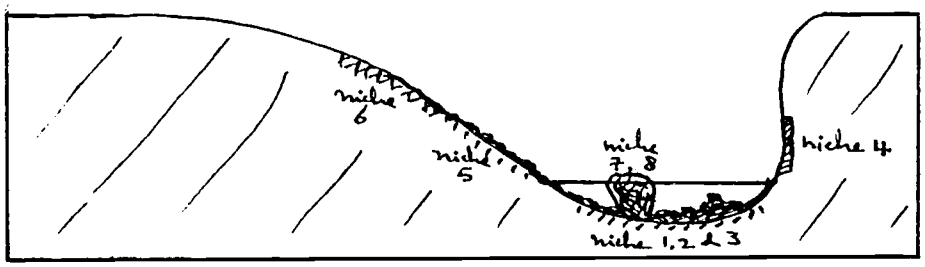


Fig. 2. Cross section through hypotetical river, showing position of niche types.

The following niche types were distinguished in the field, and are referred to by their type numbers in the text of Part 2.:

Niche type 1 and 2: Riffles and glides.
This niche contains the main aquatic plant communities of moderately to fast flowing shallow water. Type 2 is shallower, usually more rocky, faster flowing and more mossy than type 1. Type 1 is of more moderate flow, more stony, contains usually more vascular plants rather than mosses or is quite barren. For relevés from these niche types see Table 3.

Niche type 3: Pools.
This niche includes all deep unwadable stretches of river as well as the typical pools that are associated with riffles and glides. This niche is usually barren or very sparsely vegetated, because of low transparancy in most rivers, but see also types 10 and 11. For relevés see Table 7.

Niche type 4: Steep sides.
This niche covers the vertical or undercut edge of the river, just above the summer water level and still very frequently flooded. It usually contains many bryophytes and is an eroding habitat. For relevés of this niche type see Table 6.

Niche type 5: Gravel banks.
This niche falls dry at low summer level and is usually stony and sparsely vegetated with pioneer communities. For relevés see Table 7.

Niche type 6: Gently sloping sides.
This niche forms the gradual transition between the river bed and the vegetation on the banks. It contains mainly grasses and/or sedges, with a high total vegetation cover on a predominantly sandy, silty or clay substrate. It does not include beds off tall emergents. It is an accumulating habitat.

Niche type 7: Islands.
This niche includes small low islands, higher and more densely vegetated and of a finer substrate than the gravel beds, often very similar to the gently sloping sides.

Niche type 8: Tops of rocks and boulders.
This niche includes rocks and boulders in the river bed dry at low water level, but frequently flooded. They are densely or sparsely vegetated with predominantly lichens and some mosses and occur in fast flowing waters. Lichens were not identified during the survey.

Niche type 9: Waterfalls.
This niche type is related to niche type 2, but contains true waterfalls, not riffles and small cascades. For relevés see Table 7.

Niche type 10: Shallow still water, soft substrate.
This niche type includes the borders of deep stretches and pools, still or slowly flowing water with predominantly silty and sandy substrate, clad in tall fringing emergents. For relevés see Table 7.

Niche type 11: Deeper than 10, soft substrate.
This niche includes the floating leaf and submerse zone of pools and deep stretches. It is still within the photic zone. Flow is slow or still, substrate silty. For relevés see Table 7.

Niche type 12: Backwater, overflow channel or oxbow.
This niche is an aggregate of several niches, and is used for convenience, as these features are not described in detail. Relevés in Table 7.

Niche type 13: Floating scragh.
This is a floating mat of vegetation, developed in still shallow muddy conditions. It can cover most or all of the width of a stream. Niche types 3,11,10 and 13 form stages in a terrestrialization series as in lakes.

Niche type 14: Shallow areas with sandy or muddy substrate, flow moderate or fast.

This niche includes shallow beds of submerse vascular vegetation which has accumulated sand and silt. Its more eroding counterpart can be found in niche type 1 and 2 and its more still companion in niche type 10. For relevés see Table 7.

Description of the macrophyte communities

Table 1 represents the vegetation of riffles and glides, the main vegetated habitat of shallow river stretches, classified into plant communities. Table 2 lists species of low occurrence, and Table 3 supplies ecological information for each relevé, listed in the same order as Table 1.

Table 4 represents the vegetation of frequently flooded steep sides, just above summer water level, classified into plant communities. Table 5 lists species of low occurrence with an abundance greater or equal to 1, and Table 6 supplies ecological information for each relevé, in the same order as Table 4.

Table 7 represents the vegetation of a number of river bed habitats, the plant communities are related to those of Table 1. Table 8 lists species of low occurrence in Table 7, and Table 9 supplies ecological information.

Relevés which are not classified in the vegetation tables are, in most cases, assigned to vegetation units or could not be classified in others. Details are found with the individual site descriptions in Part 2 of this report. In all cases too few examples of each vegetation unit were available to combine the relevés into tables.

Below follows a description of the different vegetation types. Subunit numbers refer to Tables 1, 4, and 7.

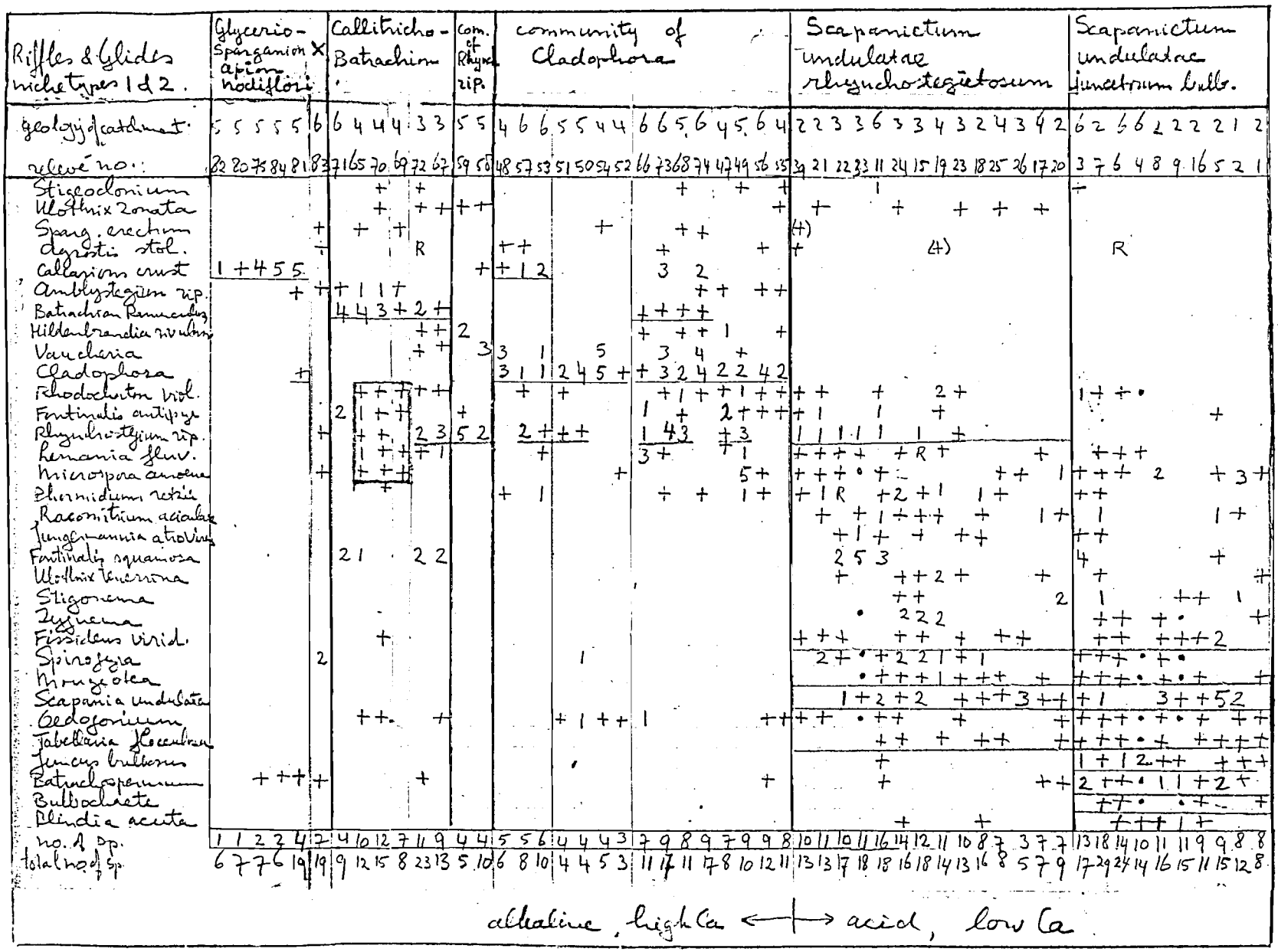


Table 1 : Riffles and glides (niche type 1 & 2)

relevés espèces

82 Apium nodiflorum 2, Pot crispus 1, Hippuris + Mentha aq. +, Gen. fluv. +
80 Berula erecta +, Pot crispus 2 Hippuris +, Elodea can. 1, Sagittaria R, Scirpus lac. +
75 Berula erecta +, Nuphar lutea + Hippuris + Elodea can. R Scirpus lac. 5
84 Nasturtium off. aq. R, Nuphar lutea R Anacharis pinguis 2, Font. antipyr. v. gig. +
81 Nast. off + Apium nod +, Pot crispus 1, Hippuris 1, Elodea can. + Nuphar lut. +, Gen. fluv. + Pot. gram. 2, Lythrum + Alisma pl. aq. + Font. antipyr. gig. Anacharis pinguis + Sparg. emersum + Sagit. + Pot sp +
48 Poa pratensis +
57 Iris +, Aphanocapsa +, Fissidens crassipes +.
53 Lemna trisulca + Fissidens crassipes 1, Anacharis pinguis +, Conocephalum conicum +
54 Monostroma +
83 Fissidens + exilifolius + Chiloscyphus pal + Plagiomnium und + Fumaria sp. + Oxyrrhynchium + Nasturtium off. aq. + Pot. nat + Alisma plan. + Callitriche +, Chaetophora elegans 1, Theridictam. + Eurhynchium praelongum +,
71 Call ham 1, Call obtusangula +, Gen. soc. R, Chiloscyphus polyanthos +, Chaemaesiphon Rhyngbya Fleckeri +
65 Call sp1 sp2 +, Myriophyllum +
70 Callitriche +, Gen. soc. + Jungermannia pumila +
72 Gen. soc R, Poa triv. R, Holcus lan R, Apium nodiflorum R, Cardamine flex +, Nostoc +, Sphaerocystis +, Oscillatoria 1, Sanguisorba Pellia +
67 Cinclidotus font + Hygrohypnum ochraceum 2, Nostoc +, Oscillatoria +. Leskea polycarpa + Amomodon 1.
69 Fissidens exilis +
68 Agrostis Zeyeri + Elodea can + Lemna minor + Mentha aq +
73 Scirpus lac +, Pot perfoliatus + Apium nodiflorum +, Lemna trisulca + Lemna minor + Anacharis pinguis 2
68 Fissidens +, Homeothecium Sericeum + Schizocarpium + Con. con 1 Fissidens crassipes +
74 Pot. lucens +, Lemna trisulca +, Scirpus lac 3 Lemna minor +, Brassica +, Melosira +, Con. con. +, Anacharis pinguis +
49 Fissidens crassipes +
50 Juncus acutiflorus + Gongylocarpus fluv + Fissidens crassipes +

55 Mentha aq R, Sedimentia nitrima +, green crust +
47 green crust +
59 Cinclidotus fontinaloides 1.
58 Cinclidotus fontinaloides +, Symphonema + Diclimosphigen. 2 Spirogyra 2 Homoeothrix varians +, Ulothrix tenuis +
39 Juncus acutiflorus +, Tolypothrix distorta +, Cinclidotus font +
21 Bradytheciun rivulare 1, Cryptaea heteromalla +.
22 Dactylis glom + Chaemaesiphon Rhyngbya Fleckeri +, Rhynchost. Rusitanicum +. Hyocomium armoricum +, Fissidens polyphyllus + Lejeunia cavifolia +, Riccardia chamaedryfolia +.
33 Drepanocladus +, Chaemaesiphon Rhyngbya Fleckeri +, Oscillatoria + Hydrohypnum ochraceum 1 Rhynch. Rusit + Brachyth. plicum + Hyocomium armoricum +.
11 Gen. soc. Coccata + Chaetophora cf pisiformis +
15 Drepanocladus +, Nostoc + Homoeothrix +, Eurhotia rigens +. Chaemaesiphon Rhyngbya Fleckeri 2 Tolypothrix distorta +.
24 Tolypothrix penicillata +, Tolypothrix sp +.
19 Equisetum fluv. (+), Ulothrix moniliformis 1, Hygrohypnum ochraceum +
23 Equisetum arvense +, Didymosphenia geminata + Brachytheciun rivulare +.
18 Dichothrix orsiniana + Pellia epiphylla + Jungermannia gracillima +, Diplophyllum obtusifolium +, Bryum pseudotriq. + Rhizomnium punctatum +, Fumaria obtusa +, Fissidens crassipes +.
25 Hyocomium armoricum +
26 Viola palustris +, Drepanocladus +
20 Eurhotia + Marsupella aquatica 2.
3 Myriophyllum alt 2, Ran. flam +, Chaetophora pisiformis, Callitriche hamulata 1
7 Myriophyllum alt +, Myol. cor. +, Agrenia +, Ulothrix moniliformis +, Gomphonema sp +, Chaemaesiphon Rhyngbya fleckeri +, Dichothrix Bavariana +, Coleochaete scutata +, Schizothrix fasciculata +, Achnanthes +. Amblystegium riparium +
6 Myriophyllum alt. R, Call. ham. +, Scirpus fluitans +, Pot. nat. R, Gen. soc. R, Ran. flam R, Sparganium sp R, Eurhotia rigens + Chlorhormidium +, Microspora sp (cf. Willeana) +.
4 Callitriche ham. 1, Myriophyllum alt +, Drepanocladus, Ulothrix moniliformis
8 Drepanocladus +, Schizothrix fasciculata + Cephalozia bicuspidata + Tetradontium brownianum +, Marsupella emarginata +
9 Scirpus fluitans +, Juncus acutiflorus +, Dichothrix orsiniana +, Dichodontium pellucidum +.
16 Marsupella aquatica 3, Cephalozia sp +.
5 Myriophyllum alt +, Scirpus fluitans +, Pot. nat +, Microspora sp (cf pal. v. minor) 4, Eurhotia + Marsupella aquatica +.
2 Ran. flam +, Equisetum fluv. 2, Eurhotia rigens +. Riccardia chamaedryfolia +.

Table 2 : Species with low occurance in table 1, riffle & glides

Riffles & Glides	OWENUR	OWENUR	OWENUR	OWENUR	OWENUR
site no.	51	51	51	51	51
relevé no.	73	82	75	74	81
RELEVE SIZE m²	8	20	50	25	210
WIDTH CHANNEL (m)	10	10	10	10	10
WATER DEPTH (cm)	20	30	45	20	
HEIGHT BANKS (cm)	150	35	30	100	
% SHADING	5	0	0	60	
% substrate:					
PEAT					
MARL CRUST				100	
CLAY					
SILT	<1	<1	<1		<1
SAND	10	40	30		<1
GRAVEL	65	60	10		5
STONES	20	<1	10		3
ROCK	5		50		92
BOULDERS					<1
BEDROCK					
WATER LEVEL	L	L	L	L	L
FLOW	M	M	M	M	M
% TOTAL COVER	20	20	55	100	95
% VASC.	15	20	55	<1	15
% BRYOPHYTES				20	3
% ALGAE	5			80	95
PLANTS, DOMINANT.	APIUM NOD.	POT. CRISP.	SCIRPUS	CRUST	CRUST
Water chemistry					
conductivity	420	420	420	420	420
Ca (mg CaCO₃/l)	67	67	67	67	67
pH	8.3	8.3	8.3	8.3	8.3

Riffles & Glides	FANE UPL	DERRY LWL	OWENTARAGH UPL	BLACKWATER UPL	OWENTARAGH L	COLLIGAN LOWL	COLLIGAN LOWL	DRIFFEEN LOWL	DRIFFEEN LOWL
site no.	30	22	50	8	50	15	15	26	26
relevé no.	83	71	65	20	39	72	57	59	58
RELEVE SIZE m²	3	100	27	50	3	75	175	10	8
WIDTH CHANNEL (m)	1.50	15	8	1	12	17	5	10	11
WATER DEPTH (cm)	40	50	25	20	60	30	15	15	15
HEIGHT BANKS (cm)	100	70	200	150	150	150	100	200	50
% SHADING	10	0	0	0	0	0	0	0	0
% substrate:									
PEAT									
MARL CRUST									
CLAY									
SILT	15	<1						<1	<1
SAND		40	50	1	2	<1			<1
GRAVEL	5	10	20	7	5	8		5	<1
STONES	5	<1	10	2	3	2			5
ROCK	70	50	20	90	90	80	10		90
BOULDERS	5	<1	1	<1		10	40		5
BEDROCK	<1						50	95	
WATER LEVEL	N	L	N	N	N	L	L	L	L
FLOW	St	M	M	F	S	F	F	M	F
% TOTAL COVER	20	85	70	45	<1	40	40	95	90
% VASC.	2	80	70	45	<1	8	<1		
% BRYOPHYTES	<1	35	7	2	<1	30	40	80	20
% ALGAE	20	<1	3	2	<1	2	5	20	70
PLANTS, DOMINANT.	SPIROGYRA DETRIT.	RAN. AQR.	RAN. BATR.	RAN. BATR.	FONT. & AMBLYST.	RHYNCH. RIP.	RAN. BATR.	RHYNCH. RIP.	CLADOPHORA
Water chemistry									
conductivity	200	185	150	100	150	130	130	320	320
Ca (mg CaCO₃/l)	21	9.6	6.2	3.9	6.2	36	36	32	32
pH	7.0	7.6	5.5	6.0	5.5	8.1	8.1	7.9	7.9
			low Ca acid						

Riffles & Glides	LINNIN, UPL	HEATHFIELD	KINGS LOWL	DRIFFEEN LOWL	DRIFFEEN LOWL	DINNIN UPL	KINGS UPL
site no.	33	37	39	26	26	23	5
relevé no.	48	47	53	51	50	54	52
RELEVE SIZE m²	8	9	12	16	15	16	2
WIDTH CHANNEL (m)	10	6	21	10	10	9	4
WATER DEPTH (cm)	5	15	40	50	40	30	25
HEIGHT BANKS (cm)	100	70	70	70	70	100	100
% SHADING	10	0	70	0	0	30	90
% substrate:							
PEAT							
MARL CRUST							
CLAY							
SILT					<1	<1	90
SAND		<1	<1		<1	2	
GRAVEL	1	3	85	5	1	10	
STONES	2	5	5		9	3	
ROCK	97	92	10		90	85	10
BOULDERS					<1		
BEDROCK				95			
WATER LEVEL	L	N	N	L	L	L	L
FLOW	M	F	F	S	S	S	S
% TOTAL COVER	45	15	20	20	100	100	<1
% VASC.	<1	<1				<1	
% BRYOPHYTES		8	3	<1	<1		
% ALGAE	45	8	20	20	100	100	<1
PLANTS, DOMINANT.	CLADOPHORA	CLAD. RHYNCH. RIP.	CRUST	CLADOPHORA	CLADOPHORA	CLADOPHORA	CLADOPHORA
Water chemistry							
conductivity	400	110	420	320	320	400	290
Ca (mg CaCO₃/l)	42	62.5	45	32	32	42	27
pH	7.3	7.3	7.1	7.9	7.9	7.3	7.3

Riffles & Glides	FANE LOWL	KINGS LOWL	DUNKELLIN LOWL	KINGS LOWL	DINNIN LOWL	CAMLOR LOWL	HEATHFIELD	DINNIN LOWL
site no.	31	39	27	39	24	13	37	24
relevé no.	30	23	38	24	42	49	56	55
RELEVE SIZE m²	16	15	4	63	20	2	15	12
WIDTH CHANNEL (m)	11	21	12	22	16	30	6	16
WATER DEPTH (cm)	15	5	10	40	20	15	30	40
HEIGHT BANKS (cm)	100	70	100	100	80	20	100	60
% SHADING	20	70	60	0	1	0	0	20
% substrate:								
PEAT								
MARL CRUST		100		73		✓		
CLAY								
SILT	<1			5		<1		12
SAND	<1		5	10	<1	<1	<1	3
GRAVEL	<1		5	5	6	<1	7	10
STONES	5		1	2	4	<1	3	5
ROCK	95		83	5	85	95	85	60
BOULDERS	<1		5		5	5	5	10
BEDROCK						<1		
WATER LEVEL	L	N	L	N	L	L	N	L
FLOW	M	F	M	M	F	F	M	M
% TOTAL COVER	50	100	50	75	12	100	70	10
% VASC.	<1	<1	<1	25			<1	<1
% BRYOPHYTES	2	70	40	<1	6	70	1	<1
% ALGAE	50	70	10	60	6	95	70	10
PLANTS, DOMINANT.	LEMANIA	RHYNCH. RIP.	RHYNCH. RIP.	CLADOPHORA	CLAD. FONT. ANTIPYR.	MICROS. AMY.	CLADOPHORA	CLADOPHORA
Water chemistry								
conductivity	244	420	440	420	370	557	? (110)	70
Ca (mg CaCO₃/l)	25	45	45	45	36	81	62.5	36
pH	8.1	7.1	8.6	7.1	7.3	8.1	7.3	7.3

Riffles & Glides	GLENAMOY LOWL	GLENAMOY LOWL	MILLTOWN LOWL	COLLIGAN UPL	ERRIFF UPL	BELTRA UPL	MILLTOWN UPL	YELLOW LOWL	BELTRA LOWL	OWENDUFF MOUNT	ANNAGEERAGH UPL	BELTRA MOUNT	YELLOW UPL	OWENBOL. UPL STR. 2	ERRIFF UPL	OWENDUFF LOWL	ERRIFF LOWL	ERRIFF LOWL	OWENDUFF UPL	OWENGLIN UPL	OWENDUFF UPL	OWENBOLISKA LOWL	OWENBOLISKA UPL	OWENDUFF LOWL
site no.	32	52	41	17	28	6	40	56	7	46	1	5	55	44	28	48	29	29	47	49	47	45	44	48
relevé no.	39	21	22	33	11	24	15	19	23	18	25	26	17	20	3	7	6	4	8	9	16	5	2	1
RELEVE SIZE m²	49	16	6	4	16	6	8	25	30	75	1	.60	50	9	8	50	34	6	7	6	3	45	8	10
WIDTH CHANNEL (m)	12	16	3	5	5	2	3	16	6	.50	.50	.30	12	10	5	27	45	38	1	3	1	20	5	27
WATER DEPTH (cm)	30	30	10	25	15	10	10	20	15	1	2	10	30	20	20	15	15	50	10	10	30	30	40	50
HEIGHT BANKS (cm)	150	10	100	40	100	60	50	10	70	20	25	5	60	5	100	150	250	100	60	50	60	50	5	150
% SHADING	0	0	0	0	0	0	0	0	40	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0
% substrate:																								
PEAT																								POOL
MARL CRUST																								
CLAY											<1								<1					
SILT																<1					<1			✓
SAND	<1		2	<1	<1	<1	<1		3						15	<1	2	35	5	<1	1		2	✓
GRAVEL	1	1	1	2	5	1	5	<1	12				3	1	<1	5	23	2	5	5	<1	1	5	
STONES	10	4	2	1	10	2	10	1	10	<1	10		7		<1	10	75	4	5	3	5	4	10	85
ROCK	88	90	75	57	30	15	75	79	73	75	80	1	30		40	75	<1	60	80	82	74	15	<1	
BOULDERS	1	5	20	40	15	62	10	20	2	<1			60	99	45	10			5	10	20	80	83	15
BEDROCK					40	20				25	10	99												
WATER LEVEL	L	H	L	L	L	L	L	L	L	L	L	L	L	N	N	L	L	L	L	L	L	N	N	L
FLOW	F	T	F	M	F	T	F	F	F	M	S	M	T	F	M	M	M	S	F	M	M	F	F	St
% TOTAL COVER	7	24	80	90	40	20	25	30	<1	5	<1	50	11	25	75	70	5	60	70	25	45	90	70	1
% VASC.	<1				<1			<1				<1			35	<1	3	10	<1	1			25	<1
% BRYOPHYTES	2	4	72	80	40	1	15	1	<1	<1	<1	50	1	10	60	3	<1	<1	35	2	40	90	15	
% ALGAE	5	20	70	40	<1	20	10	30		5	<1	<1	10	20	20	70	3	60	35	23	5	60	40	1
PLANTS, DOMINANT.	MIXTURE OF ALGAE	SPIROGYRA	CHAEM & LYNGBYA	FONT. SQUAM.	FONT. SQUAM.	FIL. GREEN, PHORM.	SCAP. UNDUL.	MIXTURE ALGAE	RHYNCH. RIP.	PHORM.	SCAP. UNDUL.	SCAP. UNDUL.	MIXTURE ALGAE	STIGEONEMA	FONT. SQUAM	MIXTURE OF ALGAE	MIXTURE OF ALGAE	MIXTURE OF ALGAE	SCAP. UNDUL. + ALGAE	MIXTURE OF ALGAE	MARSUPELLA AQUAT.	SCAP. UNDUL.	MICROSP. AMOENA	MIXTURE (DETRITUS)
Water chemistry																								
conductivity	96	96	126	75	84	85	110	46	150	110	155	83	28	54	84	140	103	103	100	185	100	58	54	140
Ca (mg CaCO₃/l)	2.0	2.0	2.8	3.0	2.6	5.2	2.8	4.8	7.2	3.2	3.7	4.2	1.2	3.1	2.6	4.1	3.9	3.9	1.7	6.8	1.7	3.5	3.1	4.1
pH	6.4	6.4	6.7	7.5	6.3	6.7	7.0	6.3	6.5	(8.2) ?	7.3	6.9	5.3	7.2	6.3	7.1	6.4	6.4	6.7	7.4	6.7	6.8	7.2	7.1

Table 3: Physico-chemical parameters and relevé details for table 1 riffles & glides

high Ca, alkaline ←→ low Ca, acid

L = low water level
H = high water level

Flow: St = still M = moderate T = torrential
S = slow F = fast

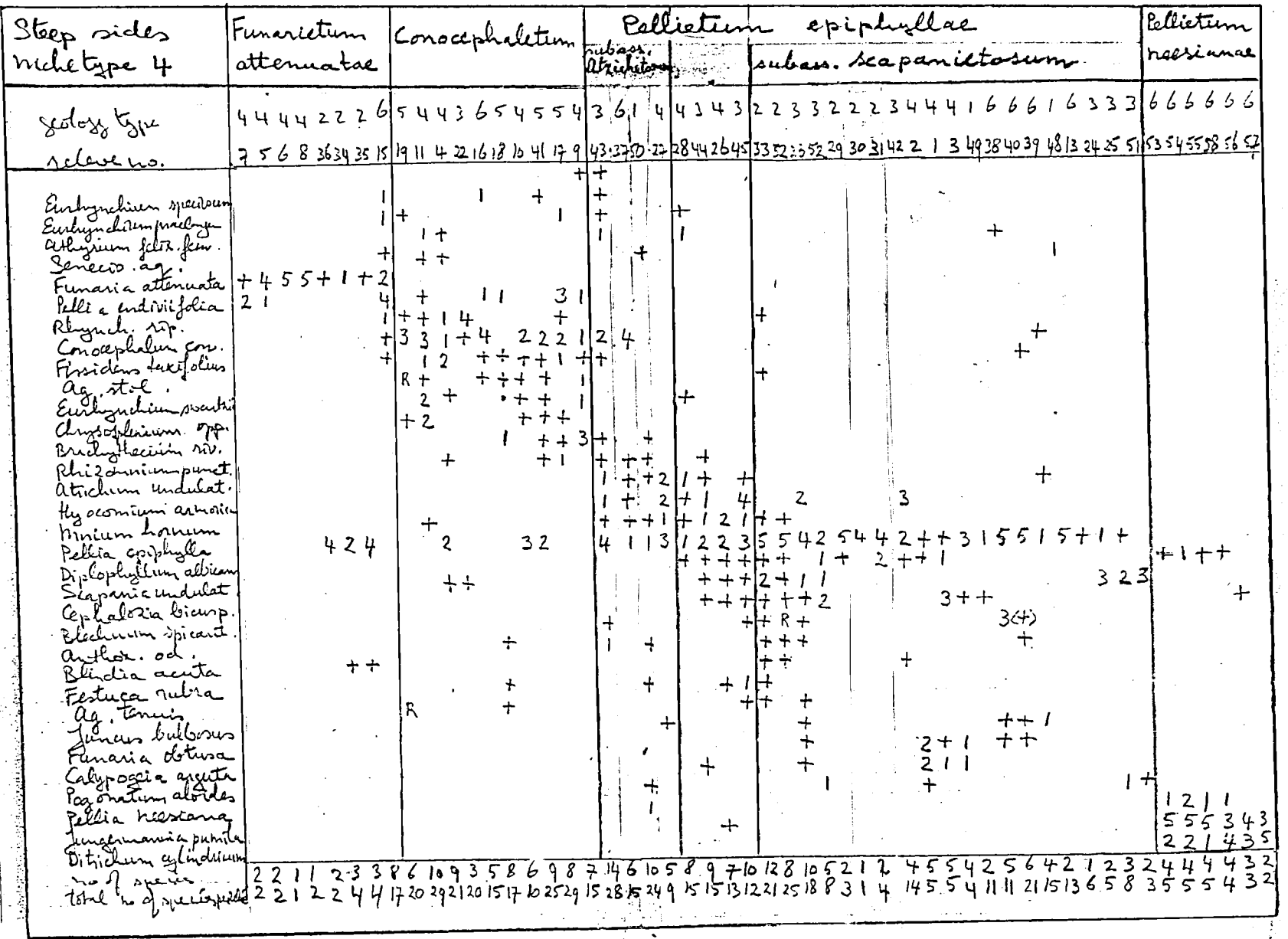


Table 4 : Steep sides (niche type 4)

relevé no.	species
19	Fissidens crassipes 2, Brachythecium rutabulum 3, Eurhynchium pumilum 2, Thamnobryum alopecurum 3.
11	Fissidens viridulus 2, Primula veris 1, Cardamine flex 1, Amblystegium riparium 1.
22	Fissidens viridulus 2, Jungermannia atrovirens 2, Amblystegium tenax 3, Cirriphyllum crassinervium 2, Leskea polycarpa 1, Brachyth. mildeanum 1
16	Cardamine flexuosa 3, Equis. arvense 1, Convolvulus 1, Rumex obtusifolius 1
18	Pohlia cruda 3, Calliergon cusp. 1, Amblystegium serpens 1
10	Cladophora glomerata 2, Sanchyis oleraceus 1
41	Dichodontium pellucidum 2, Thamnobryum alopecurum 3, Crepis paludosa 1
17	Polystichum setiferum 2, Thuidium tam 2, Primula vulgaris 1, Veronica chamaedrys 1, Hieracium spond 1, Rhytidiadelphus tric 1, Rhizomnium punct 1,
9	Pohlia wahlenbergii 2, Cardamine flex 1, Hedera helix +
28	Ulothrix tenerima 2, Dicranella rufescens 3, Rubus fruticosus 1, Fissidens viridulus 1,
26	Ulothrix tenerima 2, Dicranella heteromalla 1
52	Calypogeia fissa 3, Dicranella heteromalla 2
42	Fissidens cristatus
38	Calluna vulgaris 2, Hypericum pulchrum 1, Leontodon autumnale 1
39	Juncus effusus 2
48	Mol. coer 2, Cosmunda regalis 1
13	Porella platyphylla 4
24	Fissidens cristatus 3, Dicranella cerviculata 1
25	Dicranella cerviculata 2, Dicranella rufescens 1.
51	Jungermannia gracillima 2
54	Pogonatum urnigerum 2
53	Pogonatum urnigerum 1

additional species continued

15	Amblystegium tenax 1, Barbula spadicea 1
4	Rubus fruticosus 1, Filipendula ulm. 1, J. acutiflorus 1
43	Calliergon cuspidatum 1, Hedera helix +
37	Sagina procumbens 1, Juncus effusus 1
23	Racomitrium aciculare 1, Stigonema mam. 1.
29	Breutelia chrysocoma 1
49	Cirsium dissectum 1, mol coer 1
40	Ajuga reptans 1, Calliergon cusp. 1, Bryum pseudotriquetrum 1
55	Pogonatum urnigerum 1

Table 5 : Species with low occurance in table 4, steep sides. Only species with abundance ≥ 1 included.

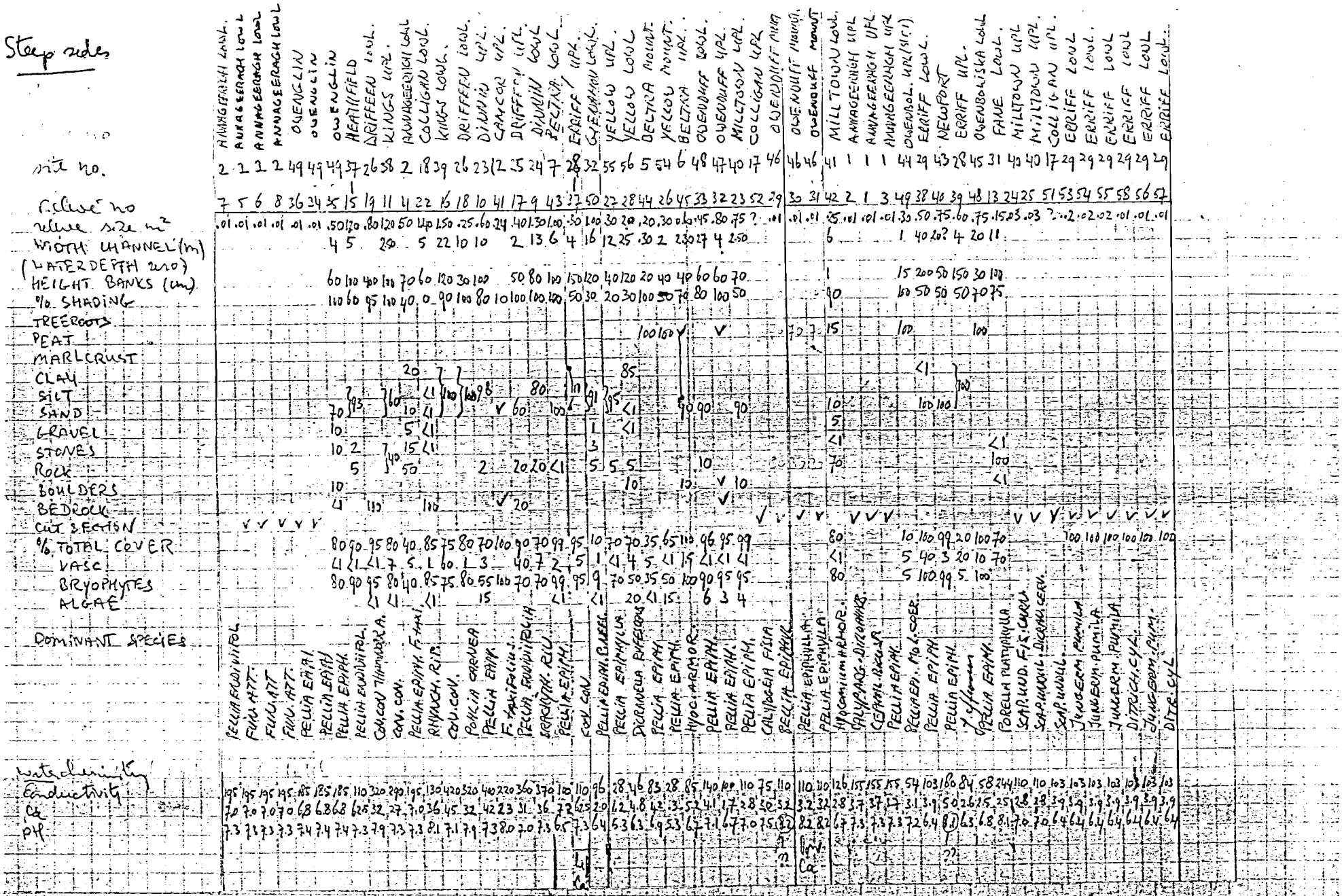


Table 6 : Physico-chemical parameters and relevé details for table 4, steep sides.

	Glyceria-Sparganietum X Apium nodiflori										Scapanietum undulatae							Littorellion				
niche type	10	11	10	10.	14	14	14	10		5	12	3	3	9	9	3	3	3	3	12	5	11	14
relevé no.	92	96	86	88	94	85	93	87		98	97	30	32	35	36	31	27	28	12	13	43	14	95
Sparganium erect.	+		3	2	+	2	+	5															
Callitriche		2	+	1	4	3	5	+		+	2												1
Glyceria fluitans	1	5			1	2	+			3	2												+
Potamogeton natans	2				+	3	2														+	+	+
Nasturtium off. ag.		1		2	+	+	+																
Mentha aq.		+	1	2	+	1																	
Rhelaris amund.		2	+	1				+															
Ag. stol.			+	+	+					+	+												
Apium nodifl.				2		2	+																
Amblystegium rip.			+	+																			
Vaucheria			+	1																			
Font. antipyr.				+							1										3		
Ran pen v. pen.										+													
Fissidens viricl.												2	+						+				
Fellia epiphylla														2	1								
Mnio spera annulata					4							1	2	2	5					•	+		
Scapania undulat												2	2	5	4	2	R	+					
Oedogonium																+	+	2	+	•	+	•	
Spirogyra																	+	2	+	o		o	
Mougeotia																+				o	+		
Batrachiospermum																			+	+	+	•	
Bulbochaete																			+	•		•	
Juncus bulb. f. fl.																			+	+	1		5
Myriophyllum alt																					2	3	+

Table 7 : A selection of relevés from various niche types.

relevés species

96 Lythrum salicaria R, Calystegia sepium R, Elodea canadensis +
86 Oenanthe aqu. 3 Berula erecta + Scirpus lacustris + Convolvulus 1, Lemna minor + Myosotis sp + Solanum dulc. + Pot perfoliatus + Urtica dioica + Salix viminalis + Poa prat +
88 Myosotis scorp 2 Cirsium sp (seedling) R Calystegia sepium + Petasites spurius +
94 Equis flav. + Galium pal + Veronica scut + Microspora tumidula +, Chaetophora elegans +
85 Alisma plant. + Glyceria declinata +, Pot crispus 1 Pot friesii 1 Myosotis scorp 1 Veronica anag. 2 Veronica cat +
93 Myosotis scorp. +. Pot friesii + Pot crispus (+).

97 Ran. flam. + Rumex sp + J effusus +
32 Chantransia stage + diatoms (1). Pharnicidium retzii +
35 Ran flam + Hydrocera coer. R Ulothrix zonata + Pharn. retzii + Palmella stage + Hyocomium armoricum 1 Fissidens taxifolius Eurhynchium speciosum + Dichodontium pellucidum +
36. Microspora amoena v. gracilis (included in M. amoena) Ulothrix tenerrima +, Draparnaldia + Pharn. retzii +
31 Fissidens crassipes 1 Stigonema mam. + Tab. floc 2.
27 Ulothrix tenerrima + Draparnaldia + Pharn. retzii + diatoms +
28 Iris R, Sphaerocystis + Chaemaesiphon 1 hyalyga + Font. squarrosa + Jungermannia atrovirens +
12 Equis pal + Chara sp + diatoms 5 Schizoclamys gelatinosa + Gloeocapsa 4.5 + Calothrix + Chaetophora incrassata + Dichothrix orsiniana v. africana + Blindia acuta +
13 Microspora amoena v. gracilis Draparnaldia Ulothrix moniliformis Chaetophora pisiformis Tab. floc.
43 Littorella uniflora 1 Senecio aq. + Phragmites australis + Ran. flam. 1 Salix pal + Tab. floc. + Eunotia pectinalis +
14 Fissidens sp + Lemania fluv. + Tolypothrix penicillata Tab floc Rhodochorton rivulare Ulothrix moniliformis, Achnanthes minutissima Ulothrix tenerrima
95 Scirpus fluitans 1 Oen. aqu 1

Table 8: Species with low occurrence in table 7, various niche types.

	BLACKWATER	DERRY Lowl.	KINGS Lowl.	GULLY	FANE Upl.	GULLY	GULLY	DUNKELLIN	KINGS Upl.	YELLOW Lowl.	BELTRA Mountain	BELTRA Mountain	BELTRA Mountain	BELTRA Mountain	OWENDUFF Upl.	MILLTOWN Upl.	MILLTOWN Lowl.	OWENGLIN	ERRIFF Lowl.	OWENBOLIGA Lowl.	ERRIFF Lowl.	ENRIFF Lowl.
site no.	8	22	39	33	30	33	33	27	38	56	5	5	5	5	47	40	41	49	29	45	29	29
relevé no.	92	96	86	88	94	85	93	87	98	97	30	32	35	36	31	27	28	12	13	43	14	95
relevé size m^2	3	2	20	3	8	18	8	1	50	3	2	15	2	50	3	4	3	6	1	1	4.5	3
width channel	10	15	22	3	250	6	4		3	26	3	3	3	3	5	3	4	3	40	3	40	40
water depth m	.50	.70	.30	0	.60	.50	.40	.02	.05	.15	20	10	0	.001	60	.50	20	.40	.10	.10	.80	0
height banks m		1.50	1	2	.30	1.50	1.50		1.20	.40	Var.	Var.	Var.	Var.	1	2.50	1	.50	1.20	.50	.50	1
% shading	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0
% substrate cover																						
peat													10	20	100							
clay				100	50																	
silt								100	20								V	V				
sand		100	100			90	99		60		1	<1				1	2	V	50	85	5	100
gravel						10	1		70	15	40	<1			<1	5	5	<1	20	5	2	
stones									5	10	1	5			2	4	3	<1	30	<1	28	
rock				40					5	15	38	85			38	70	85	95	<1	10	65	
boulders				10							20				60	20	5	5				
bedrock													100	100								
% bryophyte cover	40	100	100	70	100	95	95	90	30	50	20	50	90	100	45	5	10	100	80	90	100	90
% vasc. plants	40	100	100	70	60	95	95	90	30	45	0	0	<1	0	0	0	<1	10	<1	60	50	90
% Cryptogams	0	0	0	<1	0	0	0	0	0	5	20	50	90	70	15	<1	<1	<1	0	<1	<1	0
% algae	0	0	<1	3	70	<1	20	0	0	5	5	15	10	100	30	5	10	100	80	40	100	90
dominant spp.	POT. NAT.	GLYCERIA FL.	SPARG. ERECT.	MIXTURE	MILOSEIRA AMBIGUI	POTAMOGETON NATANS	CALLITRICHE	SPARG. ERECT.	GLYCERIA FL.	CALLITRICHE	SCAP. UNDULAT.	SCAP. UNDULAT.	SCAP. UNDULAT.	SCAPANIA MICROSPHAER.	RHYTIDIADELPHUS	FIL-GREEN	FIL-GREEN	DICRANUM S.	FIL-GREEN	MYRIOPH. ALT.	MYRIOPHYLL. ALT.	Juncus bulb. FIL.
water level	N	L	N	D	N	N	N	N	L	L	L	N	D	N	L	N	L	L	L	N	L	D
flow	St	St	St	-	St	St	M	St	M	St	M	T	-	T	S	S	S	S	St	M	St	-
water chemistry																						
conductivity	100	185	420	600	200	600	600	440	290	46	83	83	83	83	100	110	126	185	84	70	84	84
Ca	3.9	9.6	45	70	21	70	70	45	27	4.8	4.2	4.2	4.2	4.2	1.7	2.8	2.8	6.8	2.6	2.1	2.6	2.6
pH	6.0	7.6	7.1	7.4	7.0	7.4	7.4	8.6	7.3	6.3	6.9	6.9	6.9	6.9	6.8	7.0	7.0	7.4	6.25	6.0	6.25	6.25

→ low Ca

Table 9: Physico-chemical parameters and relevé details for Table 7-, various niche types.

Subunit I and XI: Glycerio - Sparganion x Apion nodiflori

Subunit I (niche type 1 and 2) contains 5 releves from the bed of the Owenur river and one relevé from the Fane; upland. Subunit XI contains 10 releves from 8 different sites from niche types 5, 10, 11, 12 and 14: from the Blackwater, Derry, Kings; upland and lowland, Fane; upland, Gully, Dunkellin, and Yellow; lowland.
The sites of subunit I are rich in Calcium, some to such an extent that tufa is formed (Owenur). Subunit XI contains sites low and high in Calcium (low Calcium: Yellow, Derry, Blackwater). The substrate is fine (gravel or smaller) in all cases and the flow still to moderate.
Phyto-sociologically these groups are somewhat heterogeneous. They show strong affinity to the Glycerio-Sparganion and to the Apion nodiflori. Several relevés (82, 84, 81, 83, 96, 88, 94, 85, 93) contain character species of the Apion nodiflori: Apium nodiflorum and Nasturtium officinale agg.. Most relevés contain one or more Potamogeton species, showing the affinity to the more permanently aquatic communities of the Potametea. Relevé 80 could have been classified as a community of Potamogeton crispus. Relevés 98 and 97 show affinity to the Callitricho-Batrachion, an important Alliance of river bed communities. Elements of the Phragmition are also present, and relevé 75 could equally well have been classified with the association Scirpetum lacustris, the Scirpus occurs here with predominantly the underwater form of leaf (strap-shaped and flexible). Relevé 96 could be classified as a community of Glyceria fluitans, of the Phragmition. Several other related communities were recorded, but the relevés are too diverse to be placed in a vegetation table (see 11. Other communities).
It is highly recommended that more research is done into this interesting and diverse group. These vegetation types of rivers are almost certainly decreasing through eutrophication and especially drainage, which destroys the shallow habitat of fine substrate that is so typical of these communities. The tufa foming communities, which appear to be quite rare, in particular, need further attention urgently.

Subunit II: Callitricho - Batrachion Den Hartog et Segal 1964
This unit contains 6 relevés from 4 different sites: Blackwater, Colligan; lowland, Derry and Owentaraglin. All are of niche type 1 and 2.
The substrate is predominantly rock and the flow slow to fast. The water can be low or high in Calcium, acid or alkaline.

Character taxa are Ranunculus subgenus Batrachium (not R. circinatus) and Callitriche species. All Batrachian Ranunculus is almost certainly Ranunculus penicillatus var. penicillatus. Amongst the Callitriche species C. hamulata and C. obtusangula were identified. All relevés can probably be assigned to the association Ranunculetum fluitantis Allorge 1922.
This association is sensitive to eutrophication: the Ranunculus gets overgrown with the alga Cladophora and decreases. See Subunit IV, relevés 66, 73, 68, 74. Relevé 66 could qually well be classified with the present group.
This Alliance is probably widespread, but has been recorded surprisingly infrequently during the survey. It is sensitive to pollution and may be decreasing. It is obviously also affected by drainage. It is in need of protection, especially in lowland sites.

Subunit III: Community of Rhynchostegium riparioides

This subunit contains two relevés, both from niche type 1 and 2 from the lowland site on the Driffeen river.
The water was alkaline and high in Calcium, the substrate bedrock in one case and rock in the other. The relevés are intermittently dry. The moss was overgrown with Cladophora in one case (relevé 58), indicating eutrophication. This community may also exist as a community of the steep sides, see sites 27 and 30.
The diagnostic species is Rhynchostegium riparioides.

Subunit IV: Community of Cladophora

This subunit contains 15 relevés from 9 different sites, all from niche type 1 and 2: Dinnin; upland and lowland, Heathfield, Kings; upland and lowland, Driffeen; lowland, Fane; lowland, Dunkellin, Camcor; lowland.
The water of all the sites was calcareous, neutral to alkaline, and the most abundant substrate was rock.
The diagnostic species is Cladophora, in all cases this is probably Cladophora glomerata. This alga is an indicator of eutrophication, especially when it occurs abundantly.
This community is obviously heterogeneous. It shows affinity to the Callitricho-Batrachion, relevés 66, 73, 68 and 74 could have been classified with this Alliance, as they contain similar species,.

It could be considered as an eutrophicated form of the Alliance, although Ranunculus occurs sparsely.
Releves 57, 53, 51, 47 and 49 can be considered as a community of Cladophora with Rhynchostegium riparioides. When eutrophication proceeds further, most species other than Cladophora are eliminated, see relevé 54.
Vaucheria was also often present within the Cladophora, but was difficult to distinguish from it macroscopically.
It is possible that the community of Cladophora exists under naturally eutrophic conditions in upland and lowland rivers, and is not the result of eutrophication. In that case Cladophora is expected to occur together with a suite of other species.
Tufa formation was encountered in several of the relevés (48, 57, 53, 73 and 74), and Cladophora can be one of the tufa forming algae. Obviously further research is needed in this area.

Subunits V, VI and XII: Scapanietum undulatae Heuff ass. nov.

This association was recorded 31 times at 18 different sites, see Tables 1 and 7.
All sites are low in electrolytes, very low in Calcium, neutral or acidic and shallow. The substrate is in most cases predominantly rock, or in a few cases larger than rock (boulders or bedrock). Flow is moderate to torrential. It occurs in riffles, glides, waterfalls or shallow pools. The plants can accumulate a certain amount of sand and silt. The association occurs in mountain, upland and lowland sites, in small and large channels.
Character species are Scapania undulata and Fissidens viridulus. The algae Mougeotia and Tabellaria flocculosa occur frequently.

Two subassociations appear to exist:
1. Scapanietum undulatae Rhynchostegietosum with the differential species Rhynchostegium riparioides and Ulothrix zonata (subunit V).
2. Scapanietum undulatae Juncetosum bulbosi f. fluitantis with the differential species Juncus bulbosus f. fluitans, Blindia acuta, Bulbochaete and Batrachospermum (subunit VI).

An impoverished form was recorded in deeper, slower flowing water, Table 7, subunit XII.
The association probably belongs to the Cardaminion of the Class Montio - Cardaminetea.

Subunit VII: Funarietum attenuatae Heuff ass. nov.

This association was recorded 8 times at 3 different sites: Annageeragh; lowland, Owenglin and Heathfield.
This is a pioneer community of the steep sides, it grows on fine substrate recently exposed (sand and silt), both acid and alkaline.
Its character species is Funaria attenuata.
Relevé 15 is transitional to the Conocephaletum (alkaline) and releves 36, 34 and 35 have elements of the Pellietum epiphyllae (acidic).

Subunit VIII: Conocephaletum Heuff ass.nov.

This association was recorded 10 times at 9 different sites: Driffeen; lowland and upland, Kings; upland and lowland; Annageeragh; lowland, Colligan; lowland, Dinnin; upland and lowland, Camcor; upland.
This association is typical of the steep sides of rivers, just above summer water level. The water of these rivers is alkaline and generally rich in Calcium. The substrate of the association varies from silt and clay to bedrock.
Character species is Conocephalum conicum. Fissidens taxifolius occurs in most of the releves.
The association belongs to the Sub-Alliance Cardaminion and is related to the association Pellio-Conocephaletum Maas 1959.

Subunit IX: Pellietum epiphyllae Heuff ass. nov.

This association was recorded 28 times at 20 different sites, see Table 4.
The association is found on the vertical sides of acid, Calcium poor rivers, usually shaded, just above summer water level on peat, sandy or rocky substrate. It is frequently flooded.
The character species is Pellia epiphylla, often in combination with Diplophyllum albicans and Mnium hornum.

Two subassociations appear to exist:

1. Pellietum epiphyllae Atrichetosum with the differential species Atrichum undulatum.
2. Pellietum epiphyllae Scapanietosum with the differential species Scapania undulata.

The association belongs to the Sub-Alliance Cardaminion of the Class Montio-Cardaminetia and is related to the association Pellio epiphyllae-Chrysosplenietum oppositifolii Maas 1959.

It is evident that a transition between the Scapanietum undulatae of the river bed and the present association of the steep sides exist, in which both Pellia epiphylla and Scapania undulata occur, for example on the waterfall in the mountain stream above Lough Beltra (Site no. 5). Frequent wetting and drying occurs here, it is in fact a position intermediate between steep sides and the river bed proper. In rivers were the Scapanietum undulatae occured in the river bed, the Pellietum epiphyllae occured on the steep sides.

Subunit X: Pellietum neesianae Heuff ass. nov.

This association was recorded six times at the same site: the steep banks on the lowland site of the Erriff river.
Character species are Pellia neesiana, Jungermannia pumila and Ditrichum cylindricum.
It grows in similar positions to the Pellietum epiphyllae and would have to be recorded from other sites to establish its exact ecology and validity.

Subunit XIII: Littorellion

This unit contains 5 relevés with elements of the Littorellion, from various niches at three different sites, see Table 7.
Relevés 43 and 14 represent a community of Myriophyllum alterniflorum and relevé 95 is a community of Juncus bulbosus f. fluitans.
The water at all sites was neutral or acid and low in Calcium.
It is expected that various associations of the Alliance occur in Irish rivers poor in electrolytes. This Alliance is under-recorded in this survey, because it appears to exist in niches other than 1 and 2 or 4. It is recommended that research is done to establish which associations are present. This group is sensitive to pollution and drainage, as it occurs in soft, clean water in lowland streams and rivers and is rare and threatened in the rest of Western Europe.

Other communities, not in the vegetation tables.

Several other communities were recognised, but either too few releves are available to compose a vegetation table, or in a few cases relevés were not taken because of lack of time in the field. Below follows a list of these communities, and the reader is referred to individual site descriptions in Part 2 of this report or to the original field records for further details.

Violon caninae, Site 5 and 48, niche type 6.

Molinio-Arrhenatheretea, Site 7, 29 and 32, niche type 5.

Community of Zygogonium, Site 11, niche type 1.

Community of Oenanthe croccata, Site 18, niche type 10 and Site 31, niche type 6.

Community of Phalaris, Site 22, niche type 7 and 10.

Community of Glyceria fluitans, Site 22, niche type 11

Community of Eleocharis palustris, Site 23, niche type 10.

Community of Rorippa sylvestris, Site 24, niche type 5.

Community of Sparganium erectum, Site 24, niche type 10.

Community of wet woodland on rocks and boulders, Site 25, niche type 1,2,3 and 9.

Apion nodiflori, Site 27, niche type 5and 6; Site 39,niche type 6.

Glycerio-Sparganion, Site 30,niche type 13 and Site 38, niche type 6.

Community of Potamogeton natans, Site 29, niche type 11.

Community of Myriophyllum alterniflorum, Site 29, niche type 11.

Community of Juncus bulbosus f. fluitans, Site 49, niche type 3.

Calthion, Site 32, niche type 7.

Community of Batrachospermum, Site 33, niche type 1.

Community of Agrostis stolonifera, Site 33, niche type 4.

Community of Potamogeton gramineus, Site 43, niche type 4.

Valeriano-Filipenduletum (Molinietalia), Site 43, niche type 6.

Narthecio-Ericetum tetralicis, Site 44, niche type 7.

Rhynchosporion x Caricion curto-nigrae, Site 44, niche type 6.

Community of Racomitrium aciculare, Site 45, niche type 4 and Site 46, niche type 8.

Community of Eurhynchium speciosum, Site 51, niche type 4.

Violion caninae x Caricion curto-nigrae, Site 55, niche type 6.

Scirpetum lacustris, Site 51, niche type 1

Community of Lophozia ventricosa, Site 11, niche type 4.

Type of River Stretch / Site no.	1 Glycerio-Sparganion x Apion nodiflori	2 Callitricho-Batrachion	4 Community of Cladophora	3 c.g.c. c.a.s.c.	5 Scapanietum undulatae	7 Littorellion	6 Zygnema
Association or Community	33 51 30 9	3 4 8 18 22 50 20 21	26 13 23 24 27 31 37 38 39 12	25	19 34 35 36 43 1 2 5 6 7 17 32 40 41 46 55 56 28 44 29 45 47 48 54 14 15 16 53 49	52	11
Com. of Batrachospermum	○						
Glycerio-Spary x Apion nod.	○○⊙						
Callitricho-Batrachion		○○○○○○○⊙					
Com. of Cladophora			○○○○○○○○○⊙				
Com. of Rhynchost. rip.			○				
com. of wet woodland x rhabd.				○			
Scapanietum undulatae					⊙⊙⊙⊙		
Scap. und. subass. Rhynch.					⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙		
Scap. und. subass. J. bulb.					⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙⊙		
Littorellion					⊙⊙	⊙	
Com. of Zygnema							○

Table 10: Classification of river stretches from the vegetation of niche types 1 & 2 (riffles and glides).
⊙ record not supported by relevés

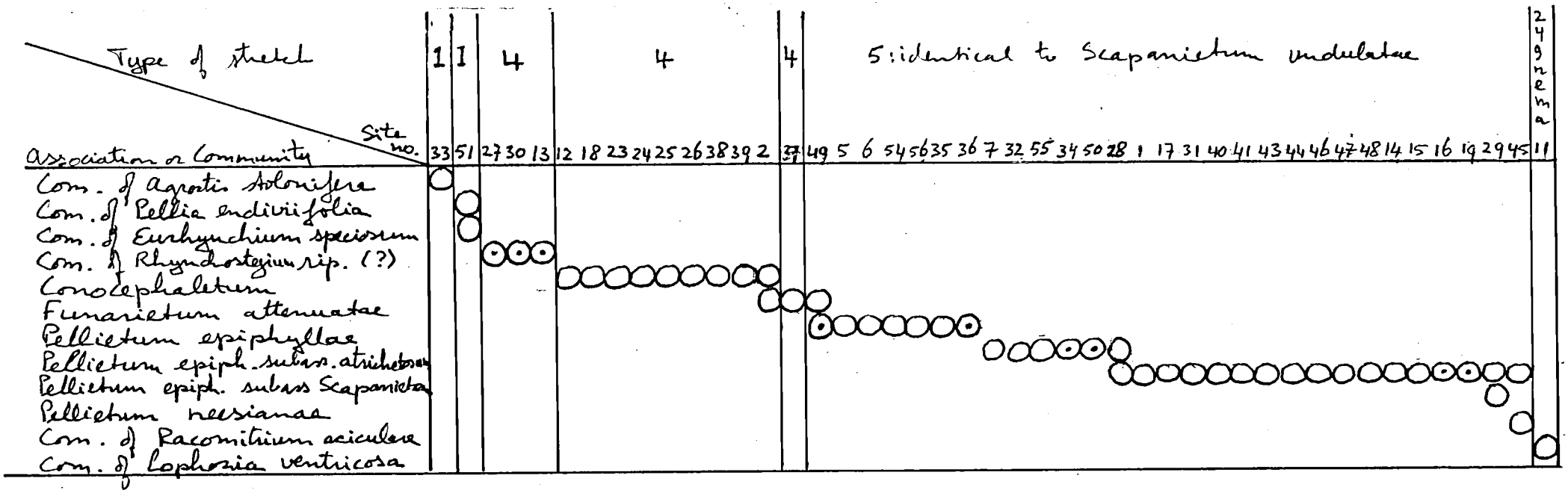
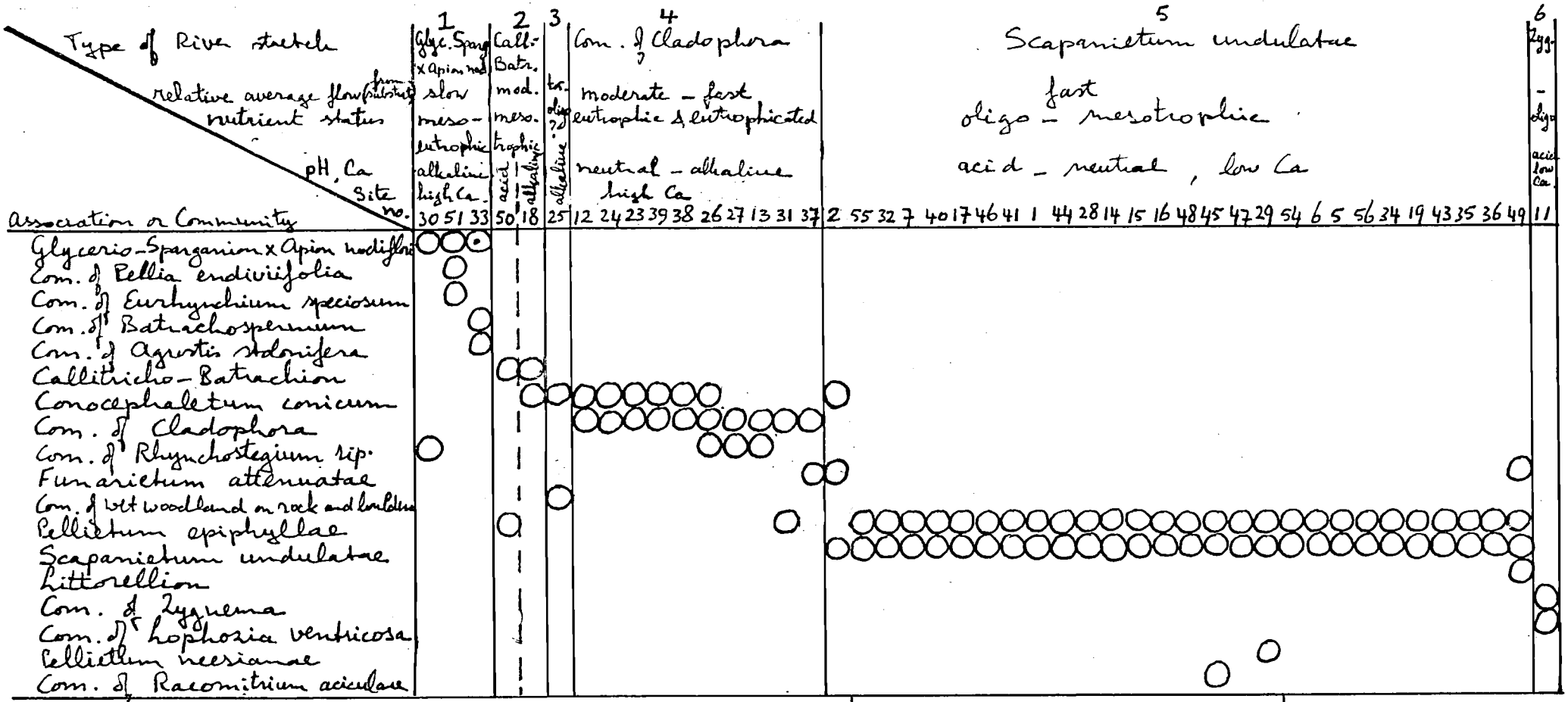


Table 11 : Classification of river stretches from the vegetation of niche type 4 (steep sides).

⊙ record not supported by relevés.



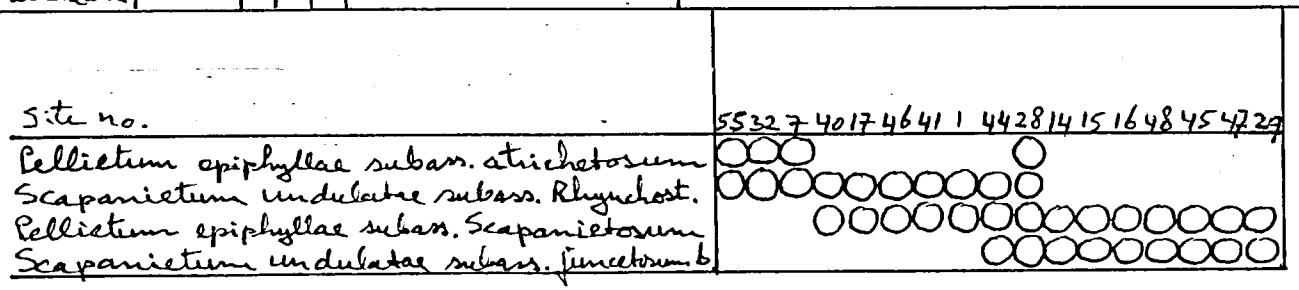


Table 12: Classification of river stretches from the vegetation of niche types 1&2 and 4. Only stretches with data for both niche types are included.

Classification of the river stretches

The river sites were classified using the results of the vegetation analysis of the riffles, glides and steep sides (niche types 1 and 2, and 4). Vegetation types of other niches were excluded, so that like is compared with like only.
The following types of river stretches can be distinguished, see Tables 10, 11 and 12:

1. Glycerio-Sparganion x Apion nodiflori stretches
Four stretches of this type were recorded: Gully, Owenur, Fane; upland and Cahir; upland.
These are streams and rivers of predominantly fine substrate (gravel or smaller) and low flows (slow to moderate). The sites are rich in Calcium, some to such an extent that tufa is formed in much of the channel.
Naturally the Glycerio-Sparganion x Apion nodiflori occurs in other stretches also, but not typically in niche type 1 and 2. It occurs in acid and alkaline streams and rivers in sandy and gravelly places (e.g. Yellow; lowland, see Table 1 and 7), but it does not determine the main aspect of the river in these cases. Various vegetation types were recorded from the steep sides of this type of stretch.

Rivers in which tufa is formed may be a specific type in its own right. The Owenur river and the lower reaches of the Cahir river are examples of this. Flows in the lower Cahir are faster, the river tends to dry out periodically and the bed is covered in tufa, with very few vascular plant present. This is a nutrient poor, calcium rich environment. It is an uncommon type of high conservation interest. A nutrient rich tufa forming type is described under 4. Cladophora stretches. In both cases spring water plays probably an important role in the hydrology of the river.
See also p. 35

2. Callitricho-Batrachion stretches

Eight stretches of this type were recorded: Argideen; upland and lowland, Blackwater, Colligan; lowland, Derry, Owentaraglin, Derreen; upland and lowland.
These are rivers of predominantly rocky substrate and slow to fast flows. Both acid to alkaline stretches, either low or high in Calcium are included, of medium to high nutrient status.
The Callitricho-Batrachion is the diagnostic species combination.
Two subtypes may exist:

a. With a vegetation of the steep sides typified by the association Conocephaletum. This includes the neutral to alkaline and Calcium rich stretches.

b. With a vegetation of the steep sides typified by the association Pellietum epiphyllae. This includes the neutral to acid and Calcium poor stretches, e.g. Owentaraglin.

3. Wooded, calcarious, intermittent torrential stretches

One such stretch was described, Site no. 25 (Driffeen; upland). The water of this stretch was highly calcareous (after a dry spell) and the nutrient status low. This is an unusual karstic waterfall of conservation interest. For further details see Part 2, p 47.

4. Community of Cladophora stretches

Ten stretches of this type were recorded: Carmac; upland, Camcor, Dinnin; upland 2x, Kings; upland and lowland, Driffeen; lowland, Dunkellin, Fane; lowland and Heathfield.
These are rivers and streams with neutral to alkaline, Calcium rich water, and slow to fast flows. The nutrient status is high.
This type of stretch can be produced as a response to eutrophication. The alga Cladophora grows over species combinations typical of other groups i.e. the Callitricho-Batrachion. Sites 31, 37 and 39 are examples of where this has occured. These three sites could

have been classified with the Callitricho-Batrachion stretches (type 2), Site 31 with 2b and Site 39 with 2a. Site 37 has eroded banks, typified by the Funarietum attenuatae. When eutrophication occurs regularly, other species are pushed out and Cladophora remains more or less as the only species e.g. Sites no. 23 and 26. Here the vegetation of the steep sides is the Conocephaletum. Before pollution occured these sites may have been of type 2a also.

A true Cladophora type of stretch may exist in naturally rich upland and lowland. In that case Cladophora will occur together with other species assemblages, not typical of the already described communities, e.g. Sites 13 and 24.
Tufa formation was noted in several rivers of this group e.g. Sites 23, 13, 37, 39. Cladophora can be one of the tufa forming algae. With enrichment, this interesting community is overgrown by fast growing Cladophora (and/or Vaucheria) and tufa can not be formed. Highly calcareous lowland rivers with tufa formation are clearly threatened by eutrophication and have probably all but disappeared from the rest of Western Europe. Further reseach, immediate identification and protection of these kind of sites is strongly recommended. See also p.35.

5. Scapanietum undulatae stretches

Twenty-eight stretches of this type were described. All were low in electrolytes, neutral to acid and poor in Calcium. The substrate was predominantly rock or larger (except in Erriff; lowland, it was mostly stones). The associated vegetation of the steep sides was the Pellietum epiphyllae.

6. Zygogonium stretches

An erosion stream of the Slieve Bloom plateau (Site 11) was described. It is a head water of the Carmac river. See Part 2, p 21.

7. Littorellion stretches

This is probably a subgroup strongly related to the Scapanietum stretches. It was tentatively recorded in 1981 in Roundstone streams (Sites 52 and 53). It may occur in slower flowing streams with predominantly smaller substrate than that of the Scapanietum group. It is oligotrophic and poor in Calcium.

8. Tufa producing river stretches

These have already been described under 1. Glycerio-Sparganion x Apion nodiflori stretches and under 4. Community of Cladophora stretches. Two types appear to exist:
a. nutrient poor e.g. Cahir river
b. nutrient rich e.g. Kings; lowland
As very few stretches of this type were recorded it must be presumed that they are rare, and certainly also threatened by eutrophication and/or drainage works. Only one stretch of the nutrient poor tufa forming type was identified (Cahir; lowland, surveyed in 1981) and it is recommended that this river is conserved with the greatest urgency. In this case it is possible to conserve the whole catchment as it is a relatively small river, situated in an area already of prime conservation interest (Burren). It is a rare system of international importance.
The nutrient rich type is disappearing from Ireland and the rest of Europe and was certainly widespread at one time. It is threatened by eutrophication and also by deepening of lowland channels. Conservation is more difficult as it involves proper management of the whole catchment. However, it is recommended that steps are undertaken in that direction with the greatest urgency, or else the last remnants of that type will disappear from Ireland and with that from Western Europe probably also.

9. Other types of river stretches

Other types of river stretches exist in Ireland, although these were not recorded formally during this survey for various reasons:
Deep stretches of both acid and alkaline rivers, both poor and rich in nutrients. Presumably these are found in conjunction with the different types of shallower stretches already described.
The reader is referred to the Wildlife Service Lake Survey Report (1984)for possible types. It is realised that the transparency in rivers is less than in lakes due to a greater silt load and hence that the types will be limited by this. It is however important that the low nutrient sites especially, of both acid and alkaline systems be located and protected as soon as possible.

CONCLUSIONS

Vegetation analysis

Thirty-nine vegetation units were recorded from 56 different river sites. Twelve of these are represented by vegetation tables, (Tables 1, 4 and 7), while the remaining units are recorded by a small number of relevés, or short descriptions.
Seven units are new to science, to my knowledge.
Below follows a summary of the new units, for further details see pages 12-17.

Scapanietum undulatae Heuff ass. nov. and its two subassociations, Scap. und. Rhynchostegietosum and Scap. und. Juncetosum bulbosi f. fluitantis. This association and its two subassociations are typical of shallow riffles and glides in rivers low in electrolytes and have never been described before, to my knowledge.
It is typical of clean soft water river systems in Ireland.

Pellietum epiphyllae Heuff ass. nov. with its two subassociation, Pell. epiph. Atrichetosum and Pell. epiph. Scapanietosum. This association and its two subassociations are typical of the steep vertical banks of soft water rivers, just above the summer water level. It has never been described before to my knowledge.
It is associated with the occurence of the Scapanietum undulatae in the river bed.

Pellietum neesianae Heuff ass. nov. is possibly a new association, but was only recorded for one site, more relevés from different locations are needed to clarify its position. It grows on the eroded vertical banks of a large soft water river (Erriff, Co. Mayo).

Conocephaletum Heuff ass. nov. This association is typical of the vertical banks of neutral to alkaline, Calcium rich rivers, just above summer water level, and has not been described before to my knowledge. It is related to the Pellio-Conocephaletum Maas 1959.

Funarietum attenuatae Heuff ass. nov. This describes a pioneer community of sandy vertical river banks and was found at three sites. More relevés are needed to establish its validity. It was not described before to my knowledge.

Classification of the river stretches

Eighteen vegetation units were used to classify the river stretches, (see Tables 10, 11 and 12) and 10 stretch types emerged as follows. One of these types may be extremely rare in Europe and most are threatened by eutrophication and/or drainage.

1. Glycerio-Sparganion x Apion nodiflori stretches
2. Callitricho-Batrachion stretches
   a. with Conocephaletum
   b. with Pellietum epiphyllae
3. Wooded calcareous intermittent stretches
4. Community of Cladophora stretches, possibly produced as a result of eutrophication.
5. Scapanietum undulatae stretches
6. Zygogonium stretches
7. Littorellion stretches
8. Tufa producing stretches
   a. nutrient poor (e.g. Cahir)
   b. nutrient rich (e.g. Kings; lowland)
9. deep stretches (not surveyed)

The nutrient poor tufa producing stretches are extremely rare (only one recorded during the survey). The tufa forming nutrient rich stretches are also rare and threatened by eutrophication, while undrained calcareous and shallow lowland stretches could not be found anywhere in Ireland. Those rivers of this type in which drainage is not maintained in recent times, should be considered very valuable for conservation and jealously garded from pollution and further drainage. In both tufa forming stretches spring water probably plays an important role. It is recommended that further research is carried out on tufa producing systems, e.g. small intermittant streams in the Burren should be investigated and it should be attempted to locate other large tufa producing rivers in the limestone areas of Ireland. It is strongly recommended that the tufa producing rivers are conserved, as soon as possible as they are of international importance, and under serious threat, and rare in Ireland and possibly extinct in the rest of Europe.

Conservation of rivers

The present classification will help to insure that a full range of river types can be conserved. It is recommended that at least one stretch of each type is conserved as soon as possible, and more than one stretch ultimately, to ensure conservation of the variability within each type.

In order to conserve a river stretch two approaches are possible: In a few cases, where the catchment is small, or the river lies entirely within a conservation area, the nature reserve approach may be applied, e.g. resp. Cahir and Owenduff rivers. However, in most cases a management approach will have to be applied, to include all human activities in the catchment in order to ensure that the water quality is satisfactory for conservation purposes and that the channels are not damaged and if necessary that both(or either) water quality and channel characteristics are restored.

In order to do this cooperation with all other bodies concerned is necessary, e.g. bodies responsible for water quality and resources (county councils, Water Resource Division, Department of the Environment, inland fisheries etc.) as well as farming organisations, and planning authorities and drainage boards. Methodologies of assessment have to be compared and calibrated so that conservation requirements can be understood in the terminology of these bodies.

It is recommended strongly that a river conservation programme is started as soon as possible along the lines described above, as most of the river types are threatened by pollution and/or drainage, some very seriously and several are of international importance.

Which rivers should be conserved?

As stated elsewhere in this report, without a national inventory it is not possible to recommend a comprehensive list of rivers for conservation. However, it is possible to identify several unique and internationally important rivers.

It is highly recommended that such a national inventory be carried out as soon as possible.

Below follows a list of rivers important for conservation;

* indicates a 'good' site; ** an excellent site; *** an unique site.

This rating system is preliminary, except for ***:

1. Cahir (type 1, type 8a) ***
2. Owenduff (type 5) ***

3. Kings, trib. of Nore (type 4, type 8b) **
4. Driffeen head stream (type 3) **
5. Roundstone streams (type 7) *
6. Annageeragh (type 5) *
7. Argideen (type 2) **
8. Beltra (type 5) **
9. Camcor (type 4, type 8b?) **
10. Caragh (type 5) **
11. Colligan (type 2) *, eutrophication
12. Erriff (type 5) **
13. Fane (type 4, type 2?) *
14. Gweebarra (type 5) **
15. Milltown (type 5) *
16. Moyree (type ?,surveyed in 1981) **, because of floodplain
18. Owenboliska (type 5) *
19. Owenglin (type 5) *
20. Owentaraglin (type 2) **
21. Yellow (type 5) *
22. Blackwater (type 2) *

Several other rivers are known to be important for conservation, but were not surveyed by the Wildlife Service sofar. Especially the River Shannon deserves a mention in this respect. It is highly recommended that the Shannon be surveyed including its wetlands, and that it be safeguarded from pollution and/or drainage.

It is concluded that Ireland still possesses a number of rivers of major international importance from a conservation point of view, both in the Calcium rich and in the Calcium poor range. It is Ireland's responsibility to assure that sufficient examples of each river type be conserved for future generations.

RECOMMENDATIONS

It is recommended that further research is carried out with the ultimate aim of site choice on the following:

Further research into the vegetation of calcareous rivers, both of the nutrient rich and of the nutrient poor type: i.e. mainly on the large rivers of the Midlands and on the intermittant streams of the Burren.

Further research be carried out on the Calcium poor rivers, with regard to the Littorellion.

Research into deep stretches of all river types described in this report,
research on associated wetlands,
research on estuaries and
research on the River Shannon, and its tributaries.

It is strongly recommended that the present survey is followed up by a national inventory with the aim of drawing up a comprehensive list of rivers for conservation.

It is strongly recommended that a programme of active nature conservation of rivers is initiated.

It is recommended that a full range of river types be conserved, and that sufficient examples of each type are included so that the diversity within each type is represented.

It is recommended that those rivers that can be conserved as nature reserves be given conservation status as soon as possible: i.e. the Cahir River, Co. Clare and the Owenduff River, Co. Mayo.

It is recommended that the tufa forming rivers of the calcareous regions of Ireland are given immediate attention, in view of their rarety and threatened position.

It is highly recommended that measures for conservation are undertaken to conserve those rivers that can not be safeguarded by the establishment of nature reserves, i.e. the majority of rivers.

It is recommended that this is done on a catchment basis, through planning control and management agreements, in liaison with the different bodies responsible for water quality and resource management, including drainage boards, inland fisheries etc.

It is strongly recommended that a field manual is produced for the assessment and monitoring of rivers and their catchment with regard to their conservation value, and that this includes comparative assessment, linking methods used by other bodies, to facilitate liaison so that conservation requirements can be understood in the terminology of these bodies.

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THE VEGETATION OF IRISH RIVERS

PART 2 - DESCRIPTIONS OF THE INDIVIDUAL RIVER STRETCHES p. 1-111, including explanation of terminology and list of sites, p. i-iv.

EXPLANATION OF TERMINOLOGY

Listings of the main physico-chemical parameters, the vegetation components and niche types, and the general site descriptions for each of 56 river stretches, numbered in alphabetical order, are presented in this part of the report. Below follow explanations of the terminology used.

The geology and soils of the catchment are catagorised, the numbers indicate the following types:

Geology
1. Schizt, gneiss & granite
2. Quarzite
3. Sandstones
4. Shales
5. Limestones
6. Mixtures

Soils (Moore, 1973)
1. Atlantic lowland blanket bog
2. Mountain blanket bog
3. Central lowland calcarious till
4. Drumlin complex
5. Acid brown earths, free drainage
6. Burren limestone

Altitude: Lowland: less than 100 m.
Upland: between 100 m and 330 m.
Mountain: higher than 330 m.

Water body size: River: wider than 5 m.
Stream: between 2 m and 5 m.
Brook: less than 2 m wide.

Height of banks, slope of banks and channel shading are average values over the whole stretch.

Channel shading: None
Light: patches not anastomising.
Medium: patches anastomising but covering less than 50%.
Heavy: extensive shady patches, covering more than 50%.

Channel substrate has been divided into the following class types and is estimated over the whole stretch and for each releve.

Peat, marl, clay, silt, sand	0.02-0.2 mm diameter
Gravel	3-12 mm diameter
Stones	12-50 mm diameter
Rock	5-30 cm diameter
Boulders	more than 30 cm in diameter
Bedrock	

Percentage plant cover and percentage niche cover is estimated over the whole stretch, bed and bank are considered as one unit, percentage bed and percentage bank is indicated.
Releves for the steep sides are numbered 1 to 59, releves for all other niche types are numbered 1 to 143.

Water chemistry, units are as follows:

Total P:	mg P l^{-1}
Total dissolved P:	mg P l^{-1}
Orthophosphate	mg P l^{-1}
Conductivity	umho cm^{-2}
Total alkalinity	mg $CaCO_3$ l^{-1}
Total hardness	mg $CaCO_3$ l^{-1}
Ca hardness	mg $CaCO_3$ l^{-1}
NH_4	mg NH_4 l^{-1}
NO_3	mg NO_3 l^{-1}
SO_4	mg SO_4 l^{-1}

All other parameters are expressed in mg l^{-1}

Site descriptions include a value judgment of the conservation potential of each site. It must be stressed that this survey was not intended to identify conservation sites. To identify conservation sites comprehensively a national inventory of rivers should be carried out. The present survey is a necessary preliminary to such an inventory.

Table 13 List of Sites and Site numbers.

Table 13, continued

Name of river: Annageeragh Site no. 1

General information

County: Clare
O.S. ½ inch sheet no. 17
O.S. 6 inch sheet no. 39
Grid ref: R 140 750
Sampling date: 11.7.84
Altitude: upland
Land use: rough grazing

Geology: Millstone Grit and Flagstone (4)
Soils: Climatic peat (1)
Water body size: brook
Height banks: 0.25m
Slope banks: 90°
Channel shading: heavy
Length of stretch: 250m

Physico-chemical information

				Channel substrate	
Total-P	0.035	NH_4^+	-	Type	% Cover
Total dissolved-P	0.013	NO_3^-	0.02	Rock	60
Ortho-phosphate	0.028	SO_4^{2-}	-	Bedrock	40
pH	7.3	Ca^{2+}	3.7	Stones	<1
Conductivity	155	Mg^{2+}	4.1		
Alkalinity	52	Na^+	15.2		
Total hardness	40	Cl^-	21		
Ca-hardness	41	K^+	0.4		

Vegetation

Plant type	% Plant cover	Dominant species
Emergent vascular plant	10	Herbs, grasses of Community type 4&6
Submergent bryophyte	5	Scapania undulata
Emergent bryophyte	45	Pellia epiphylla
Submergent algae	<1	Microspora amoena
Emergen algae	<1	Oscillatoria splendida

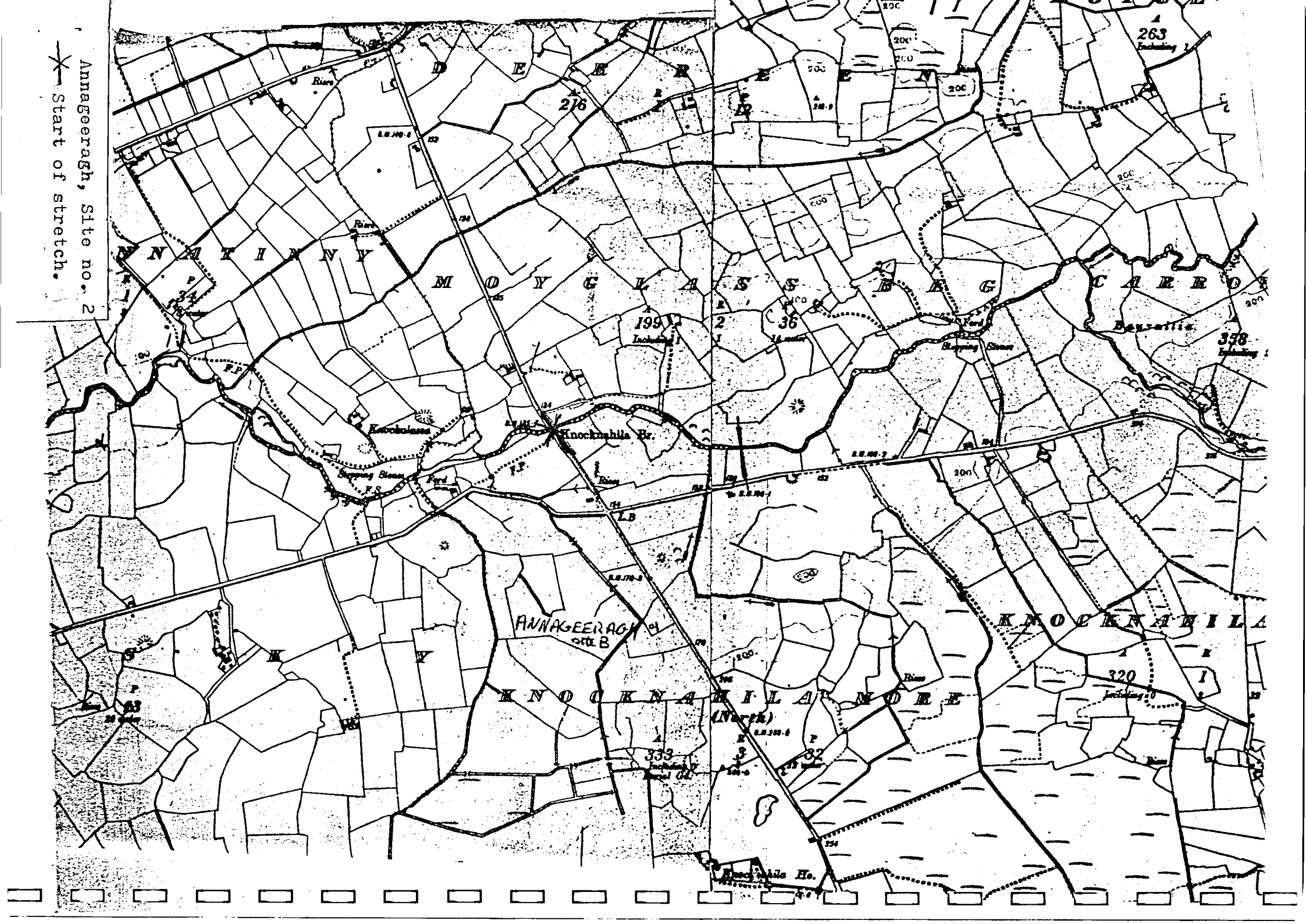
	Niche type	% Niche cover	Releve no.	Classification
Bed: 50%	1	30	25	Scapanietum undulatae
	8	20	37	- Rhynchostegietosum
Bank: 50%	4	49	1,2,3	Pellietum epiphyllae
	6	1	-	- Scapanietosum

Site description and comments

Small headstrean rising in dried-out bog. On one side the channel is bordered by an earthen bank. The plants in the channel are full of red peaty deposit. This channel was dug out in the past, and was recently dug upstream and downstream from the site. This stretch runs over rock

and bedrock and presumably does not need frequent drainage maintenance. It is not of conservation interest.

Annageeragh, Site no. 1.
A detail of the 0.50m wide ditch.
Microspora amoena is the dominant alga.


Annageeragh, Site no. 2
Start of stretch.
DERREEN
MOYGLASSBEG
CARRO
KNOCKNAHILA
KNOCKNAHILAMORE
(North)
ANNAGEERAGH
Site B
Knockmahila Br.
Knockmahila Ho.
Beenatia.
216
199
263
358
320
333
82
63

Name of river: Annageeragh Site no. 2

General information

County: Clare
O.S. ½ inch sheet no. 17
O.S. 6 inch sheet no. 38
Grid ref: R 055 710
Sampling date: 11.7.84
Altitude: lowland
Land use: pasture

Geology: Millstone Grit and Flagstone (4)
Soils: Gleys (4)
Waterbody size: river
Height banks: 0.50m
Slope banks: 90°
Channel shading: light
Lenght of stretch: 500m

Physico-chemical information

Total-P	0.025	NH_4^+	-
Total dissolved-P	0.018	NO_3	0.21
Ortho-phosphate	0.023	SO_4^{2-}	-
pH	7.3	Ca^{2+}	7.0
Conductivity	195	Mg^{2+}	3.8
Alkalinity	30	Na^+	16.8
Total hardness	43	K^+	1.8
Ca-hardness	31	Cl^-	31

Channel substrate	
Type	% Cover
Rock	67
Boulders	30
Sand	1
Gravel	1
Stones	1
Bedrock	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Myriophyllum alternifolium
Floating leaf, rooted	<1	Potamogeton natans
Emergent vascular plant	3	Oenanthe croccata & bank species
Submerse bryophyte	35	Fontinalis squamosa
Emerse bryophyte	5	Pellia epiphylla, Fissidens taxifolius
Submerse algae	3	Phormidium retzii

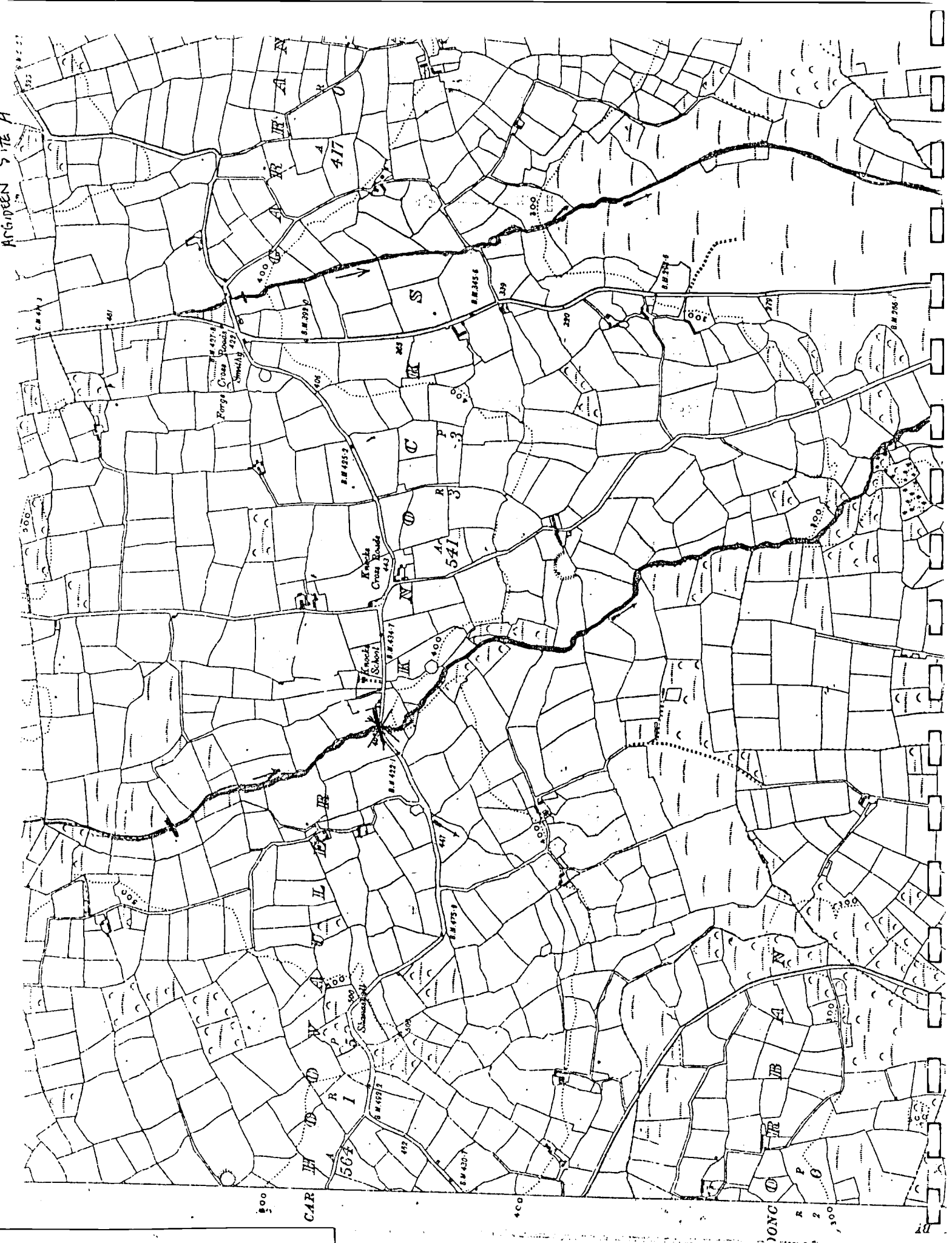
	Niche type	% Niche cover	Releve no.	Classification
Red 88%	1	65	142	Scapanietum undulatae
	3	23	106	- Rhynchostegietosum
	8	<1	108	-
Bank 12%	4	10	4,5,6,7,	Conocephaletum, Funarietum attenuatae
	6	2	-	-

Site description and comments

Shallow mossy rocky areas alternate with silty pools. The river is bordered Salix scrub and Rubus and flows through wet pasture land.

Banks are predominantly steep or undercut, twenty percent of banks are gently sloping. With good management this river is probably of conservation interest.

Annageeragh, Site no. 2.
Typical view of shallow stretch of river, pool in background.



Argideen, Site no. 3.
Strart of strètch.

Name of river: Argideen Site no. 3

General information

County: Cork
O.S. ½ inch sheet no. 25
O.S. 6 inch sheet no. 122
Grid ref: W 347 482
Sampling date: 28.7.81
Altitude: upland
Land use: pasture

Geology: Slate and Grits (6)
Soils: Acid brown earths (5)
Water body size: brook
Height banks: 0.10-1m
Slope banks: 90°
Channel shading: heavy
Length of stretch: 500m

Physico-chemical information

Total-P	0.036	NH_4^+	-
Total dissolved-P	0.036	NO_3^-	-
Ortho-phosphate	0.017	SO_4^{2-}	-
pH	7.0	Ca^{2+}	7.6
Conductivity	155	Mg^{2+}	1.5
Alkalinity	0.28	Na^+	0.7
Total hardness	-	K^+	1.6
Ca-hardness	18	Cl^-	20

Channel substrate

Type	% Cover
Stones	50
Rock	40
Gravel	6
Boulders	1
Bedrock	1
Sand	1
Silt	1

Vegetation

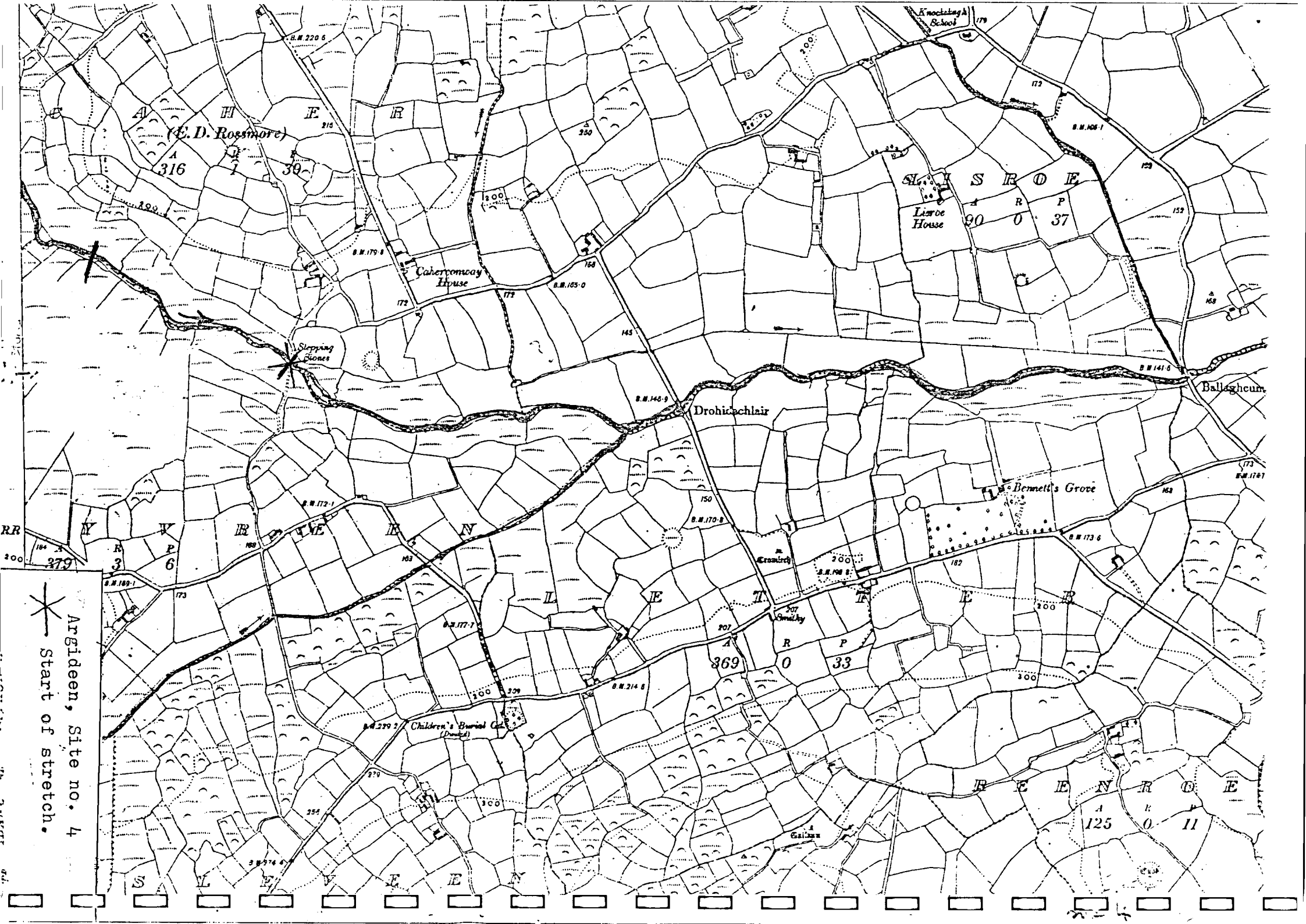
Plant type	% Plant cover	Dominant species
Floating leaf, rooted	<1	Callitriche
Emergent vascular plant	5	Apium nodiflorum
Total bryophyte	25	Epilithic Liverwort
Submerse algae	30	Cladophora
Total plant	60	Cladophora

Classification: Streambed community is problably the Callitricho-Batrachion

Site description and comments

First order stream forming field boundary, shaded by Salix, Rubus, Ulex, grasses and herbs. Stream bounded by springs giving rise to marshy areas. Cattle excluded from stream in most places, leaving bank vegetation in tact. Possibly enriched by nutrients indicated by Cladophora. Of conservation interest.

Argideen, Site no. 3.
An open stretch of the 1m wide, shaded channel.


Knocktegh School
(E.D. Rossmore)
A 316 Q 1 P 39
Lisroe House
A 90 R 0 P 37
Caherconway House
Stepping Stones
Drohidachlair
Ballaghcum
Bennett's Grove
A 279 R 3 P 6
A 369 R 0 P 33
A 125 R 0 P 11
Children's Burial Ground
Argideen, Site no. 4
Start of stretch.

Name of river: Argideen Site no. 4

General information

County: Cork
O.S. ½ inch sheet no. 25
O.S. 6 inch sheet no. 122
Grid ref: W343 453
Sampling date: 29.7.81
Altitude: lowland
Land use: rough grazing

Geology: Shale and Grits (6)
Soils: Acid brown earths (5)
Water body size: river
Height banks: 0.80m
Slope banks: 90°
Channel shading: light
Lenght of stretch: 500m

Physico-chemical information

Total-P	0.027	NH_4^+	-
Total dissolved-P	0.011	NO_3^-	-
Ortho-phosphate	0.009	SO_4^{2-}	-
pH	7.2	Ca^{2+}	5.5
Conductivity	175	Mg^{2+}	3.5
Alkalinity	0.38	Na^+	3.3
Total hardness	-	K^+	0.7
Ca-hardness	16	Cl^-	8

Channel substrate	
Type	% Cover
Stones	45
Rock	45
Gravel	5
Sand	2
Bedrock	1
Boulders	1
Silt	1

Vegetation

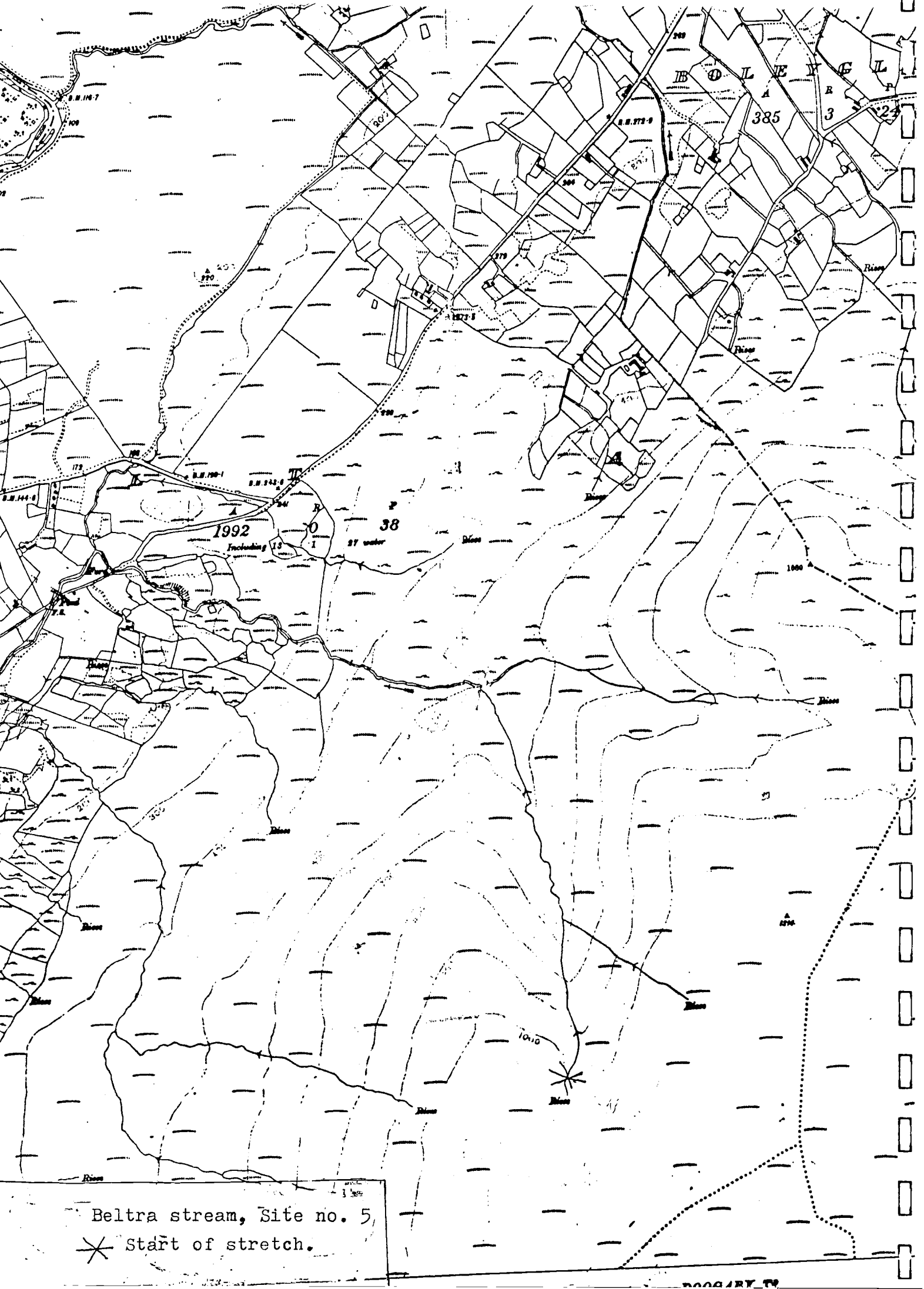
Plant type	% Plant cover	Dominant species
Submerse vascular plant	65	Ranunculus penicillatus var. pen.
Floating leaf, rooted	2	Ranunculus penicillatus var. pen.
Emerse vascular plant	3	Oenanthe croccata
Submerse bryophyte	5	Amblystegium riparium, Fissidens vir
Submerse algae	80	Melosira (filamentous) var. vir.
Total plant	95	Melosira

Classification: Streambed community is the Callitricho-Batrachion.

Site description and comments

Shallow channel, well vegetated with Ranunculus penicillata var. penicillata. Both steep and gently sloping banks. Grazing mostly excluded from banks. Possibly enriched by nutrients indicated by algal species (filamentous Melosira). Interesting river system of conservation interest. Management to maintain the conservation interest would be of importance.

Argideen, Site no. 4
Typical view of channel.


Beltra stream, Site no. 5
Start of stretch.

Name of river: Beltra stream Site no. 5

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 59
Grid ref: M 101 990
Sampling date: 25.7.85
Altitude: mountain
Land use: Rough grazing

Geology: Old red sandstone (3)
Soils: Peaty gleys (2)
Water body size: brook
Height banks: various
Slope banks: various
Channel shading: none
Lenght of stretch: 250m

Physico-chemical information

Total-P	0.015	NH_4^+	-
Total dissolved-P	0.001	NO_3^-	-
Ortho-phosphate	0.0001	SO_4^{2-}	-
pH	6.85	Ca^{2+}	4.2
Conductivity	83	Mg^{2+}	1.3
Alkalinity	13.8	Na^+	8.0
Total hardness	44.7	K^+	0.16
Ca- hardness	10.2	Cl^-	17.3
Mn	0.16	Fe	0.6

Channel substrate	
Type	% Cover
Bedrock	50
Peat	20
Rock	15
Gravel	10
Stones	2
Boulders	2
Sand	1

Vegetation

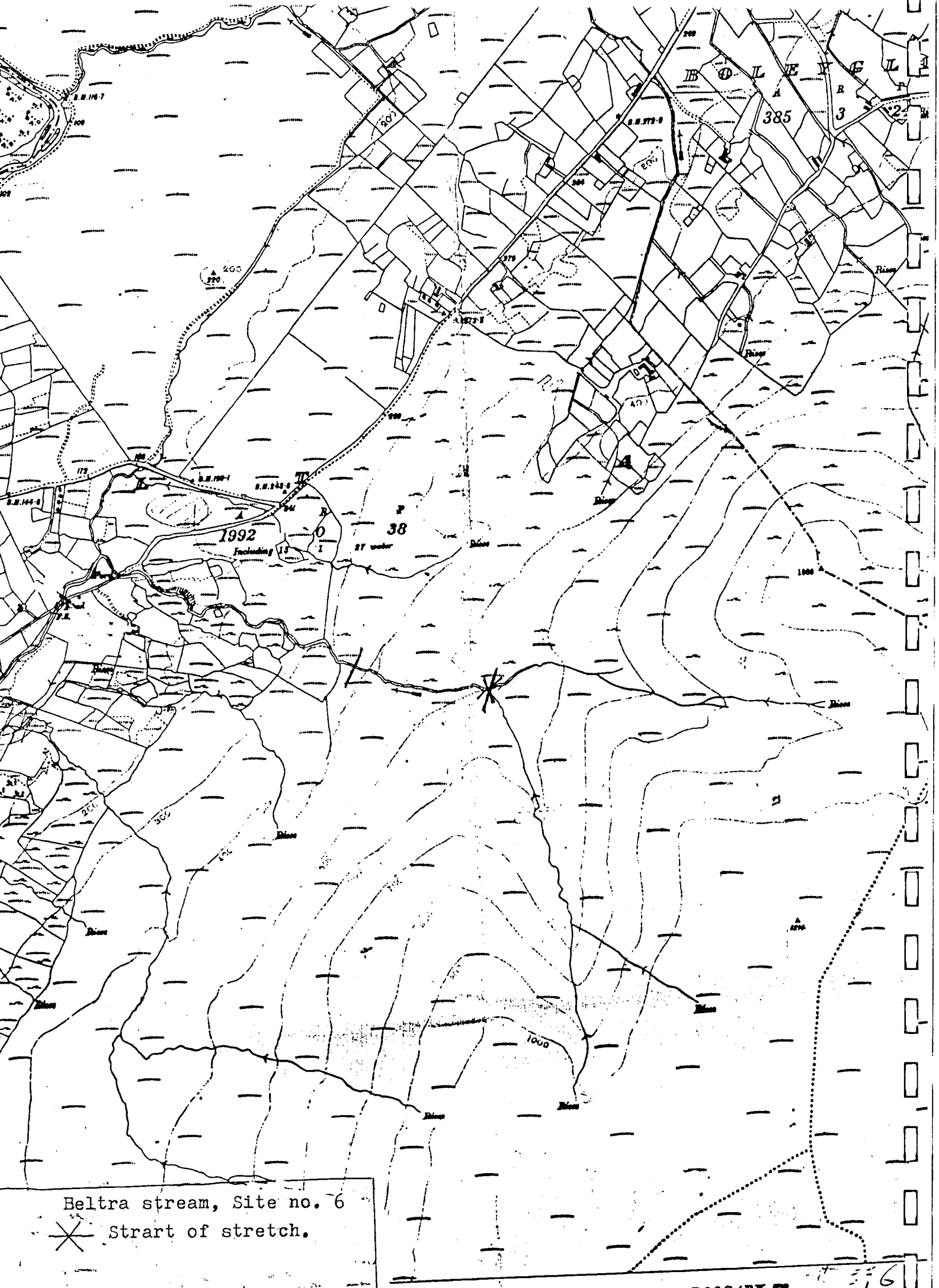
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Juncus bulbosus f. fluitans
Emerse vascular plant	<1	Ranunculus flammula
Submerse bryophyte	20	Scapania undulata
Emerse bryophyte	29	Scapania undulata
Submerse algae	5	Microspora amoena
Splash algae	<1	Microspora amoena

	Niche type	% Niche cover	Relevé no.	Classification
Bed 50%	1	42	26	Scapanietum undulatae
	9(waterfall)	5	36	- Rhynchostegietosum
	3A(shallow, below waterfall)		32	-
	3(pool)	2	30	-
	8	1	-	-
Bank 50%	6	5	132	Violon caninae
	9A(splash, waterfall)	25	35	-
	4	20	44	Pellietum epiphyllae

Site description and comments

First order stream appears from below peat and flows through steep valley. It consists of small waterfalls, riffles and short flat stretches. It cuts deeply into the peat. Soft orange deposits indicate the presence of iron in a few places. Above this site the stream flows under the peat or consists of large flush areas. One of the few catchments left in this area without afforestation. Of conservation interest.

Beltra stream, Site no. 5.
First order stream contributing water to Lough Beltra. Waterfall. Note large splash area.


BOLEY GL
385
1992
38
Beltra stream, Site no. 6
Strart of stretch.
DOOGARY TY

Name of river: Beltra stream Site no. 6

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 59
Grid ref: M 100 000
Sampling date: 26.7.85
Altitude: upland
Land use: rough grazing

Geology: Old red sandstone (3)
Soils: Peaty gleys (2)
Water body size: stream
Height banks: 0.40
Slope banks: 90°
Channel shading: none
Length of stretch: 250m

Physico-chemical information

Total-P	0.008	NH_4^+	0.0
Total dissolved-P	<0.0001	NO_3^-	0.02
Ortho-phosphate	0.0001	SO_4^{2-}	0.04
pH	6.65	Ca^{2+}	5.2
Conductivity	85	Mg^{2+}	1.4
Alkalinity	22.6	Na^+	8.4
Total hardness	43.0	K^+	0.22
Ca-hardness	31.2	Cl^-	14.7
Mn	0.05	Fe	0.3

Channel substrate	
Type	% Cover
Boulders	40
Rock	30
Bedrock	20
Stones	4
Gravel	3
Sand	3

Vegetation

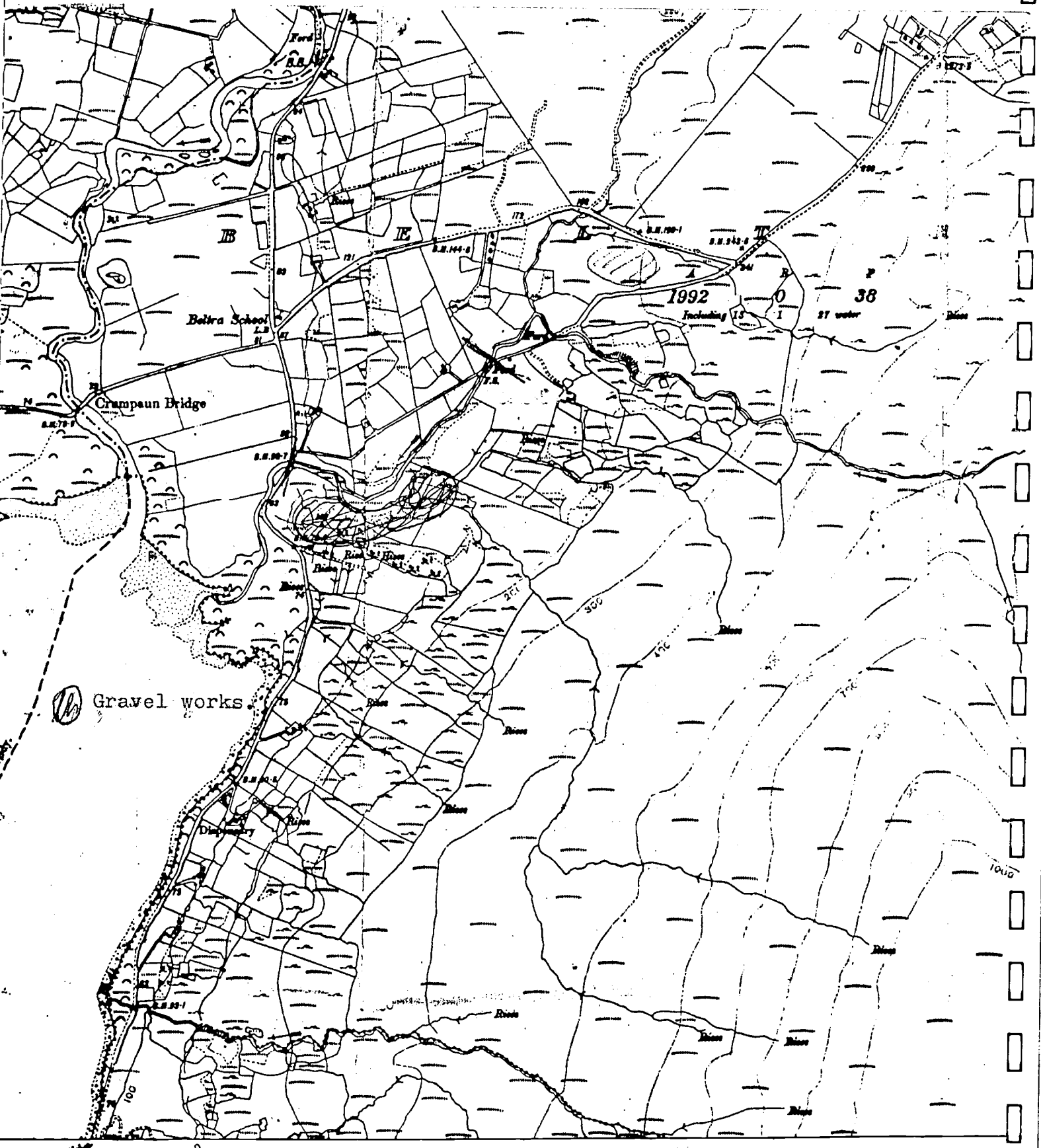
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Equisetum arvense
Emerse vascular plant	<1	Ranunculus flammula
submerse bryophyte	<1	Scapania undulata & Blindia acuta
Emerse bryophyte	12	Pellia epiphylla & Hyocomium armoricum
Submerse algae	8	Spyrogyra, Zygnema, Phormidium retzii
Splash algae	<1	Palmella stage

	Niche type	% Niche cover	Relevé no.	Classification
Bed 80%	2	60	24	Scapanietum undulatae Rhynchostegietosum
	3	10	-	-
	5	<1	45	-
	8	10	-	-
Bank 20%	4	18	45	Pellietum epiphyllae
	4A	<1	-	-
	6	2	-	-
	7	<1	130	-

Site description and comments

Upland stream with bouldery riffles and small pools, quite barren of vegetation. There is an appreciable amount of sand in the channel, presumably derived from erosion of the surrounding rock. The heathland is eroded down to the rock in various places and sheep tracks are sandy. Sand accumulates downstream of large boulders and coarser material is deposited further down from the boulder. In this manner an island gradates into gently sloping edge into a gravelbank going downstream. No forestry in the catchment. Of conservation interest, but obvious signs of overgrazing present upstream of site. This should be kept in check.

Keltra stream, Site no. 6.
General view of stream and surrounding heathland.



Revised in 1915. Levelled in 1894.

Beltra stream, Site no. 7

Start of stretch.

ASTICS AND SYMBOLS

Trigonometrical Station

Antiquities (Site of)

For other information see Characteristic Sheet

Name of river: Beltra stream Site no. 7

General information

County: Mayo
O.S. ½ inch sheet no. 6
C.S. 6 inch sheet no. 39
Grid ref: G 090 003
Sampling date: 24.7.85
Altitude: lowland
Land use: pasture, meadow, gravel works

Geology: Old red sandstone (3)
Soils: Peaty gleys (2)
Water body size: river
Height banks: 0.60m
Slope banks: 90°
Channel shading: heavy
Length of stretch: 500m

Physico-chemical information

Total-P	0.144	NH_4^+	0.01
Total dissolved-P	0.134	NO_3^-	0.04
Ortho-phosphate	0.0004	SO_4^{2-}	2.03
pH	6.5	Ca^{2+}	7.2
Conductivity	100	Mg^{2+}	1.6
Alkalinity	33.3	Na^+	8.3
Total hardness	42.9	K^+	2.1
Ca-hardness	31.2	Cl^-	27.3
Mn	0.03	Fe	0.3

Channel substrate

Type	% Cover
Rock	70
Gravel	15
Stones	10
Sand	5
Boulders	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Agrostis stolinifera, Equisetum arvense
Emerse vascular plant	<1	Tussilago farfara, Juncus articulatus
Submerse bryophyte	<1	Scapania undulata, Jungermannia atrovirens, Fissidens viridulus Rhynchostegium riparioides
Emerse bryophyte	6	Pellia epiphyla
Submerse algae	<1	Spirogyra, Phormidium retzii
Splash algae	<1	Cladophora glomerata, Ulothrix tenerrina

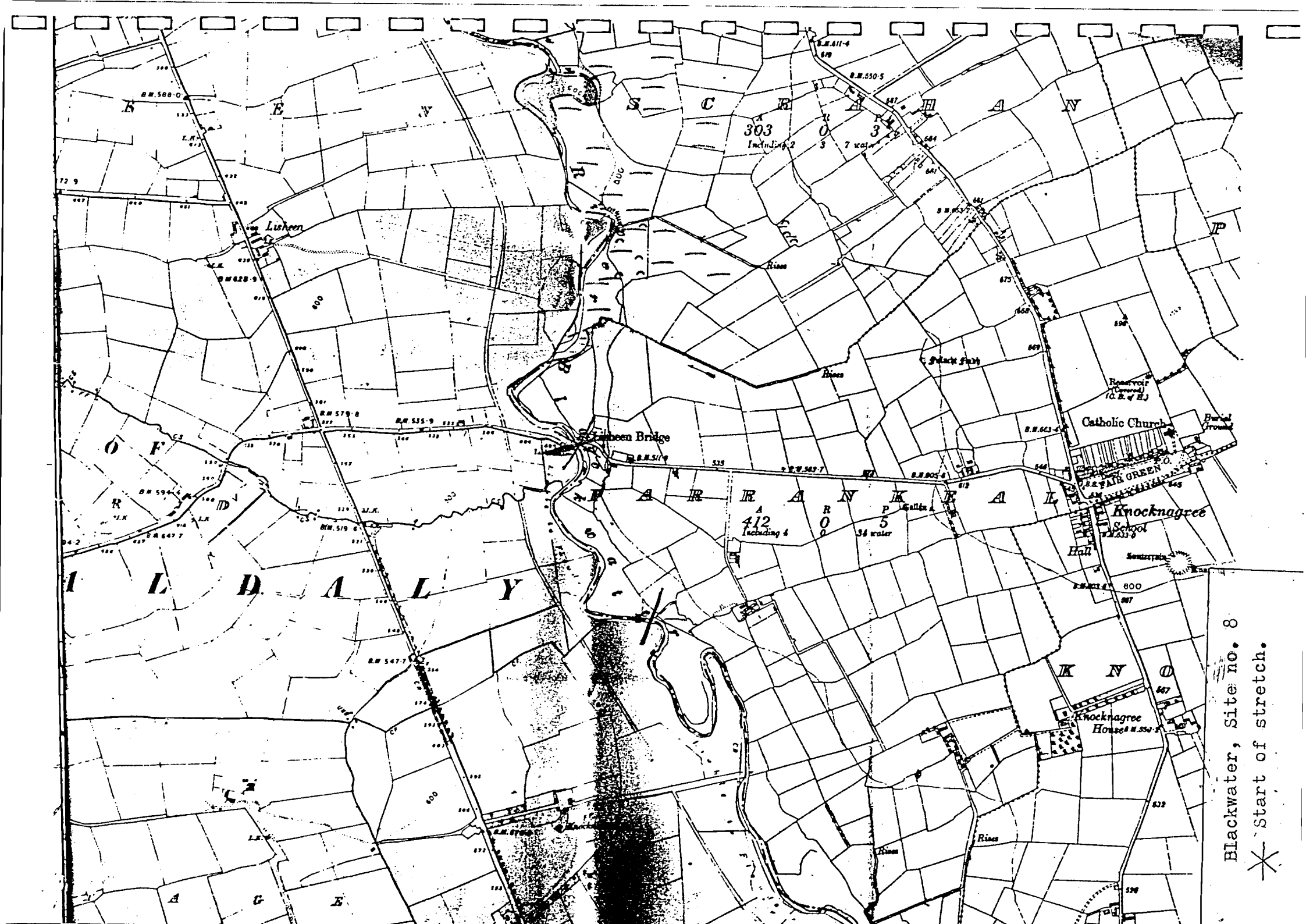
		Niche type	% Niche cover	Relevé no.	Classification
Bed	86%	2	80	23	Scapania undulatae Rhynchostegietosum
		5	6	115	Molinio-Arrhenatheretea
		8	<1	-	-
		7	<1	-	-

	Niche type	% Niche cover	Releve no.	Classification
Bank 14%	4	12	43	Pellietum epiphyllae Atrichetosum
	6	2	124	Calthion

Site description and comments

Wooded stream flowing into Lough Beltra. River bed community looks the same everywhere, no mossy riffles, slow silty areas or deep pools, all quite barren, with fast flow. A lot of sand and gravel accumulated in gravel banks and bank vegetation, green plant parts buried in at least 5 cm of sand, steep sides not affected. High Phosphorus levels in the water, confirmed by the unexpected presence of the alga Cladophora on the steep sides. Sand high Phosphorus and colour in the water possibly caused by washings in the gravelworks. Sand and other materials are transported into Lough Beltra. The barrenness of the streambed can be explained by the scouring effect of the sand during regular flash flooding. Apart from the effects of overgrazing and the resulting erosion, and the obvious influence of the gravel works on the lower part of the stream, this is an interesting fast flowing river system on sandstone with an unforested catchment.

Beltra stream, Site no. 7. Overall view of river.


Blackwater, Site no. 8
Start of stretch.
Lisheen
Lisheen Bridge
Catholic Church
Knocknagree School
Knocknagree House
FARRANKEALA
SCRAHAN
KEAN
OF
LDALY
KNO
AGE
303 A 0 R 3 P
412 A 0 R 5 P

Name of river: Blackwater Site no. 8

General information

County: Kerry/Cork
O.S. ½ inch sheet no. 21
O.S. 6 inch sheet no. Kerry 60, Cork 29
Grid ref: W 160 980
Sampling date: 29.5.85
Altitude: upland
Land use: pasture, meadow

Geology: Coal measures (4)
Soils: Gleys (4)
Water body size: river
Height banks: 1.30m
Slope banks: 90°
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.066	NH_4^+	0.065
Total dissolved-P	0.046	NO_3^-	1.63
Ortho-phosphate	0.045	SO_4^{2-}	4.4
pH	5.95	Ca^{2+}	3.9
Conductivity	100	Mg^{2+}	2.5
Alkalinity	25	Na^+	1.6
Total hardness	176	K^+	9.8
Ca-hardness	24	Cl^-	18.2

Channel substrate	
Type	% Cover
Rock	75
Sand	15
Stones	6
Gravel	4
Boulders	<1

Vegetation

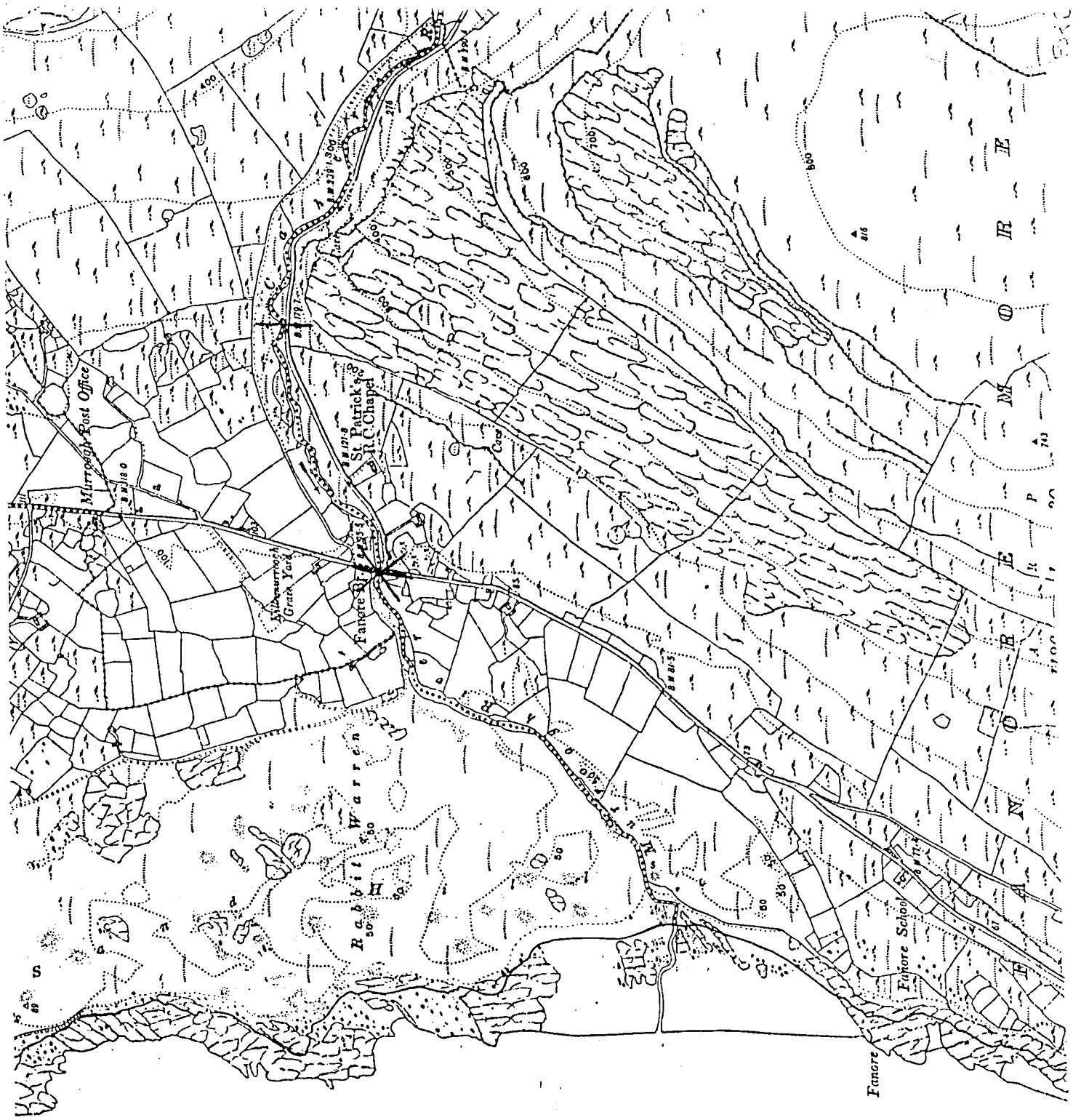
Plant type	% Plant cover	Dominant species
Submerse vascular plant	4	Ranunculus penicillata var. pen.
Floating leaf, rooted	<1	Potamogeton natans
Emerse vascular plant	<1	Iris, Sparganium erectum
Submerse bryophyte	<1	Amblystegium riparium
Emerse bryophyte	<1	- (moss sample missing)
Submerse algae	<1	Lemania
Splash algae	<1	Vaucheria

	Niche type	% Niche cover	Relevé no.	Classification
Bed 93%	1	60	70	Callitricho-Batrachion
	2	10	60	?
	3	20	-	-
	5	<1	104	-
	10	3	92	-
Bank 7%	4	7	-	

Site description and comments

Meandering channel with riffles, glides and deep pools. Vegetation sparse, banks steep. The high nitrate level is probably caused by agricultural run-off, and is not mopped up sufficiently by the plants. Of conservation interest with proper management.

Blackwater, between Ballydesmond and Rathmore.
Site no. 8. Pool with riffle in background.



9

Cahir, Site no. 9

Start of stretch.

Name of river: Cahir Site no. 9

General information

County: Clare
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 1
Grid ref: M 175 060
Sampling date: 26.8.81
Altitude: upland
Land use: rough grazing, woodland

Geology: Limestone (5)
Soils: Lithosols, shallow organic soils (6)
Water body size: stream
Height of banks: 0.40m
Slope of banks: various
Channel shading: heavy
Length of stretch: 500m

Physico-chemical information

				Channel substrate	
Total-P	0.003	NH_4^+	-	Type	% Cover
Total dissolved-P	-	NO_3^-	-	Boulders	30
Ortho-phosphate	0.002	SO_4^{2-}	-	Gravel	20
pH	8.1	Ca^{2+}	29.6	Rock	20
Conductivity	295	Mg^{2+}	7.05	Stones	10
Alkalinity	-	Na^+	5.95	Sand	10
Total hardness	-	K^+	0.31	Silt	10
Ca-hardness	79	Cl^-	4	Bedrock	<1

Vegetation

Plant type	% Plant cover	Dominant species
Vascular plant	30	Apium nodiflorum, Berula erecta
Bryophyte	70	Fontinalis antipyretica
Submerse algae	7	Hildenbrandia rivularis, Nostoc

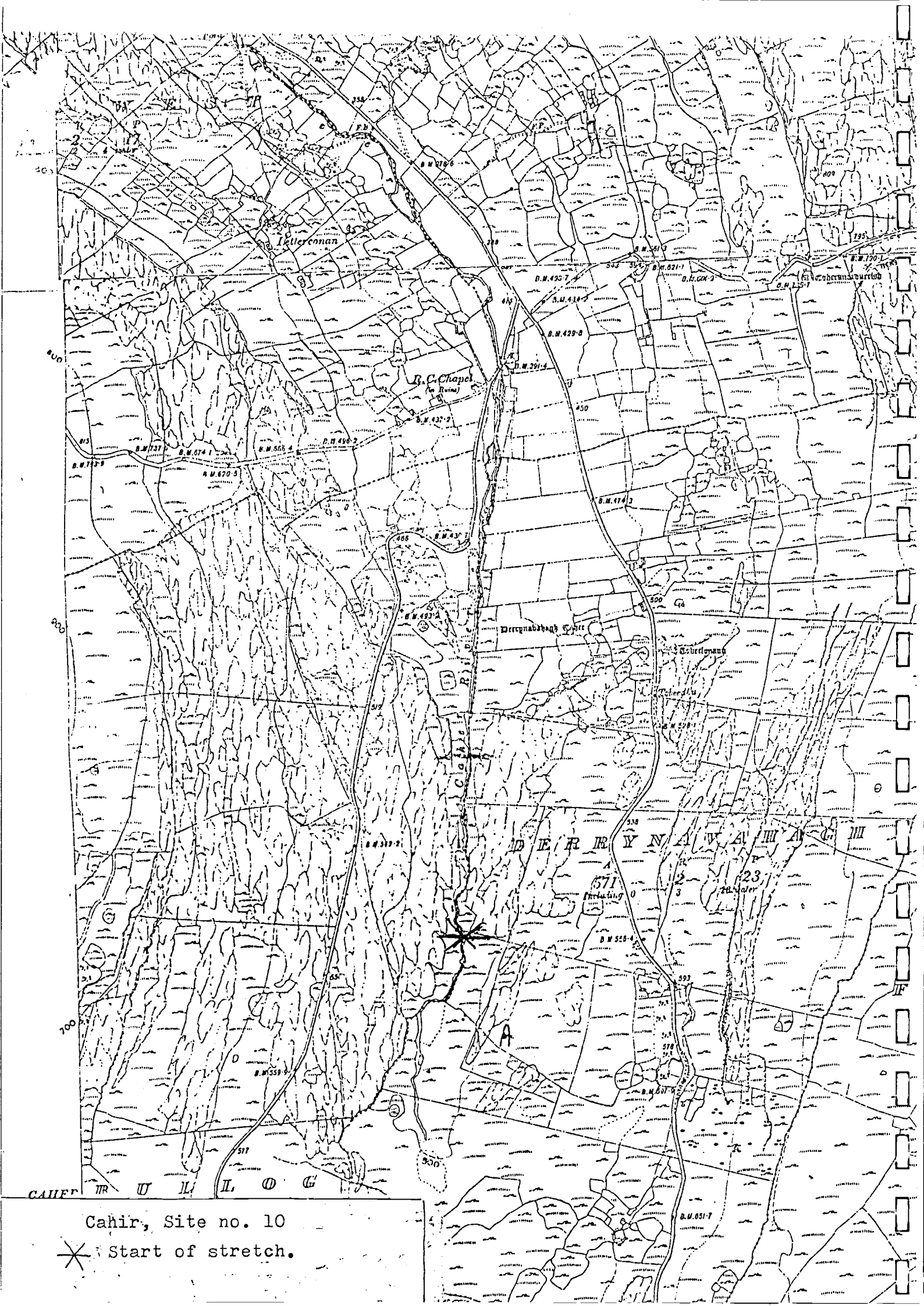
Classification: Stream bed community problably Glycerio-Sparganion x Apion nodiflori

Site description and comments

Shallow stony stream shaded by hazelscrub alternated with more open areas were Apium nodiflorum and Berula erecta are abundant. Calcarious algal crusts are common. Phalaris beds occur in still silty areas. Deep still pools contain large clumps of Callitriche and Apium nodiflorum Several springs (colder water) join the main channel.

This is part of the only major permanent overground river in the Burren. It is a unique calcarious stream, which is spring fed during dry spells. It is strongly recommended that the whole river system be conserved as a nature reserve. It is of major international importance.

Cahir river, Site no. 9. Overall view of unshaded section of channel. This is a site of major international importance.



Cahir, Site no. 10

Start of stretch.

Name of river: Cahir Site no. 10

General information

County: Clare
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 5
Grid ref: M 140 088
Sampling date: 27.8.81
Altitude: lowland
Land use: rough grazing

Geology: Limestone (5)
Soils: Lithosols, shallow organic soils (6
Water body size: river
Height banks: 0.30m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.003	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	0.002	SO_4^{2-}	-
pH	8.8	Ca^{2+}	24.35
Conductivity	283	Mg^{2+}	1.93
Alkalinity	-	Na^+	6.45
Total hardness	61	K^+	0.52
Ca-hardness	-	Cl^-	9.0

Channel substrate	
Type	% Cover
Bedrock	80
Boulders	10
Rock	4
Stones	3
Gravel	2
Silt	1

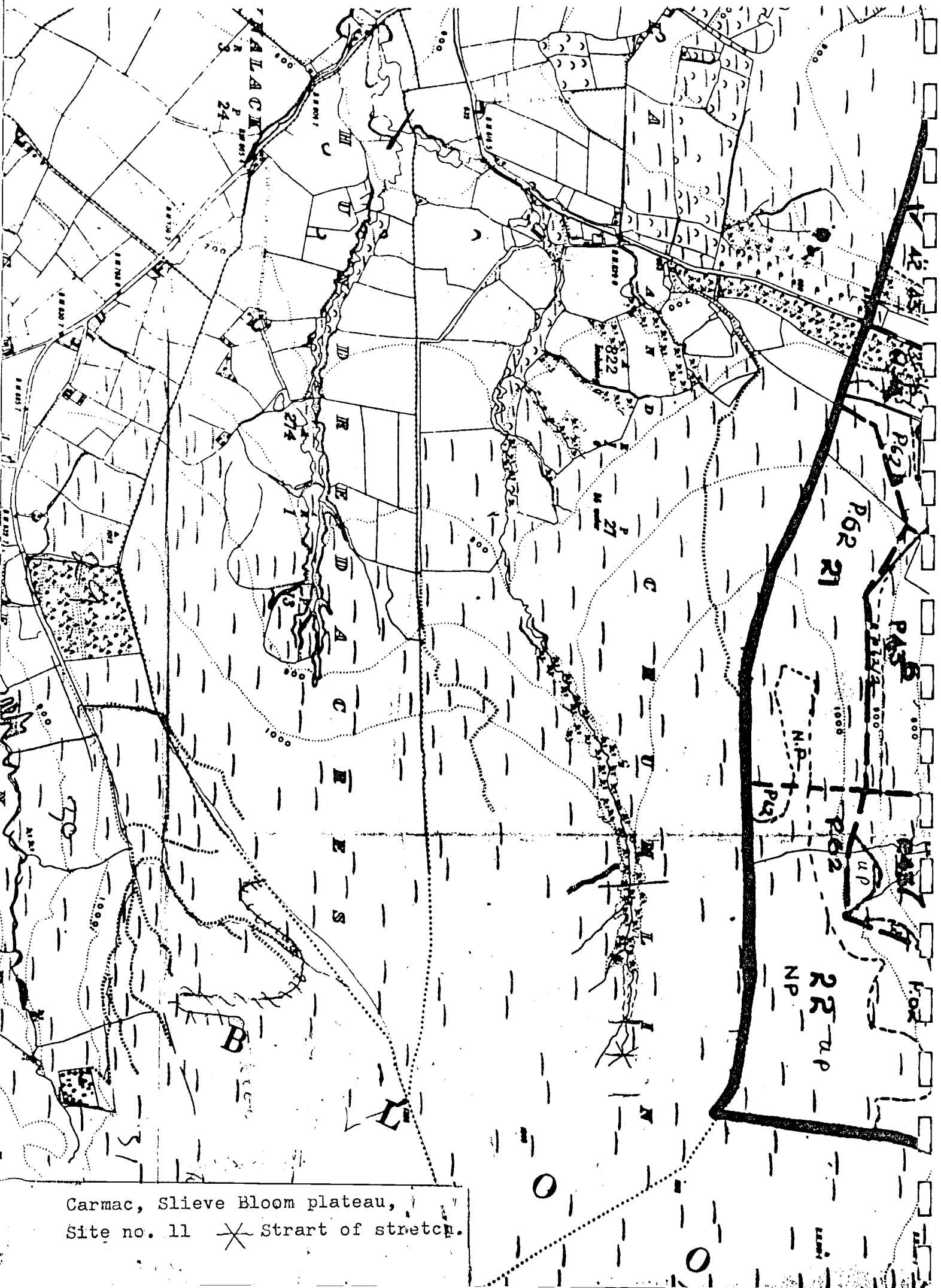
Vegetation

Plant type	% Plant cover	Dominant species
Emerse vascular plant	<1	Caltha palustris, Agrostis stolonifera
Bryophyte	20	Cratoneuron commutatum var. falcatum
Algae	90	Calcarious crust

Site description and comments

River bed consists of bedrock with small waterfalls over whole width of river covered in moss and calcarious crust. The calcified algal species include Cladophora, the seldom recorded red alga Bangia atropururea, the bleugreen algae Tolypothrix distorta var. penicillata, Phormidium calcicola, Scytonema mycchrous and Rivularia spp.. The following Charophyta were recorded: Chara vulgaris, Chara globularis and Nitella flexilis ag.. This is an unique calcarious spring fed river and should be conserved as a nature reserve. It is the only major overground river in the Burren and is of major international importance.

Cahir river, Site no. 10. River bed at very low flows. Tufa, the calcarious deposit thought to be mainly formed by the biological action of mosses and algae, is clearly seen on the waterfall in the middleground of the picture. This is a site of major international importance.



Carmac, Slieve Bloom plateau,
Site no. 11 ✕ Strart of stretch.

Name of river: Carmac, Slieve Bloom plateau Site no. 11

General information

County: Offaly
O.S. ½ inch sheet no. 15
O.S. 6 inch sheet no. 39
Grid ref: N 210 005
Sampling date: 17.5.84
Altitude: mountain
Land use: rough grazing

Geology: Sandstone (3)
Soils: Climatic peat (2)
Water body size: brook/stream
Height banks: 0.40m
Slope banks: 90°
Channel shading: none
Length of stretch: 60m

Physico-chemical information

Total-P	0.088	NH_4^+	-
Total dissolved-P	0.090	NO_3^-	0.005
Ortho-phosphate	0.025	SO_4^{2-}	-
pH	3.85	Ca^{2+}	0.0
Conductivity	69	Mg^{2+}	1.6
Alkalinity	11	Na^+	1.6
Total hardness	16	K^+	0.8
Ca-hardness	3.8	Cl^-	21.0

Channel shading

Type	% Cover
Peat	100

Vegetation

Plant type	% Plant cover	Dominant species
Emerse vascular plant	1	Eriophorum angustifolium
Submerse bryophyte	1	Campylopus pyriformis
Emerse bryophyte	2	Lophozia ventricosa
Submerse algae	90	Zygogonium ericetorum
Splash algae	<1	Ulothrix sp.

	Niche type	% Niche cover	Relevé no.	Classification
Bed 77%	1	73	137	Community of Zygogonium
	1A	3	-	-
	1B	1	138	Community of Zygogonium
Bank 23%	4	23	-	-

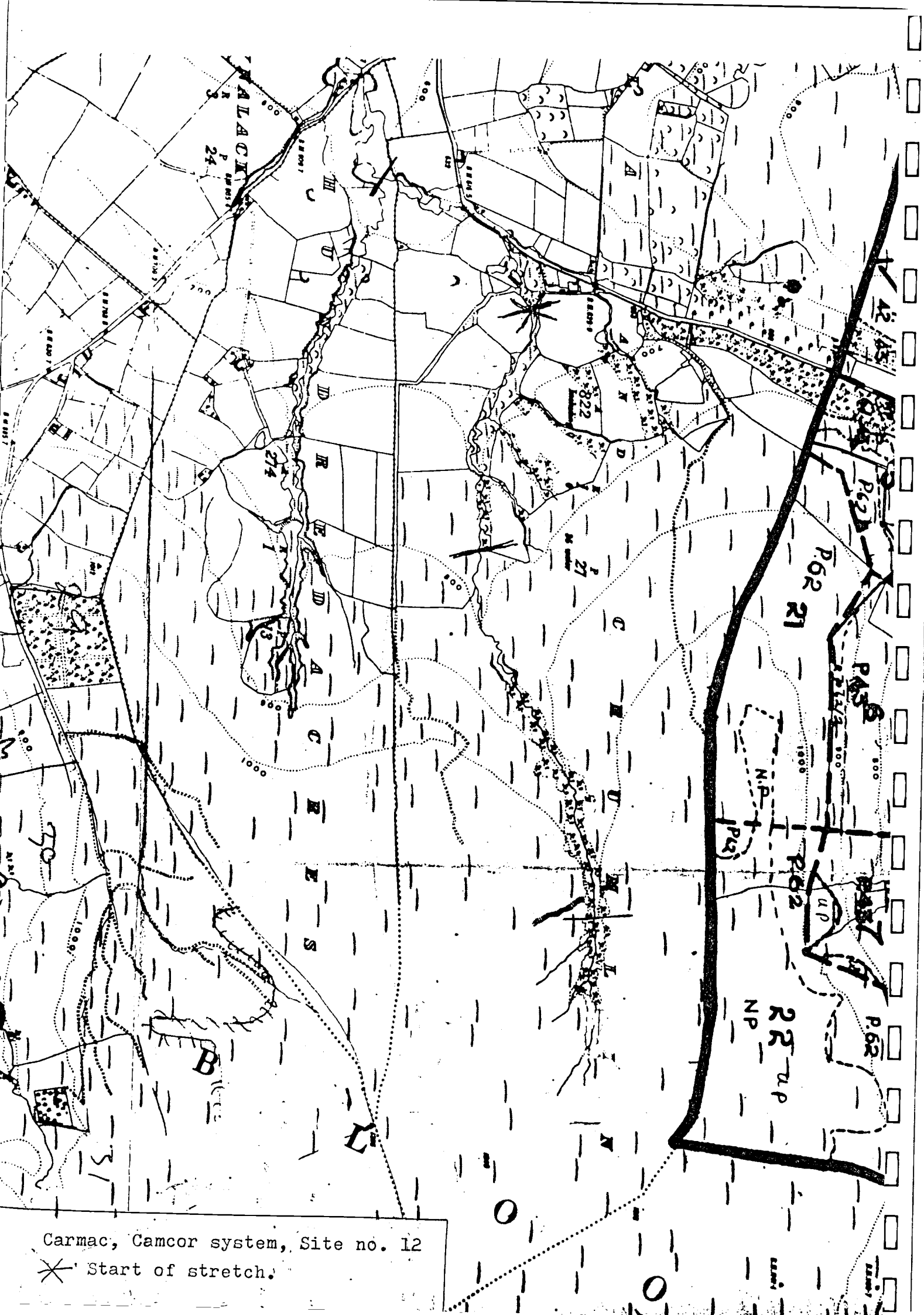
Site description and comments

Stream on blanket peat. This is an eroding channel. The erosion is probably caused by some forestry drains feeding water into the stream. Pools and riffles are formed into the peat, which will be eroded away

completely with time. Below the site the stream disappears under the peat to rise again as a proper stream on mineral substrate, bordered by trees. The headstream system proper is of conservation interest. The drains that cause the peat erosion should be blocked.

Camcor, Slieve Bloom plateau, Site no. 11. Erosion channel on blanket peat. Pool in forground. If erosion continues peat will erode to mineral ground.

Camcor headwater streams, Slieve Bloom plateau, below site 11. These streams are of conservation interest. Channel erosion is affecting the streams on peat above the wooded area, caused by forestry drains on the plateau.


Carmac, Camcor system, Site no. 12
Start of stretch.

Name of river: Carmac (Camcor system) Site no. 12

General information

County: Offaly
O.S. ½ inch sheet no. 15
O.S. 6 inch sheet no. 39
Grid ref: N 200 000
Sampling date: 16.5.84
Altitude: upland
Land use: pasture, woodland

Geology: Sandstone (3)
Soils: Peaty podzols (2)
Water body size: stream
Height banks: 1.20m
Slope banks: 90°
Channel shading: medium
Length of stretch: 500m

Physico-chemical information

Total-P	0.038
Total dissolved-P	0.008
Ortho-phosphate	0.011
pH	8.0
Conductivity	220
Alkalinity	79
Total hardness	121.4
Ca-hardness	87

NH_4^+	-
NO_3^-	0.053
SO_4^{2-}	-
Ca^{2+}	23.0
Mg^{2+}	4.0
Na^+	7.0
K^+	0.49
Cl^-	6.0

Channel substrate	
Type	% Cover
Stones	50
Rock	20
Gravel	10
Boulders	10
Sand	5
Bedrock	5
Silt	<1

Vegetation

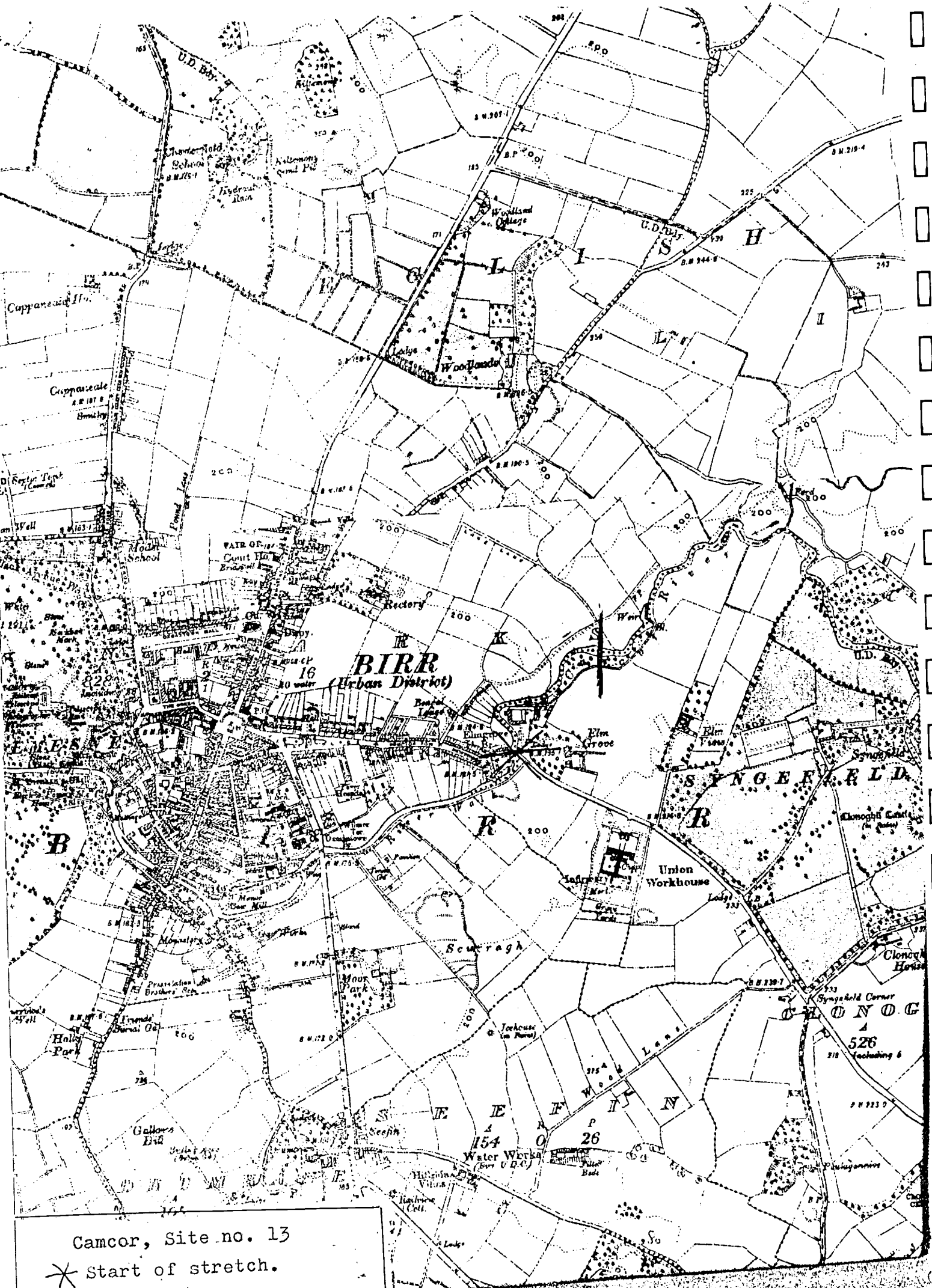
Plant type	% Plant cover	Dominant species
Emerse vascular plant	<1	Ranunculus repens
Submerse bryophyte	2	Rhynchostegium riparioides
Emerse bryophyte	8	Mixture
Submerse algae	<1	Lemania, Cladophora
Splash algae	<1	Ulothrix moniliforme

	Niche type	% Niche cover	Relevé no.	Classification
Bed 90%	1	87	-	probably Cladophora community
	2		-	
	3	3	-	-
	8	<1	-	-
	12	<1	119	-
Bank 10%	4	10	41	Conocephaletum
	6	<1	120	-

Site description and comments

Wooded stream cutting through rough pasture land. No forestry in catchment. Vegetation in stream sparse. Adjacent wet woodland of conservation interest.

Carmac river, Camcor system, Site no. 12. General view of stream. Note a hose for local water supply in stream bed. Headwaters above this site and the surrounding woodland are of conservation interest.



Camcor, Site no. 13

✳ Start of stretch.

Name of river: Camcor

Site no. 13

General information

County: Offaly
O.S. ½ inch sheet no. 15
O.S. 6 inch sheet no. 35
Grid ref: N 065 045
Sampling date: 18.5.84
Altitude: lowland
Land use: pasture

Geology: Limestone (5)
Soils: Grey brown podzolics (3)
Water body size: river
Height banks: 0.50-2.00m
Slope banks: 90°
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Water not analysed.

Channel substrate

Type	% Cover
Rock	45
Stones	45
Sand	8
Gravel	2
Boulders	1
Bedrock	1
Silt	1

Vegetation

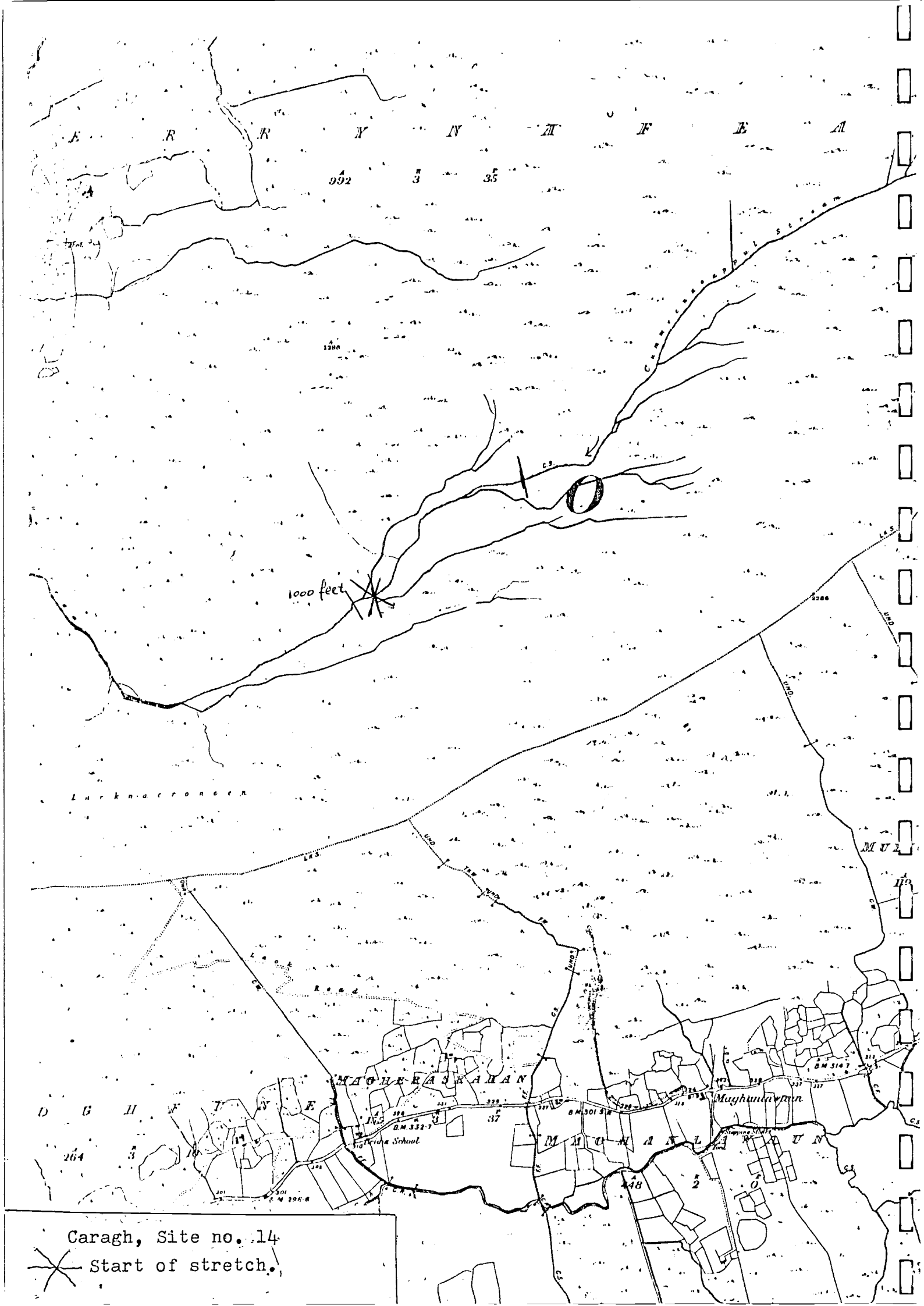
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Mixture
Emerse vascular plant	<1	Mixture
Submerse bryophyte	30	Rhynchostegium riparioides
Emerse bryophyte	1	Mixture
Submerse algae	40	Diatoma vulgare, Cladophora
Splash algae	<1	-

	Niche type	% Niche cover	Relevé no.	Classification
Bed 99%	1	99	49	Cladophora community
	5	<1	-	-
	8	<1	109,110	-
	14	<1	-	-
Bank 1%	4	1	-	-

Site description and comments

Slightly enriched steepsided river channel. With good management of conservation interest, tufa present.

Camcor river, just upstream of Birr, Site no. 13.
General view of river.


1000 feet
Caragh, Site no. 14
Start of stretch.

Name of river: Caragh Site no. 14

General information

County: Kerry
O.S. ½ inch sheet no. 20
O.S. 6 inch sheet no. 72
Grid ref: V 780 825
Sampling date: 30.7.81
Altitude: mountain
Land use: rough grazing

Geology: Old red sandstone (3)
Soils: Climatic peat (2)
Water body size: stream
Height banks: 0-2m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	-	SO_4^{2-}	-
pH	~7.5	Ca^{2+}	0.85
Conductivity	44	Mg^{2+}	0.84
Alkalinity	-	Na^+	3.65
Total hardness	-	K^+	0.11
Ca- hardness	17	Cl^-	7

Channel substrate	
Type	% Cover
Boulders	50
Rock	20
Stones	20
Gravel	9
Bedrock	1

Vegetation

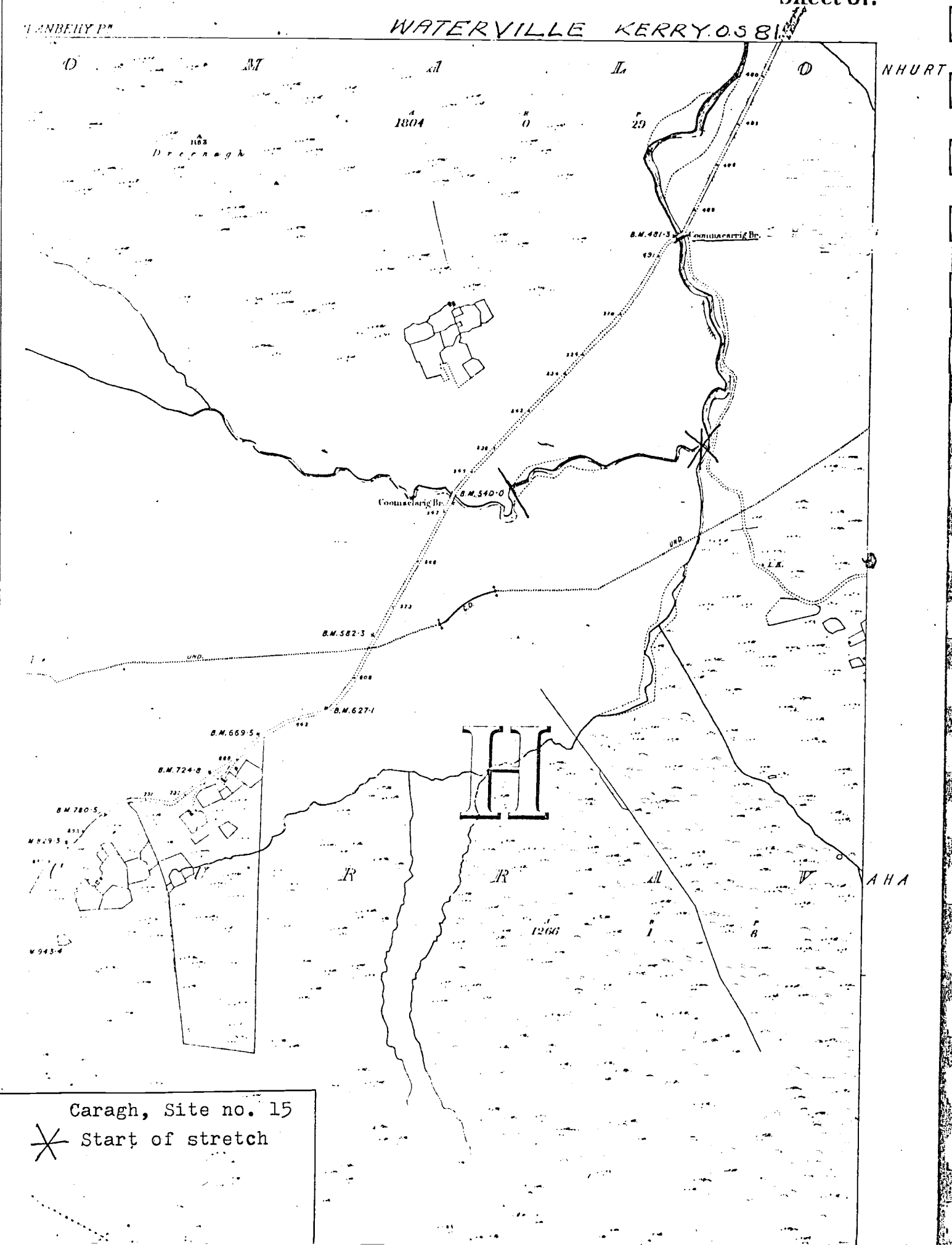
Plant type	% Plant cover	Dominant species
Vascular plants	<1	Potentilla erecta
Submerse bryophyte	5	Scapania undulata
Emerse bryophyte	<1	Pellia epiphyla
Algae	25	Spirogyra, Lemania

Classification: Stream bed community - Scapanietum undulatae JUNCETOSUM BULB.
Community of steep sides - Pellietum epiphyllae, prob. Scap.

Site description and comments

First order mountain stream. No forestry in catchment. Of conservation interest.

Sheet 81.



Caragh, Site no. 15

Start of stretch

Name of river: Caragh Site no: 15

General information

County: Kerry
O.S. ¼ inch sheet no. 20
O.S. 6 inch sheet no. 81
Grid ref: V 687 803
Sampling date: 30.7.81
Altitude: upland
Land use: rough grazing

Geology: Old red sandstone (3)
Soils: Climatic peat (2)
Waterbody size: stream
Height banks: 0-1m
Slope banks: various
Channel shading: none
Lenght of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	-	SO_4^{2-}	-
pH	7.3	Ca^{2+}	3.45
Conductivity	83	Mg^{2+}	1.21
Alkalinity	-	Na^+	7.45
Total hardness	-	K^+	0.14
Ca-hardness	6	Cl^-	13

Channel substrate	
Type	% Cover
Stones	90
Gravel	5
Rock	5
Silt	<1
Sand	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Callitriche
Submerse bryophyte	<1	Scapania undulata
Emerse bryophyte	<1	Pellia epiphyla
Submerse algae	100	Spirogyra, Mougeotia, Oedogonium

Classification: Stream bed community - Scapanietum undulatae JUNCETUM BUCB.
Community of steep sides - Pellietum undulatae prob. Scap.

Site description and comments

Meandering stream, algae covered in red iron deposit from iron flushes flowing into stream. No forestry in catchment. Of conservation interest.

Caragh, Site no. 16

Start of stretch.

Name of river: Caragh Site no. 16

General information

County: Kerry
O.S. ½ inch sheet no. 20
O.S. 6 inch sheet no. 72
Grid ref: V 713 865
Sampling date: 31.7.81
Altitude: lowland
Land use: woodland, forestry

Geology: Old red sandstone (3)
Soils: Peaty podzols, lithosols (2)
Water body size: river
Height banks: 0-1m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	-	SO_4^{2-}	-
pH	7.5	Ca^{2+}	3.50
Conductivity	73	Mg^{2+}	1.12
Alkalinity	-	Na^+	5.70
Total hardness	-	K^+	0.19
Ca-hardness	6	Cl^-	8

Channel substrate	
Type	% Cover
Boulders	70
Rock	15
Bedrock	10
Stones	3
Silt	1
Sand	1
Gravel	<1

Vegetation

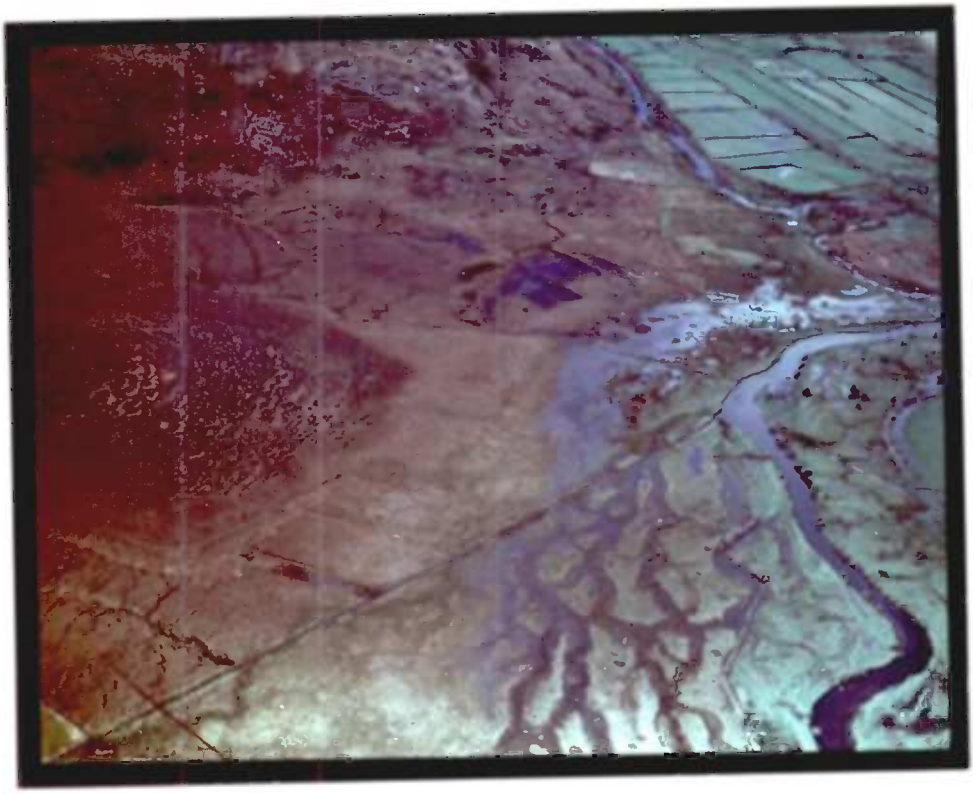
Plant type	% Plant cover	Dominant species
Vascular plant	1	Myriophyllum alterniflorum & Oenanthe croccata
Submerse bryophyte	50	Scapania undulata
Algae	90	Stigonema, Oedogonium, Phormidium retzii

Classification: River bed community - Scapanietum undulatae JUNCETUM BULB.

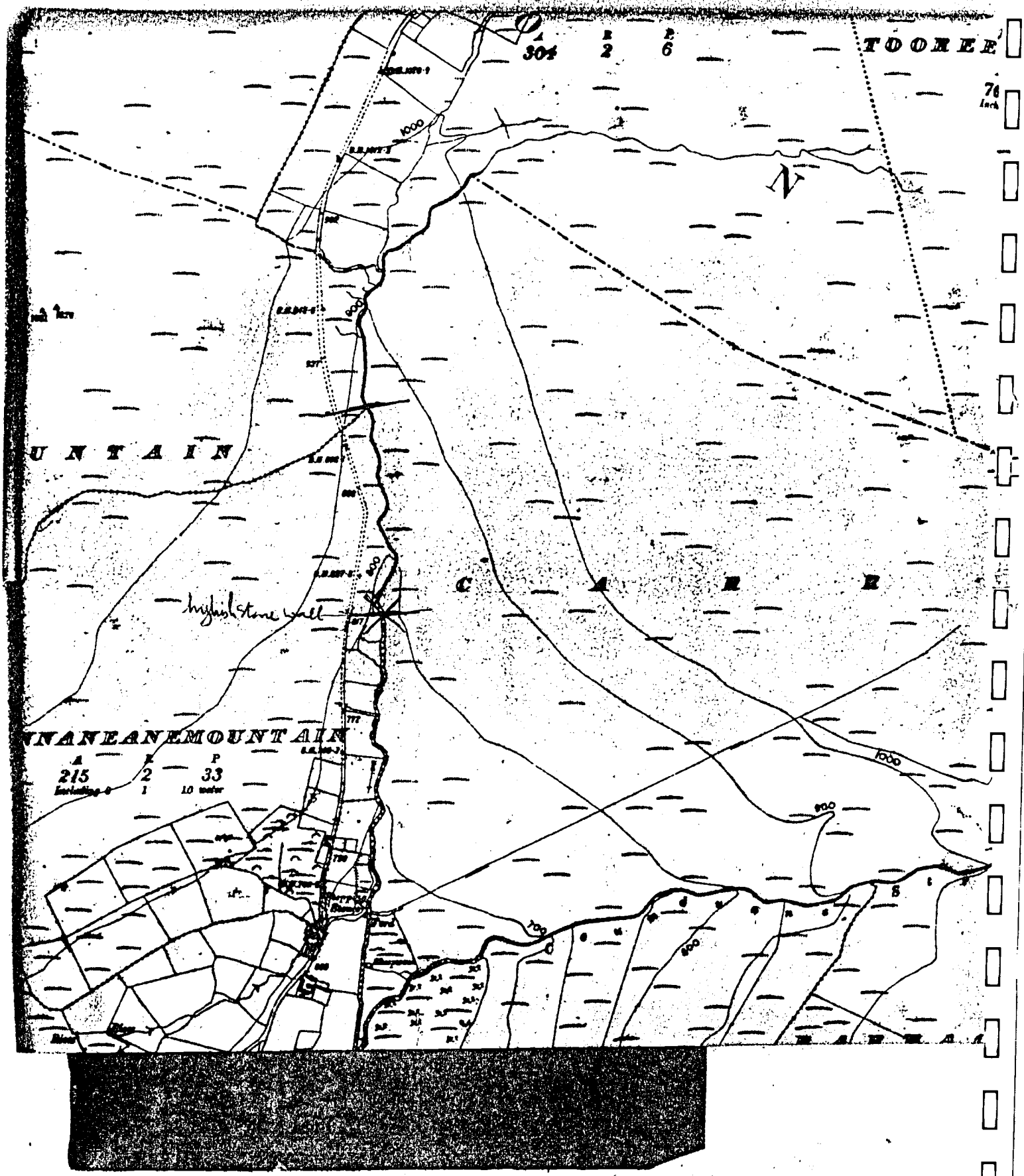
Site description and comments

River with series of large mossy cascades, glides and deep pools. The whole Caragh river system is of conservation interest, it is free of pollution, there are no towns or villages in the catchment. Any industrial, urban, agricultural or forestry development should be discouraged in the catchment. For further information see Heuff & Horgan Caragh River, in: The Ecology of European rivers, Blackwell Scientific Publ. The Caragh is an unique soft water system of international importance, and should be managed in order to preserve its conservation interest.

Caragh river, Site no. 16. River bed with mossy boulders.



Caragh river in flood. Note the many overflow channels, typical of an undrained river. This is a system of international importance.



Colligan, Site no. 17
Start of stretch.

Name of river: Colligan Site no. 17

General information

County: Waterford
O.S. ½ inch sheet no. 22
O.S. 6 inch sheet no. 14
Grid ref: S 242 075
Sampling date: 20.6.84
Altitude: upland
Land use: rough grazing

Geology: Sandstone (3)
Soils: reclaimed podzols (5)
Water body size: stream
Height banks: 0.20m
Slope banks: various
Channel shading: none
Lenght of stretch: 500m

Physico-chemical information

Total-P	0.008	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	0.038
Ortho-phosphate	0.018	SO_4^{2-}	-
pH	7.5	Ca^{2+}	3.0
Conductivity	75	Mg^{2+}	2.4
Alkalinity	17	Na^+	5.03
Total hardness	38	K^+	0.19
Ca-hardness	17	Cl^-	12

Channel substrate

Type	% Cover
Boulders	50
Rock	45
Stones	3
Gravel	2
Sand	<1

Vegetation

Plant type	% Plant cover	Dominant species
Emerse vascular plant	10	Anthoxanthum odoratum
Submerse bryophyte	50	Fontinalis squamosa
Emerse bryophyte	<1	Polytrichum commune, Sphagnum palustre
Submerse algae	25	Diatoms
Splash algae	<1	Filamentous greens

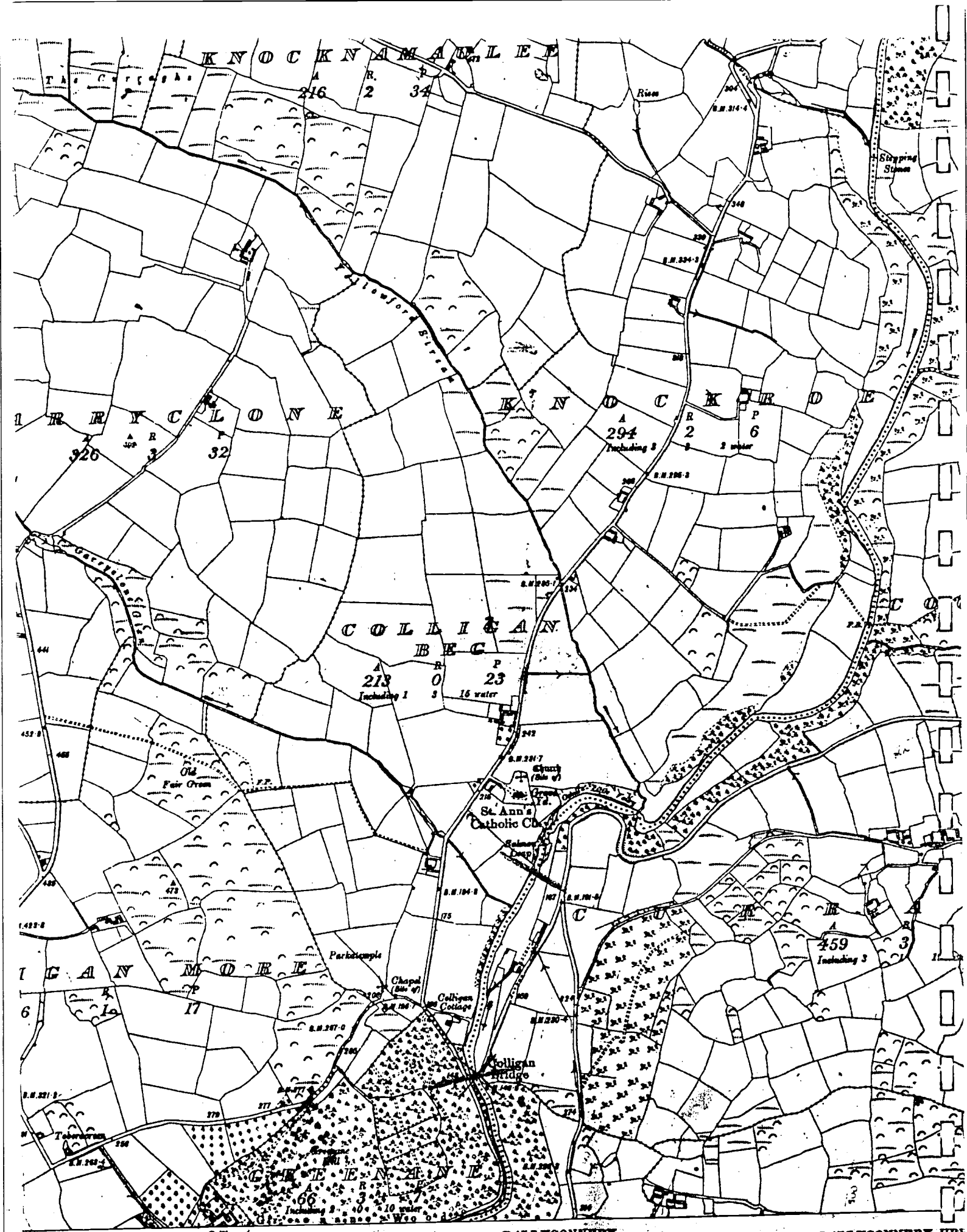
	Niche type	% Niche cover	Relevé no.	Classification
Bed 90%	1	70	33	Scapanietum undulatae Rhynchostegietosum
	3	<1	40	-
	8(incl. 8A)	20	127	-
Bank 10%	6	10	-	-
	4	<1	51,52	Pellietum epiphyllae Scapanietosum

Site description and comments

Mossy upland headwater stream, banks are sandy and mostly gently sloping,

with species of acid grassland. No habitation or forestry upstream, high grazing pressure. Of interest for conservation.

Colligan, Site no. 17. General view of stream. Note the lack of steep sides and the V-shaped valley typical of mountain and upland streams.



Colligan, Site no. 18

Start of stretch

Name of river: Colligan Site no.18

General information

County: waterford
O.S. ½ inch sheet no. 22
O.S. 6 inch sheet no. 22
Grid ref: X 220 977
Sampling date: 19.6.84
Altitude:lowland
Land use: aminity, forestry

Geology: Sandstone (3)
Soils: Brown podzolics (5)
Water body size: river
Height banks: 1m
Slope banks: 90°
Channel shading: light
Length of stretch: 500m

Physico-chemical information

	Upstream of sewage	Downstream fungus		Upstream of sewage	Downstream fungus
Total-P	0.045	0.065	NH_4^+	-	-
Total dissolved-P	0.028	0.033	NO_3^-	0.194	0.938
Ortho-phosphate	0.028	0.020	SO_4^{2-}	-	-
pH	7.05	7.55	Ca^{2+}	36.0	38.0
Conductivity	130	-	Mg^{2+}	3.0	3.2
Alkalinity	36	27	Na^+	6.56	6.66
Total hardness	34	34	K^+	1.15	1.18
Ca-hardness	21	23	Cl^-	12	10

Channel substrate

Type	% Cover
Rock	60
Bedrock	30
Boulders	7
Stones	3
Gravel	<1
Sand	<1

Vegetation

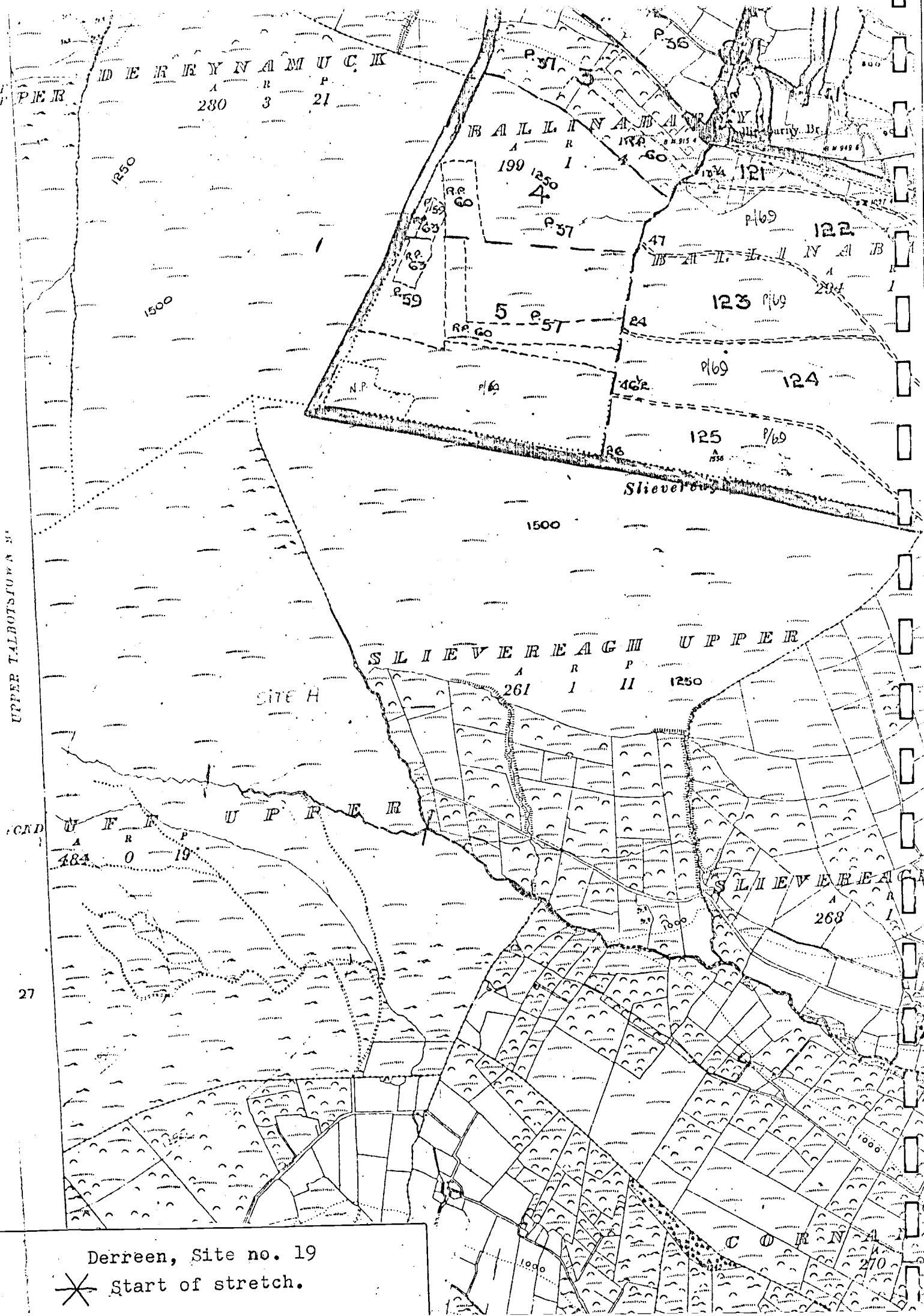
Plant type	% Plant cover	Dominant species
Submerse vascular plant	20	Ranunculus penicillata var. pen.
Floating leaf, rooted	<1	Ranunculus penicillata var. pen.
Emerse vascular plant	3	Oenanthe croccata
Submerse bryophyte	6	Rhynchostegium riparioides
Emerse bryophyte	4	Rhynchostegium riparioides
Submerse algae	1	Oscillatoria
Splash algae	<1	-
Others	25	Sewage fungus (mostly bacteria)

	Niche type	% Niche cover	Releve no.	Classification
Bed 97.5%	1,2	65	72	Callitricho-Batrachion
	2A	25	67	Callitricho-Batrachion
	3	5	-	-
	10	3	-	Community of Oenanthe croccata
Bank 2.5%	4	2	22	Conocephaletum
	6	0.5	141	-

Site description and comments

Strech consists of an area with rapids, pools and bedrock followed by shallow areas of riffles and glides. About half the stretch is infected by sewage fungus, caused by silage effluent. The sewage fungus covers everything over half the width of the channel. Note the high nitrate cont nt of the water. This type of pollution could be prevented and is an health hazard for the aminity use of the river and can cause fish kills. Otherwise this is a nice stretch of river, quite similar to the Argideen, Co. Waterford.

Colligan, Site no. 18. Overall view of shallow stretch of the river.


DERRYNAMUCK
A R P
280 3 21
BALLINABARNY
A R P
199 1 4
SLIEVEREAGH UPPER
A R P
261 1 11
SLIEVEREAGH
A R P
268 1
CORN
270
Site H
Derreen, Site no. 19
Start of stretch.

Name of river: Derreen Site no. 19

General information

County: Wicklow
O.S. ½ inch sheet no. 16
O.S. 6 inch sheet no. 28
Grid ref: S 970 880
Sampling date: 9.9.81
Altitude: mountain
Land use: roug grazing

Geology: Granite (1)
Soils: Acid brown earths (5)
Water body size: brook
Height banks: 0.20-1m
Slope banks: various
Channel shading: madium
Lenght of stretch: 500m

Physico-chemical information

pH	7.6
Conductivity	46

Channel substrate

Type	% Cover
Rock	48
Stones	25
Gravel	15
Boulders	10
Bedrock	1
Sand	1

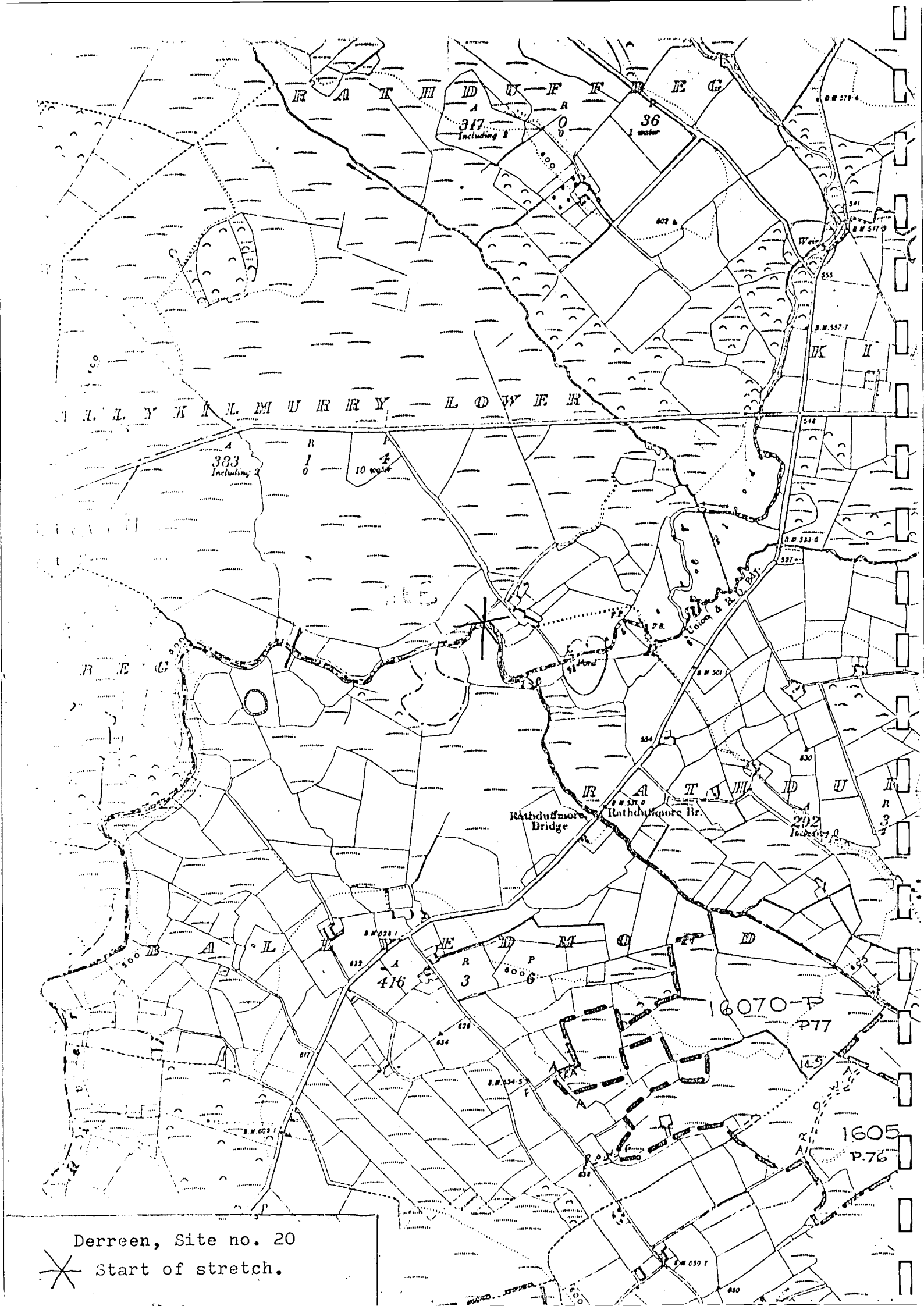
Vegetation

Plant type	% Plant cover	Dominant species
Bryophyte	40	probably Scapania undulata
Algae	80	Filamentous greens

Classification: Stream bed community is probably Scapanietum undulatae. Community of steep sides is probably Pellietum epiphyllae Scapanietosum.

Site description and comments

Head water stream with cascades, riffles and some small deep pools. Banks are eroding, undercut or rocky.



Derreen, Site no. 20

Start of stretch.

Name of river: Derreen Site no. 20

General information

County: Wicklow/Carlow
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. Wicklow 33
Carlow 5
Grid ref: S 993 831
Sampling date: 8.9.81
Altitude: upland
Land use: rough grazing

Geology: Granite (1)
Soils: Acid brown earths (5)
Water body size: river
Height of banks: 2m
Slope of banks: 90°
Channel shading: none
Length of stretch: 500m

Physico-chemical information

pH	7.9
Conductivity	56

Channel substrate

Type	% Cover
Gravel	30
Stones	30
Rock	30
Sand	8
Boulders	1
Silt	1

Vegetation

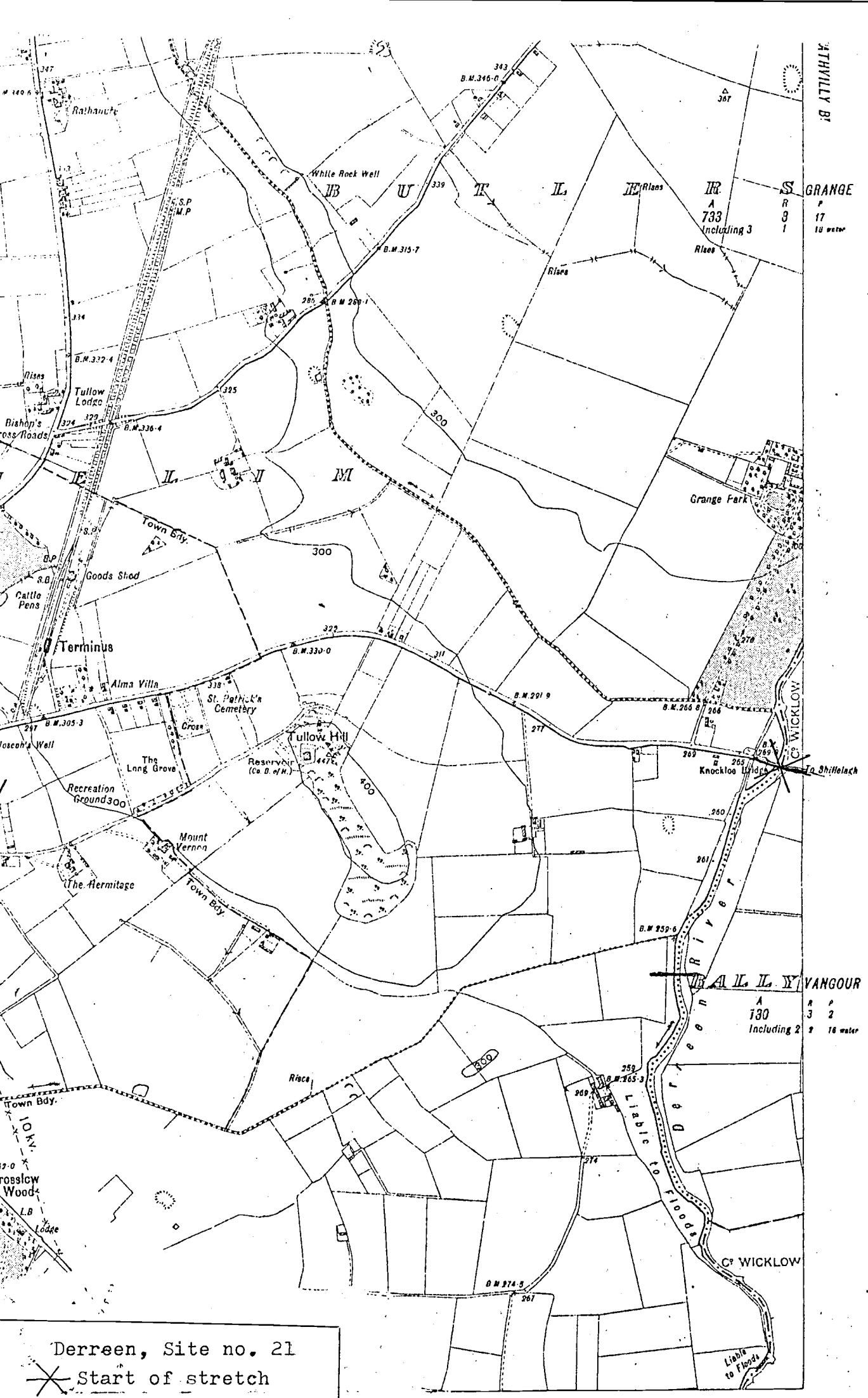
Plant type	% Plant cover	Dominant species
Submerse vascular plant		Callitriche obtuseangula and
Floating leaf, rooted	20	Ranunculus penicillata var. pen.
Floating leaf, free		Lemna minor
Emerse vascular plant		Sparganium erectum ag., Phalaris Iris, Agrostis stolonifera
Bryophyte	60	Fontinalis squamosa, Fissidens viridulus
Algae	5	Palmella stage, Diatoms and Phormidium retzii

Classification: Stream bed community is probably Callitricho-Batrachion, also elements of Scapanietum undulatae.

Site description and comments

Shallow river, of conservation interest.

Derreen, Site no. 20. Overall view of channel.


Derreen, Site no. 21
Start of stretch

Name of river: Derreen Site no. 21

General information

County: Carlow
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. 8
Grid ref: S 873 733
Sampling date: 7.9.81
Altitude: lowland
Land use: pasture, tillage

Geology: Granite (1)
Soils: Acid brown earths (5)
Water body size: river
Height banks: 1m
Slope banks: 90°
Channel shading: light
Length of strech: 500m

Physico-chemical information

pH 8.1
Conductivity 250

Channel substrate

Type	% Cover
Gravel	52
Sand	20
Stones	15
Rock	9
Silt	3
Boulders	1

Vegetation

Plant type	% Plant cover	Dominant species
Vascular plant	15	Ranunculus penicillata var. pen and Callitriche obtuseangula
Bryophyte	15	Amblystegium riparium, Fontinalis squamosa
Algae	10	Cladophora, Hildenbrandia rivularis and Melosira

Classification: Stream bed community is Callitricho-Batrachion.

Sit description and comments

Shallow steepsided river, probably enriched with nutrients (pig slurry?). Gravel banks with macrophytes present. Enrichment decreases the conservation interest and should be prevented.

Derreen river, Site no. 21. Overall view of channel.


St. Bridget's Well
Reservoir (Covered)
St. Finoo's Church
Grave Yard
Methodist Chapel
Burial Ground
Grave Yard
R.C.Church
Sch.
Ponnybrook Bridge
Presbytery
Dispensary
Clonegall
Moyacomb
Watch House Village
Huntington Castle
HUNTINGTON
Weir
Electric Power Ho.
Loose Ho.
Rivers
ASKA BRIDGE
Union & R.D. Maj.
Tipping Stones
Derry, Site no. 22
Start of atretch.

Name of river: Derry Site no. 22

General information

County: Carlow/Wexford
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. Carlow 18
Wexford 4
Grid ref: S 920 610
Sampling date: 21.6.84
Altitude: lowland
Land use: pasture, tillage

Geology: Ordovician (6)
Soils: Acid brown earths (5)
Water body size: river
Heigth banks: 1m
Slope banks: 90°
Channel shading: none
Length of strech: 500m

Physico-chemical information

Total-P	0.090	NH_4^+	-
Total dissolved-P	0.053	NO_3^-	3.37(!)
Ortho-phcsphate	0.075	SO_4^{2-}	-
pH	7.6	Ca^{2+}	9.6
Conductivity	185	Mg^{2+}	4.8
Alkalinity	47	Na^+	10.42
Total hardness	52	K^+	1.68
Ca-hardness	31	Cl^-	18

Channel substrate	
Type	% Cover
Sand	60
Rock	24
Gravel	10
Silt	5
Stones	1
Boulders	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	10	Ranunculus penicillata var. pen.
Floating leaf, rooted	50	Ranunculus penicillata var. pen.
Emerse vascular plant	15	Glyceria fluitans, Phalaris
Submerse bryophyte	15	Fontinalis antipyretica, F. squamosa
Emerse bryophyte	1	Mixture
Submerse algae	1	Chaemaesiphon, Oedogonium

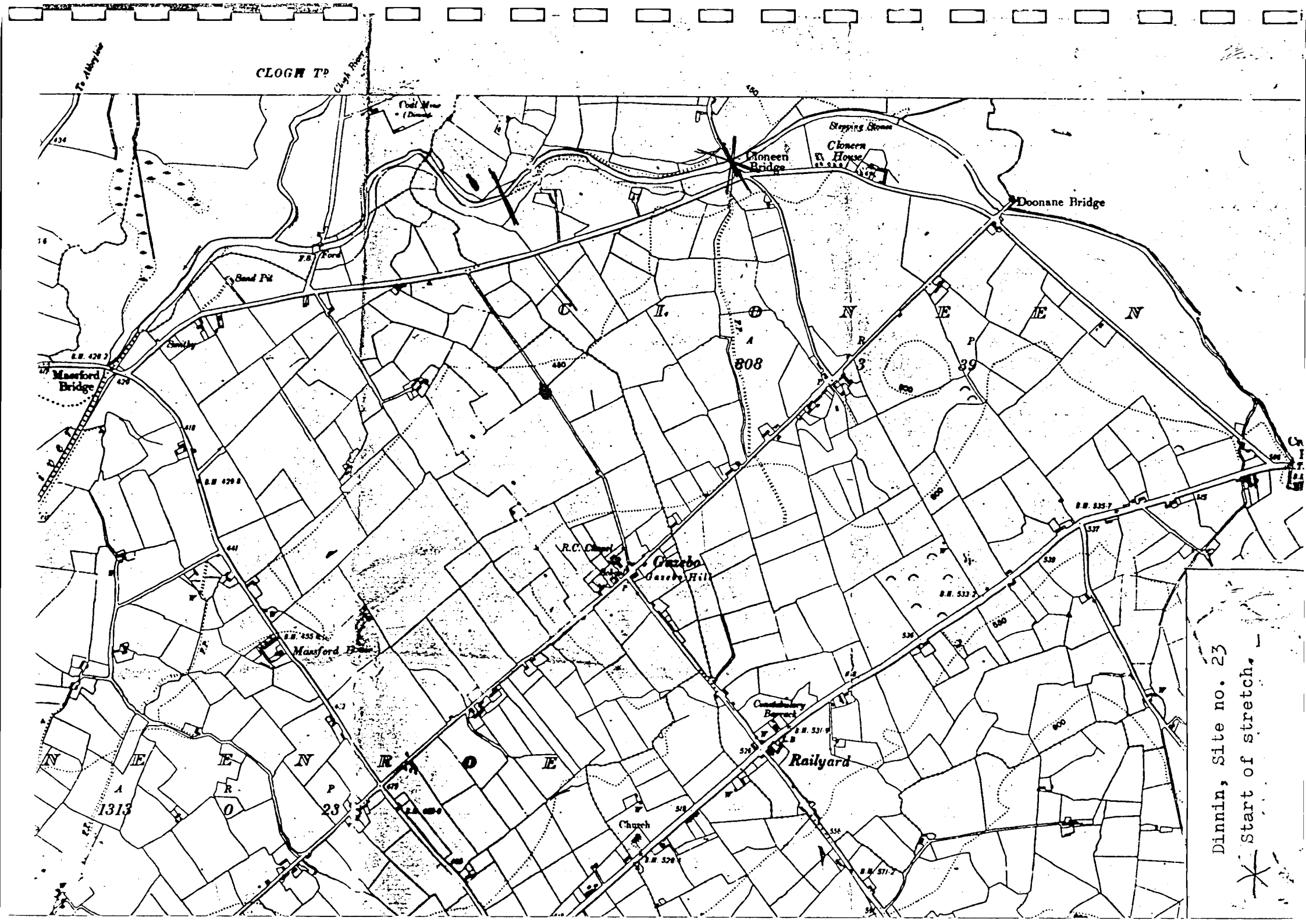
	Niche type	% Niche cover	Releve no.	Classification
Bed 100%	1	85	71	Callitricho-Batrachion
	10	10	77	Community of Phalaris
	11	5	96	Com. of Glyceria fluitans
Bank <1%	4	<1	-	-
	7	<1	76	Com. of Phalaris

Site description and comments

Ranunculus dominated shallow steepsided sandy strech of river, bordered by narrow fringe of emergents. Drained in the past. No river side wetlands. Diversity could be increased with proper management. The high

nitrate level is unexplained, the excess is not mopped up by the macrophytes and may be of agricultural origines, and released Shortly before sampling?

Derry river at Clonagal, Site no. 22. Overall view of river with flowering Water crowfoot.


CLOGH Tp
To Abbeyleix
Clogh River
Pioneen Bridge
Stepping Stones
Clonern House
Doonane Bridge
Sand Pit
Ford
Mansford Bridge
Gazebo
Gazebo Hill
R.C. Church
Mansford House
Railyard
Church
Dinnin, Site no. 23
Start of stretch.

Name of river: Dinnin Site no. 23

General information

County: Kilkenny
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. 6
Grid ref: S 575 775
Sampling date: 10.9.85
Altitude: upland
Land use: pasture

Geology: Coal measures (4)
Soils: Gleys (4)
Waterbody size: river
Height banks: 1m
Slope banks: 90°
Channel shading: medium
Length of stretch: 500m

Physico-chemical information

Total-P	0.078	NH_4^+	0.06
Total dissolved-P	0.065	NO_3^-	0.54
Ortho-phosphate	0.039	SO_4^{2-}	15.12
pH	7.25	Ca^{2+}	42.0
Conductivity	400	Mg^{2+}	5.0
Alkalinity	-	Na^+	14.5
Total hardness	205	K^+	4.0
Ca-hardness	199	Cl^-	15.6

Channel substrate	
Type	% Cover
Rock	85
Gravel	10
Stones	3
Sand	2
Silt	<1
Boulders	<1

Vegetation

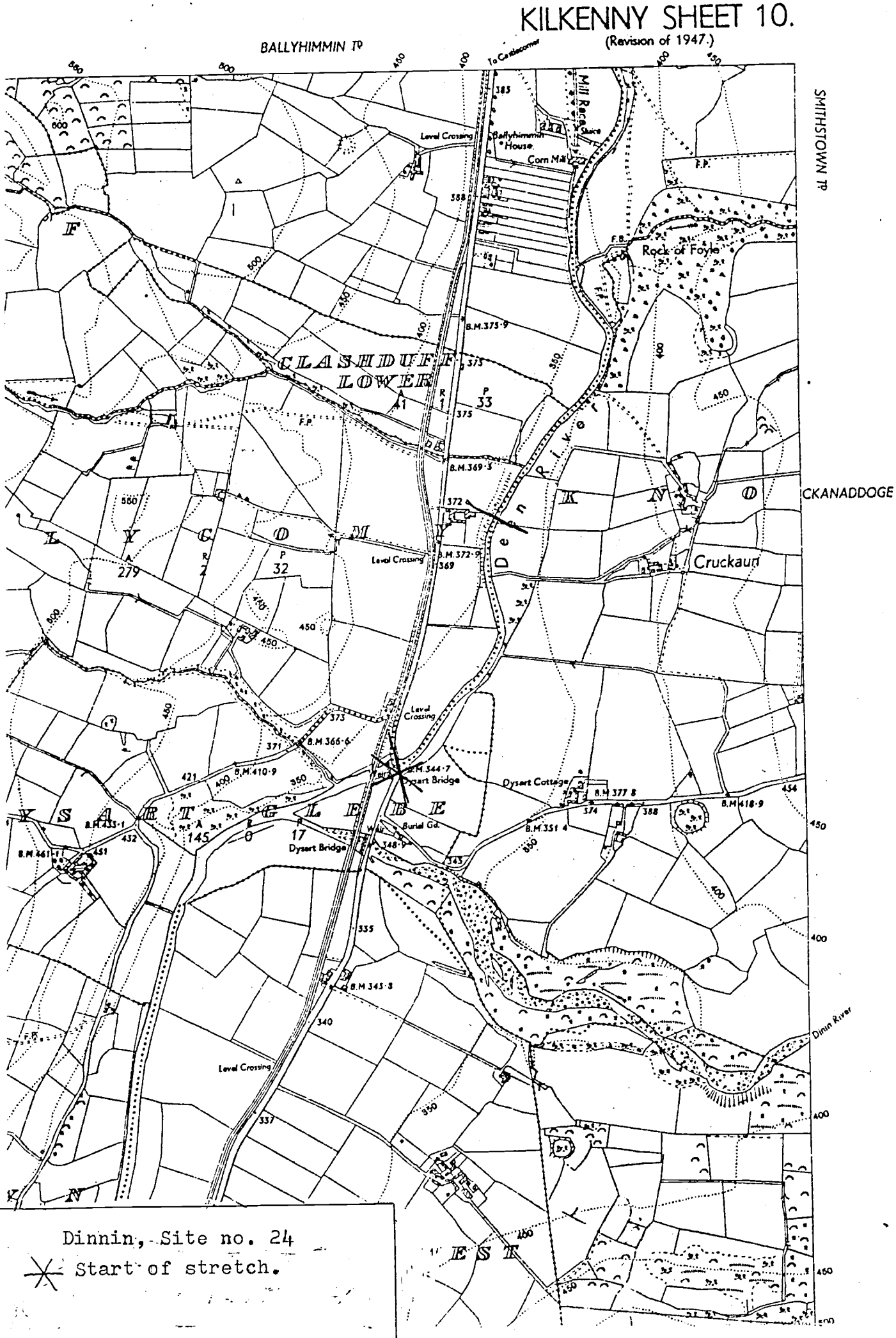
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Zannichellia palustris
Floating leaf, rooted	<1	Callitriche
Emerse vascular plant	<1	Sparganium erectum ag.
Emerse bryophyte	2.5	Pellia epiphylla, Dichodontium pellucidum
Submerse algae	80	Cladophora, Vaucheria
Splas algae	0.5	Cladophora, Vaucheria

	Niche type	% Niche cover	Relevé no.	Classification
Bed 90%	1	70	54	Community of
	2	17	48	Cladophora
	5	3	111	-
	10	<1	78	Community of Eleocharis palustris
Bank 10%	4	10	10	Conocephaletum

Site description and comments

Steep sided scannel. Areas of shallow and slightly deeper water altenate. Gravel banks and muddy areas present. Signs of enrichment (algae and vigorous beds of Sparganium). Drained in the past. Algae less abundant under shade of Alnus.

Dinnin, Site no. 23. View of channel.


KILKENNY SHEET 10.
(Revision of 1947.)
BALLYHIMMIN Td
To Castlecomer
SMITHSTOWN Td
Mill Race
Sluice
Level Crossing
Ballyhimmin House
Corn Mill
Rock of Foyle
B.M.375·9
CLASHDUFF LOWER
B.M.369·3
Denrike
CKANADDOGE
Cruckaun
B.M.372·9
Level Crossing
B.M.366·6
B.M.344·7
Dysart Bridge
Dysart Cottage
B.M.377 8
B.M.418·9
B.M.410·9
B.M.433·1
B.M.461·1
Burial Gd.
B.M.351 4
Dysart Bridge
B.M.348·9
B.M.345·8
Level Crossing
Dinnin River
Dinnin, Site no. 24
Start of stretch.

Name of river: Dinnin Site no. 24

General information

County: Kilkenny
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. 10
Grid ref: S 532 698
Sampling date: 11.7.85
Altitude: upland
Land use: pasture, meadow

Geology: Millstone Grit & Flagstone (4)
Soils: Gleys (4)
Water body size: river
Heigth banks: 0.60m
Slope banks: 90°
Channel shading: medium
Length of stretch: 500m

Physico-chemical information

Total-P	0.078	NH_4^+	0.01
Total dissolved-P	0.066	NO_3^-	0.36
Ortho-phosphate	0.066	SO_4^{2-}	9.95
pH	7.25	Ca^{2+}	36.0
Conductivity	370	Mg^{2+}	6.0
Alkalinity	-	Na^+	11.76
Total hardness	211	K^+	5.0
Ca-hardness	184	Cl^-	12.8

Channel substrate	
Type	% Cover
Rock	75
Gravel	10
Boulders	5
Sand	5
Stones	3
Silt	2

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Potamogeton crispus
Floating leaf, rooted	<1	Callitriche
Emerse vascular plant	3	ROrippa sylvestris
Submerse bryophyte	1	Fontinalis antipyretica
Emerse bryophyte	<1	Brachythecium rivulare, Pellia endiviifolia
Submerse algae	15	Cladophora, Vaucheria
Splash algae	<1	Cladophora, Vaucheria

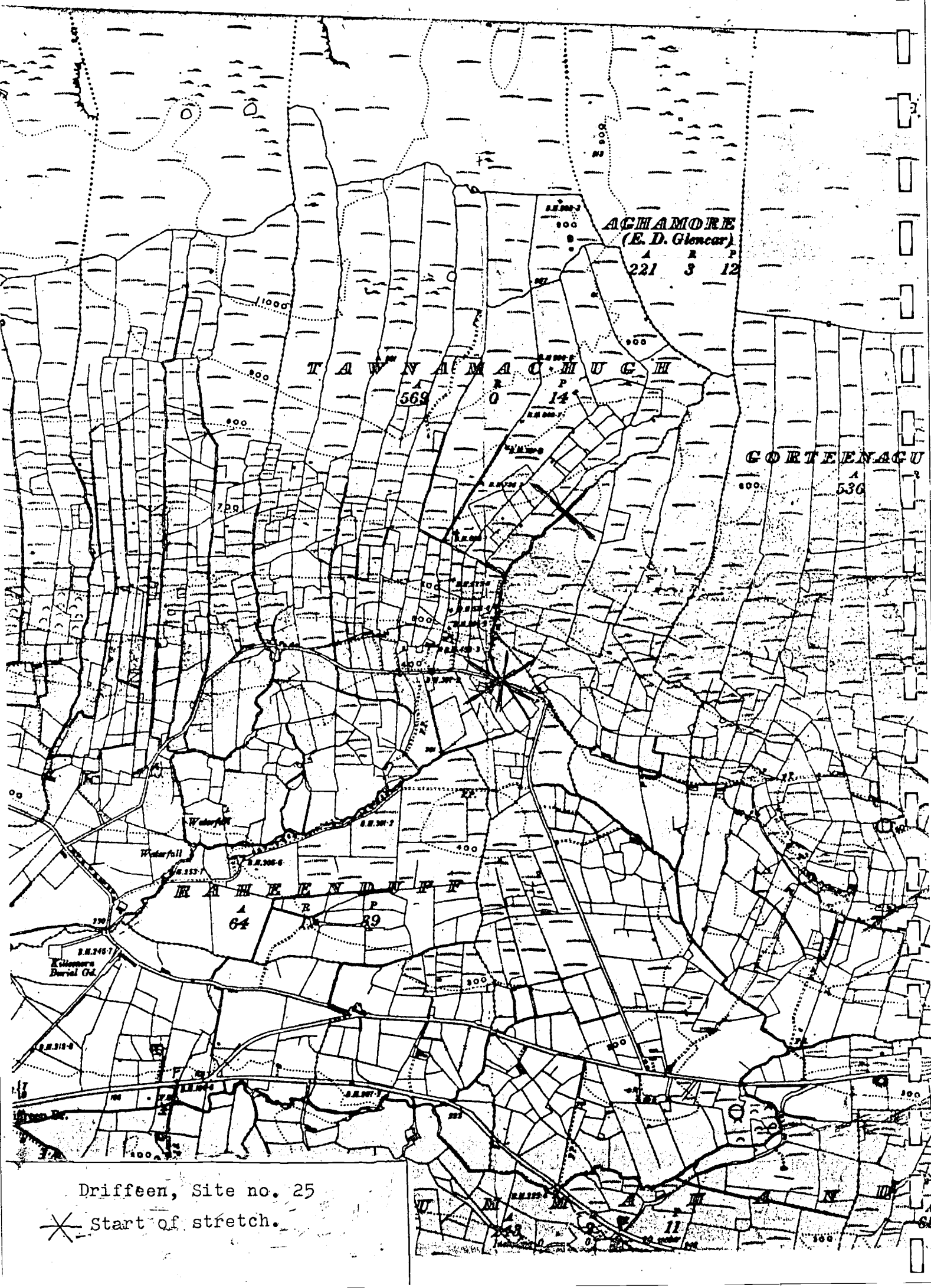
	Niche type	% Niche cover	Relevé no.	Classification
Bed 94%	1	60	55	Community of
	2	10	47	Cladophora
	3	20	-	-
	5	4	112	Com. of Rorippa sylvestris
	10	<1	-	Com. of Sparganium erectum
	11	<1	-	-
	8	<1	-	-

		Niche type	% Niche cover	Relevé no.	Classification
Bank	6%	4	5	9	Conocephaletum
		6	1	-	-

Site description and comments

Slightly enriched, previously drained channel. Drainage not maintained. Managed for fishing. Mostly shallow, some deep pools. Could be managed for conservation.

Dinnin, Site no. 24. View of channel.



Driffeen, Site no. 25

Start of stretch.

Name of river: Driffeen Site no. 25

General information

County: Leitrim
O.S. ½ inch sheet no. 7
O.S. 6 inch sheet no. 6
Grid ref: G 798 430
Sampling date: 3.6.84
Altitude: upland
Land use: pasture, rough grazing

Geology: Limestone (5)
Soils: Climatic peat (1)
Water body size: brook/stream
Height banks: 0.60-3m
Slope banks: 90°
Channel shading: heavy
Length of stretch: 100m

Physico-chemical information

Total-P	0.018	NH_4^+	-
Total dissolved-P	0.050	NO_3^-	0.43
Ortho-phosphate	0.013	SO_4^{2-}	-
pH	7.0	Ca^{2+}	31.0
Conductivity	360	Mg^{2+}	8.4
Alkalinity	103	Na^+	8.52
Total hardness	103	K^+	0.47
Ca-hardness	5	Cl^-	14

Channel substrate	
Type	% Cover
Boulders	50
Rock	45
Stones	3
Gravel	2
Sand	<1

Vegetation

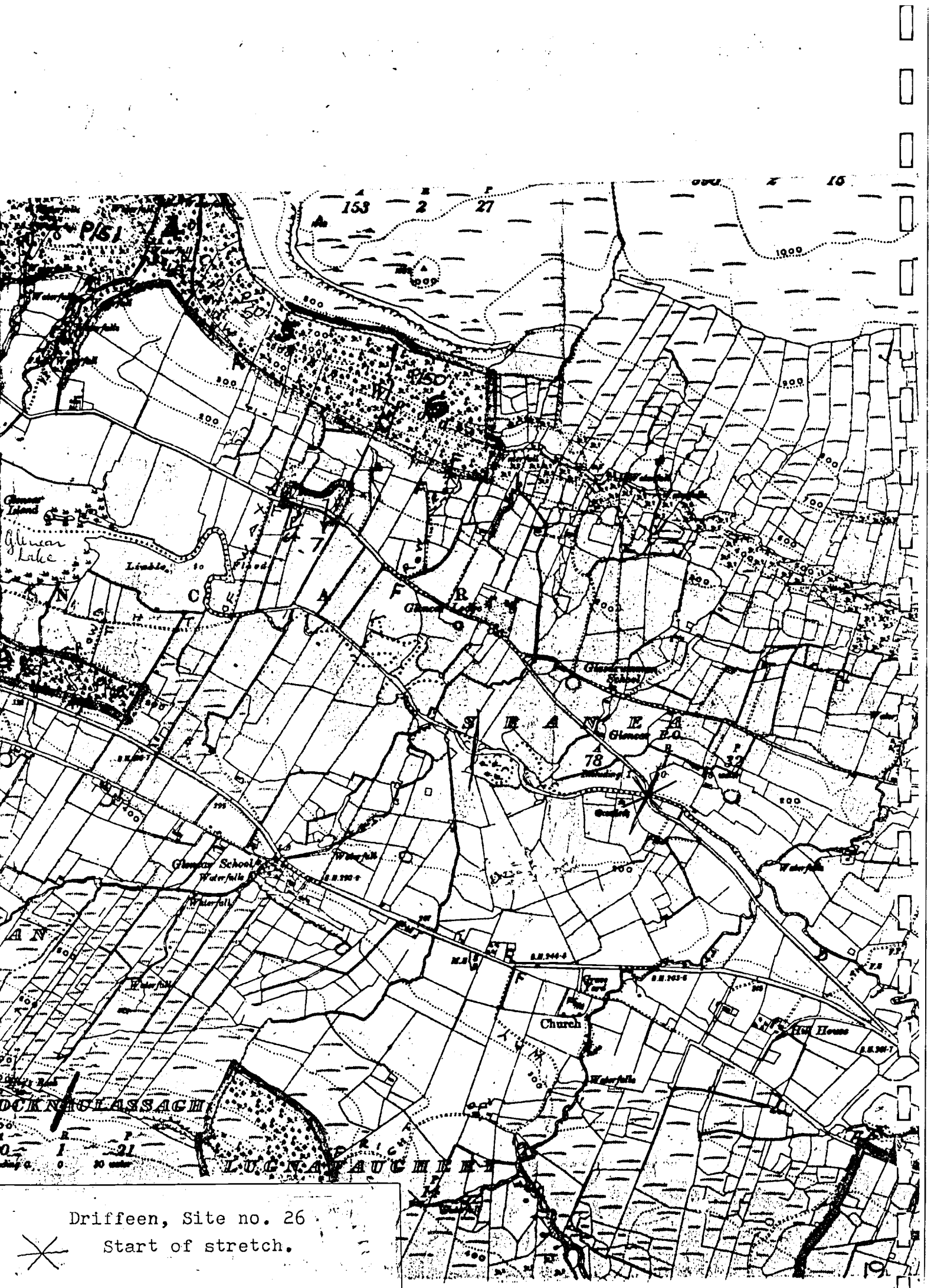
Plant type	% Plant cover	Dominant species
Emerse vascular plant	1	Luzula sylvatica
Submerse bryophyte	30	Thamnobryum alopecurum
Emerse bryophyte	20	Thuidium tamariscinum

	Niche type	% Niche cover	Relevé no.	Classification
Bed 70%	bed	70(incl. pools, waterfalls, cascades, riffles)	121(niche 2)	Vegetation typical of wet woodland
Bank 30%	4	30	17	Conocephaletum

Site description and comments

Steep intermittant head water stream on limestone, with cascades, waterfalls, riffles and small pools. This is a very distinct habitat, the "turlough" amongst rivers. An example of it should be conserved as a nature reserve. This is a site worthy of conservation.

Driffeen, Site no. 25. Stream bed of intermittant headwater stream. A riffle is shown, note Luzula sylvatica and Endymion nonscripta. Flow is from left to right in the picture. Substrate is limestone.



Driffeen, Site no. 26

Start of stretch.

Name of river: Driffeen Site no. 26

General information

County: Leitrim
O.S. ½ inch sheet no. 7
O.S. 6 inch sheet no. 6
Grid ref: G 777 420
Sampling date: 4.7.84
Altitude: lowland
Land use: pasture, meadow

Geology: Limestone (5)
Soils: Gleys (4)
Waterbody size: river
Heigth banks: 0.50m
Slope banks: steep
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.013	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	-
Ortho-phosphate	0.010	SO_4^{2-}	-
pH	7.9	Ca^{2+}	32.0
Conductivity	320	Mg^{2+}	6.2
Alkalinity	116	Na^+	8.56
Total hardness	117	K^+	0.59
Ca-hardness	80	Cl^-	10

Channel substrate	
Type	% Cover
Rock	55
Bedrock	35
Boulders	5
Stones	3
Gravel	2
Silt	<1
Sand	<1

Vegetation

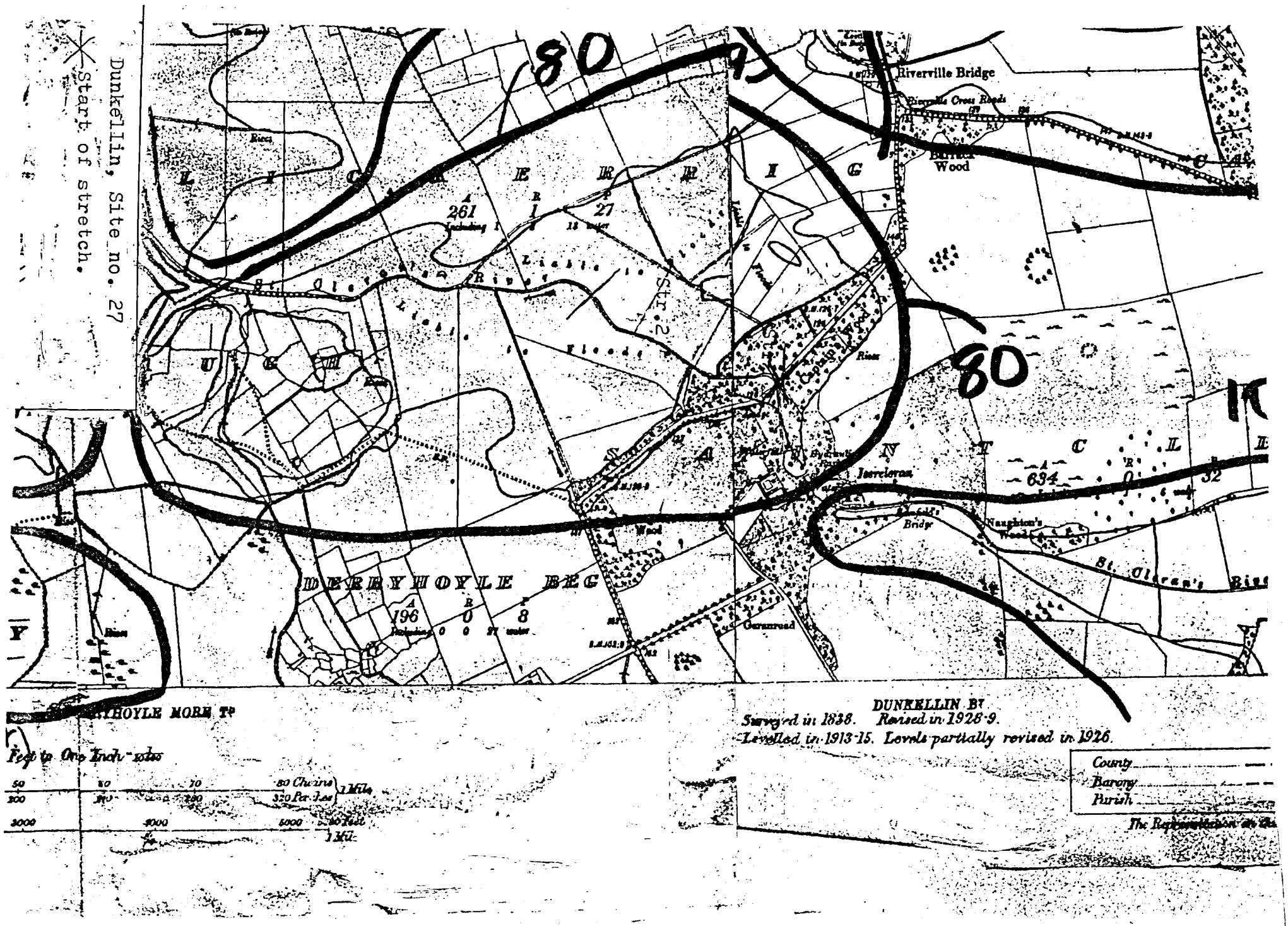
Plant type	% Plant cover	Dominant species
Emerse vascular plant	<1	Tussilago farfara
Submerse bryophyte	6	Rhynchostegium riparioides
Emerse bryophyte	5	Pohlia carnea
Submerse algae	30	Cladophora, Vaucheria
Splash algae	<1	Nostoc, Vaucheria

	Niche type	% Niche cover	Releve no.	Classification
Bed 90%	1	49	50,51	Cladophora community
	2	10	58,59	Com. of Rhynchostegium rip.
	3	3	-	-
	5	15	117	-
	8	5	140	-
Bank 10%	4	2	19	Conocephaletum
	4A	8	18	Conocephaletum
	6(7)	<1	-	-

Site description and comments

River on limestone, some signs of enrichment. Cattle have access to river. Of conservation interest, with proper management. Should not be subjected to arterial drainage.

Driffeen river, Site no. 26. Overall view.


Dunkellin, Site no. 27
Start of stretch.
80
Riverville Bridge
Wood
261
27
Liath
St. Glioran's Riv
Wood
Capaghs
80
Jarrleoran
634
32
Bridg
Naughton's Wood
St. Glioran's
196
8
Gearnroad
DUNKELLIN BY.
Surveyed in 1838. Revised in 1928-9.
Levelled in 1913-15. Levels partially revised in 1926.
County
Barony
Parish
Feet to One Inch 10560
50 80 70 80 Chains 1 Mile
200 240 320 Per Acre
3000 6000 5000 10560 Feet
1 Mile

Name of river: Dunkellin Site no. 27

General information

County: Galway
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 96, 97
Grid ref: M 554 201
Sampling date: 12.7.84
Altitude: lowland
Land use: woodland

Geology: Limestone (5)
Soils: Shallow brown earths (3)
Water body size: river
Height banks: 1m
Slope banks: 90°
Channel shading: medium
Length of stretch: 200m

Physico-chemical information

Total-P	<0.2	NH_4^+	-
Total dissolved-P	<0.2	NO_3^-	-
Ortho-phosphate	<0.2	SO_4^{2-}	-
pH	8.6	Ca^{2+}	45.0
Conductivity	440	Mg^{2+}	12.0
Alkalinity	150	Na^+	13.1
Total hardness	148	Cl^-	16
Ca-hardness	121		

Channel substrate	
Type	% Cover
Rock	40
Gravel	40
Silt	15
Stones	4
Boulders	1
Marl	<1
Sand	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	40	Ranunculus penicillatus var. pen.
Floating leaf, rooted	<1	Ranunculus penicillatus var. pen.
Floating leaf, free	3	Lemna minor
Emerse vascular plant	35	Rorippa nasturtium aquatica ag. and a mixture of bank species.
Submerse bryophyte	10	Rhynchostegium riparioides
Emerse bryophyte	3	Rhynchostegium riparioides
Submerse algae	10	Cladophora
Splash algae	<1	Cladophora

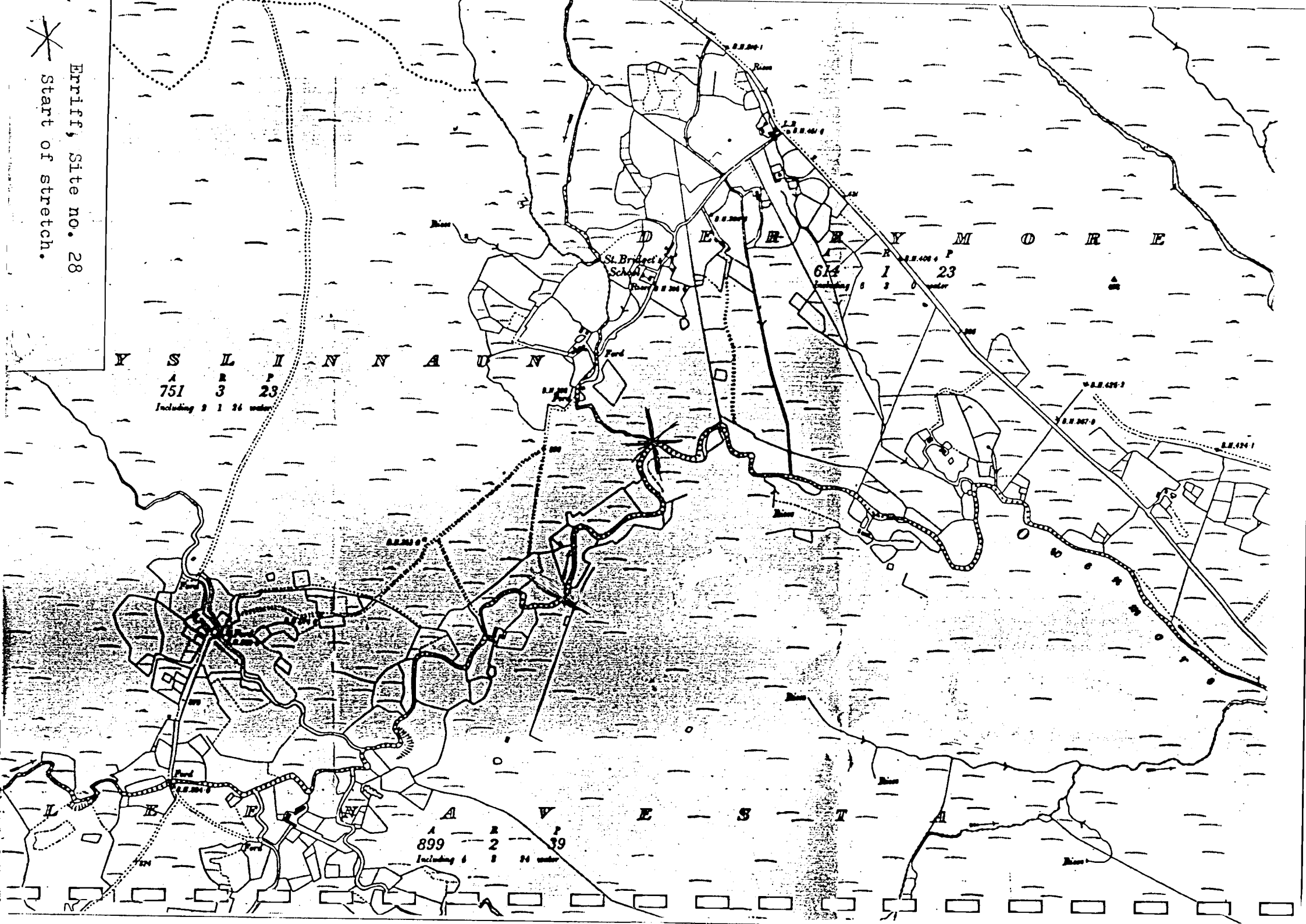
	Niche type	% Niche cover	Releve no.	Classification
Bed 80%	1	30	68	Cladophora community
	3	<1	64	-
	5	50	90	Apion nodiflori
Bank 20%	4	20	-	-
	6	<1	89	Apion nodiflori

Site description and comments

River in estate woodland. Riverbed vegetation includes also Callitricho-Batrachion, as well as the communities listed above. Some signs of enrichment present. 200m downstream the river changes dramatically into a drain choked with Sparganium erectum, Phalaris, Iris and Cladophora. It flows through wet pasture land and the banks are trampeled by cattle. Relevé 87 records a community of Sparganium erectum on a substrate of 100% silt (niche type 10).

Dunkellin river, Site no. 27. River in estate woodland.

Dunkellin, 200m downstream of site 27. River flows through wet pasture land and has changed into choked drain.


Erriff, Site no. 28
Start of stretch.
St. Bridget's School
DERRYMORE
614 1 23
YSLINNAUN
751 3 23
LEENANE
899 2 19
WEST

Name of river: Erriff Site no. 28

General information

County: Mayo
O.S. ½ inch sheet no. 10
O.S. 6 inch sheet no. 97
Grid ref: L 897 756
Sampling date: 19.6.85
Altitude: upland
Land use: rough grazing

Geology: Ordovician (6)
Soils: Peaty gleys (2)
Water body size: river
Height banks: 1-1.50m
Slope banks: 70°-90°
Channel shading: none
Length of strech: 500m

Physico-chemical information

Total-P	0.001	NH_4^+	0.05
Total dissolved-P	0.0	NO_3^-	1.07
Ortho-phosphate	<0.001	SO_4^{2-}	0.06
pH	6.35	Ca^{2+}	3.9
Conductivity	103	Mg^{2+}	2.9
Alkalinity	26.4	Na^+	9.15
Total hardness	61.6	K^+	0.85
Ca-hardness	28.0	Cl^-	18.7
Mn	0.0	Cu	0.0
Fe	0.1		

Channel substrate	
Type	% Cover
Rock	65
Boulders	15
Stones	10
Gravel	5
Bedrock	3
Sand	2

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	20	Myriophyllum alterniflorum
Floating leaf, rooted	<1	Potamogeton natans
Emerse vascular plant	12	Agrostis tenuis
Submerse bryophyte	30	Fontinalis squamosa
Emerse bryophyte	1	Conocephalum conicum
Submerse algae	10	Batrachpspernum (atrum-type)
Splash algae	<1	Phormidium

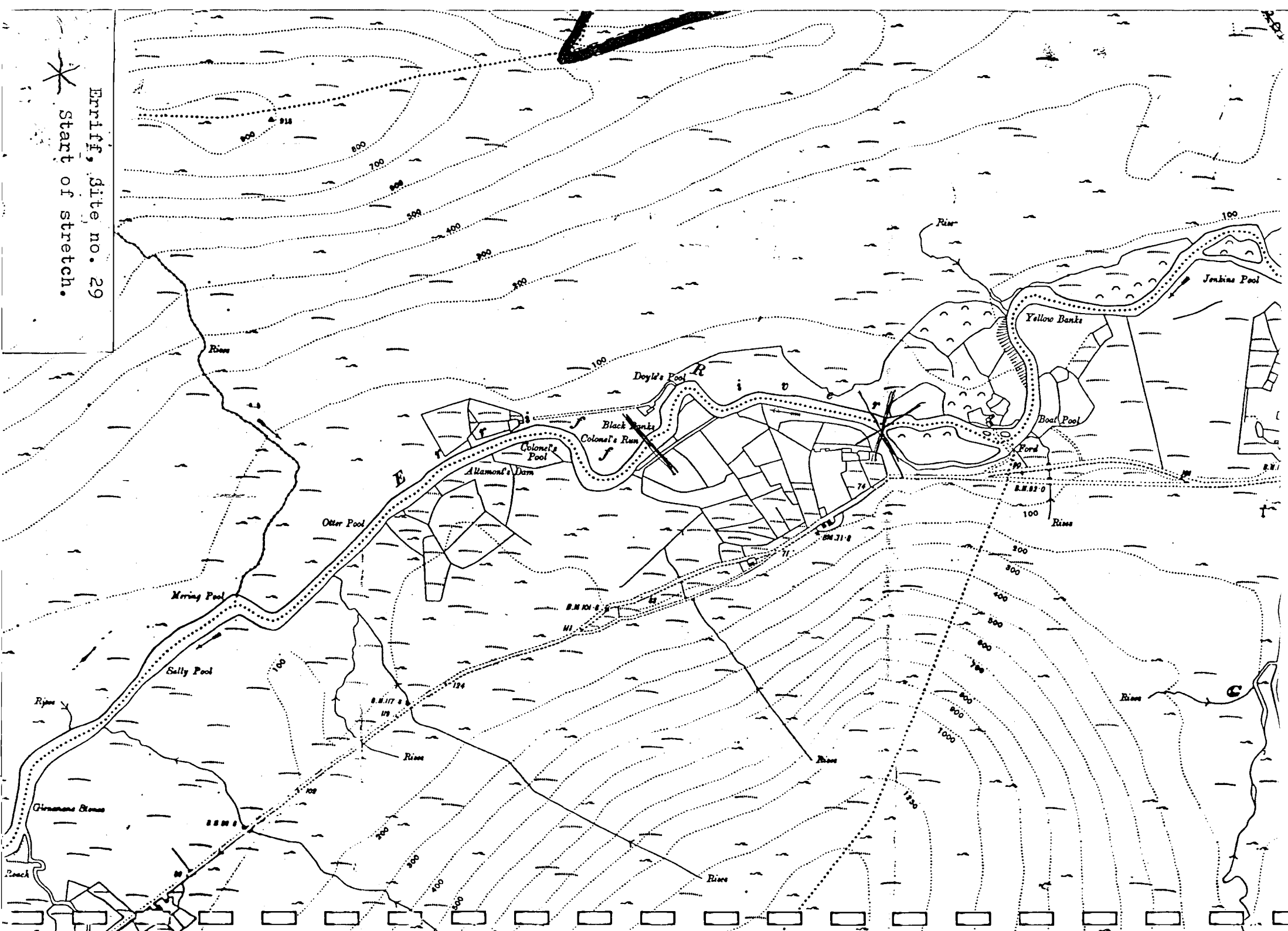
	Niche type	% Niche cover	Releve no.	Classification
Bed 83%	1	75	3	Scapanietum undulatae Juncetosum bulbosi
	2	5	11	Scapanietum undulatae Rhynchostegietosum
	3	<1	-	-
	5	<1	107	-

	Niche type	% Niche cover	Releve no.	Classification
Bank 17%	4	1	37	Pellietum epiphyllae Atrichetosum
	4A	4	39	Pellietum epiphyllae Scapanietosum
	6	12	125	-

Site description and comments

Stream/river with steep banks. Note the high nitrate level. A small small tributary showed a high algal biomass, even after extensive flooding one week before sampling. Some enrichment may have taken place here. Could be managed for conservation.

Erriff, Site no. 28. Overall view of river.


Errif, site no. 29
start of stretch.
Doyle's Pool
Black Banks
Colonel's Run
Colonel's Pool
Allamont's Dam
Otter Pool
Merring Pool
Sally Pool
Yellow Banks
Jenkins Pool
Boat Pool
Ford
Rivers
Glenamaus Bridge
Beach

Name of river: Erriff Site no. 29

General information

County: Mayo
O.S. ½ inch sheet no. 10
O.S. 6 inch sheetno. 116
Grid ref: L 925 658
Sampling date: 18.6.85
Altitude: lowland
Land use: rough grazing

Geology: Ordovician (6)
Soils: Peaty gleys (2)
Water body size: river
Height banks: 1-2m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.001	NH_4^+	0.06
Total dissolved-P	0.001	NO_3^-	1.2
Ortho-phosphate	0.001	SO_4^{2-}	0.10
pH	6.25	Ca^{2+}	2.6
Conductivity	84	Mg^{2+}	1.9
Alkalinity	16.2	Na^+	8.3
Total hardness	42.4	K^+	0.4
Ca-hardness	25.6	Cl^-	15.9

Channel substrate	
Type	% Cover
Stones	60
Rock	30
Gravel	5
Sand	5
Boulders	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	5	Juncus bulbosus f. fluitans
Floating leaf, rooted	1	Potamogeton natans
Emerse vascular plant	4	Ranunculus flammula & grass spp.
Submerse bryophyte	<1	Fissidens viridulus
Emerse bryophyte	<1	Mixture of species
Submerse algae	50	Green filamentous & Diatoms
Splash algae	<1	not collected

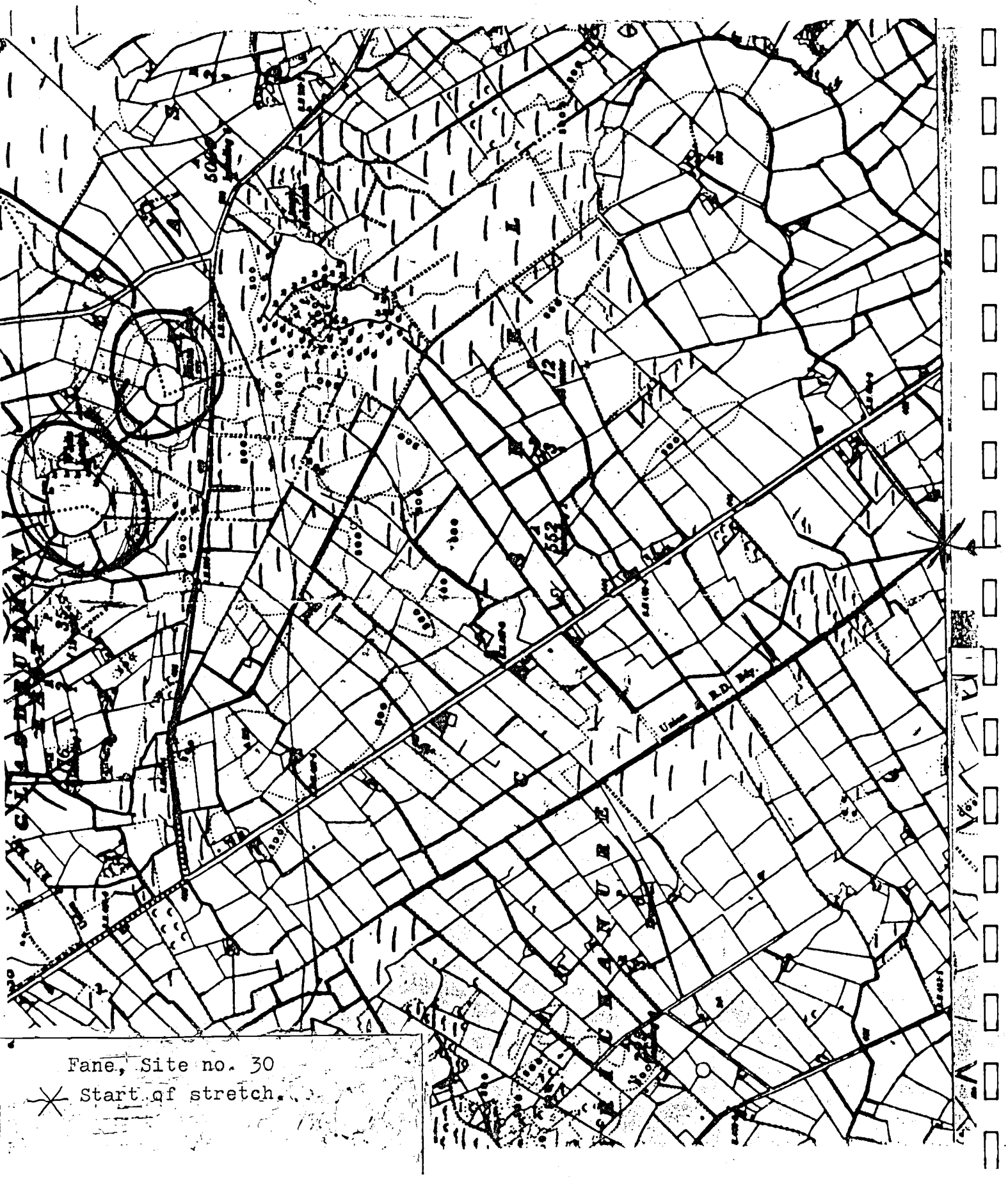
	Niche type	% Niche cover	Relevé no.	Classification
Bed 93%	1	<1	-	-
	1A	38	4	Scapanietum undulatae Juncetosum bulbosi
	2	5	6	
	3	20	-	-
	5	20	114	Molinio-Arrhenatheretea
	10	<1	-	-
	11	8	63,14	Com. of Potamogeton natans, Com. of Myriophyllum alt.

	Niche type	% Niche cover	Relevé no.	Classification
Bed, cont.	12	2	13	-
	14	<1	95	Com. of Juncus bulbosus f. fluitans
Bank 7%	4	4	38	Pellietum epiphyllae Scapanietosum
			53-58	Pellietum neesianae
	6	3	-	-

Site description and comments

Large river, gravel works upstream, no signs of excess sand or gravel, managed for fishing. The high nitrate level could be caused by forestry activity in the catchment, noticable because of the very low flows during sampling. Of interest for conservation.

Erriff, Site no. 29. Overall view of river, flashy nature evident.



Fane, Site no. 30

Start of stretch.

Name of river: Fane Site no. 30

General information

County: Monaghan
O.S. ½ inch sheet no. 8
O.S. 6 inch sheet no. 14
Grid ref: H 780 253
Sampling date: 5.6.84
Altitude: upland
Land use: pasture, rough grazing

Geology: Silurian (6)
Soils: Acid brown earths (4)
Water body size: stream
Height banks: 0-1m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	0.04
Ortho-phosphate	-	SO_4^{2-}	-
pH	7.0	Ca^{2+}	21.0
Conductivity	200	Mg^{2+}	4.0
Alkalinity	64	Na^+	6.55
Total hardness	81	K^+	0.47
Ca-hardness	53	Cl^-	15

Channel substrate	
Type	% Cover
Root mat	85
Rock	7
Clay	7
Gravel	<1
Stones	<1
Sand	<1
Silt	<1

Vegetation

Plant type	% Plant cover	Dominant species
Floating leaf, rooted	5	Potamogeton natans, Callitriche
Floating leaf, free	<1	Lemna minor
Emerse vascular plant	85	Glyceria fluitans, Agrostis stolini
Submerse bryophyte	<1	Mixture
Emerse bryophyte	<1	Rhynchostegium riparioides
Submerse algae	10	Microspora amoena, Spirogyra

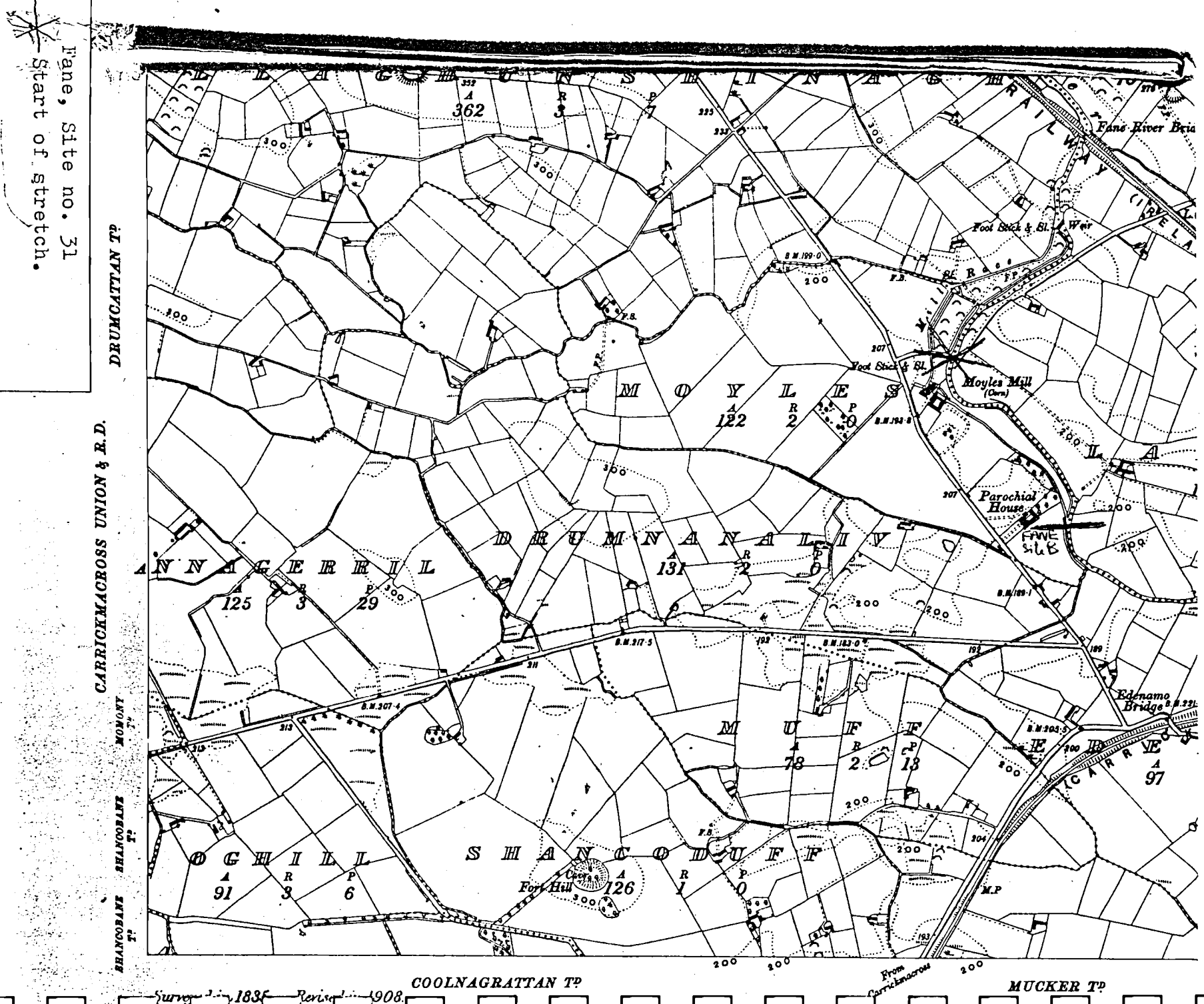
		Niche type	% Niche cover	Relevé no.	Classification
Bed	100%	1	5	83	Glycerio-Sparganion x Apium nod.
		13	85	100	Glycerio-Sparganion
		14	10	94	Glycerio-Sparganion
Bank	1%	4	<1	-	-
		6	<1	101	-

Site description and comments

This headwater stream starts as a spring, widens out into an extensive floating Glyceria scraw and than changes into a narrow slow flowing ditch. Some Salix is present on the scraw, it is bordered by cut-over bog. This type of site is fairly common in Co. Monaghan to my Knowledge and an example of it should be conserved.

Fane river headwater, Site no. 30. Extensive floating scraw, spring-fed.

Fane, Site no. 31
Start of stretch.



Name of river: Fane Site no. 31

General information

County: Monaghan
O.S. ½ inch sheet no. 8
O.S. 6 inch sheet no. 29
Grid ref: H 920 077
Sampling date: 6.6.84
Altitude: lowland
Land use: pasture, meadow

Geology: Silurian (6)
Soils: Acid brown earths (4)
Water body size: river
Heigth banks: 0-1m
Slope banks: various
Channel shading: medium to heavy
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	1.25
Ortho-phosphate	-	SO_4^{2-}	-
pH	8.05	Ca^{2+}	25.0
Conductivity	244	Mg^{2+}	4.7
Alkalinity	82	Na^+	8.09
Total hardness	92	K^+	4.18
Ca-hardness	64	Cl^-	16

Channel substrate	
Type	% Cover
Rock	85
Stones	9
Boulders	5
Gravel	1
Bedrock	<1
Silt	<1
Sand	<1

Vegetation

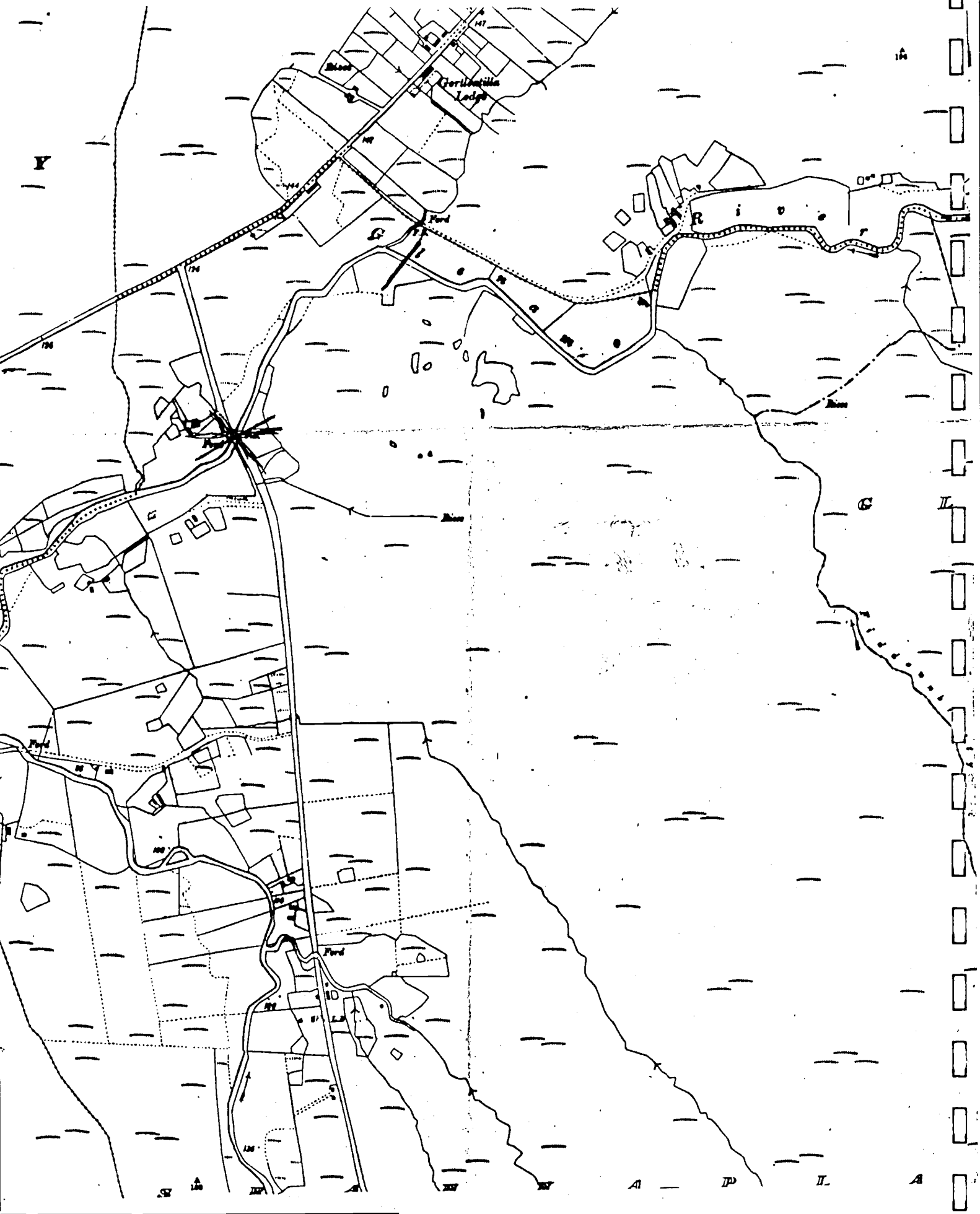
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Ranunculus penicillata var. pen.
Floating leaf, rooted	<1	Ranunculus pen. v. pen., Callitriche
Floating leaf, free	<1	Lemna minor
Emerse vascular plant	20	Oenanthe croccata
Submerse bryophyte	5	Rhynchostegium riparioides
Emerse bryophyte	5	Thuidium tamariscinum, Porella platyphylla
Submerse algae	50	Lemania fluviatile
Splash algae	10	Vaucheria, Oedogonium

	Niche type	% Niche cover	Releve no.	Classification
Bed 81%	2	70	66	Com. of Cladophora / Callitricho-Batrachion
	3	1	-	-
	5	10	-	-
Bank 19%	4,4A,4B	10	12,13,14	Pellietum epiphyllae Scapanietosum
	6	9	105	Com. of Oenanthe croccata

Site description and comments

Moderately fast flowing river on rocky substrate consisting mostly of riffle areas half overshadowed by large trees. Could be managed for conservation.

Fane, Site no. 31. View of channel. Note Oenanthe croccata on gently sloping rocky shore.



Glenamoy, Site no. 32

⚹ Start of stretch.

Name of river: Glenamoy Site no. 32

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 12
Grid ref: F 938 348
Sampling date: 22.7.85, 6.9.85
Altitude: lowland
Land use: pasture, rough grazing

Geology: Schist & Gneiss (1)
Soils: Climatic peat (1)
Water body size: river
Height banks: 0-5m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.031	NH_4^+	0.1
Total dissolved-P	<0.0001	NO_3^-	0.03
Ortho-phosphate	0.0002	SO_4^{2-}	1.76
pH	6.35	Ca^{2+}	5.0
Conductivity	93	Mg^{2+}	1.8
Alkalinity	33.4	Na^+	10.15
Total hardness	41	K^+	0.49
Ca-hardness	11	Cl^-	28.1

Channel substrate	
Type	% Cover
Rock	90
Boulders	5
Stones	4
Gravel	1
Sand	<1

Vegetation

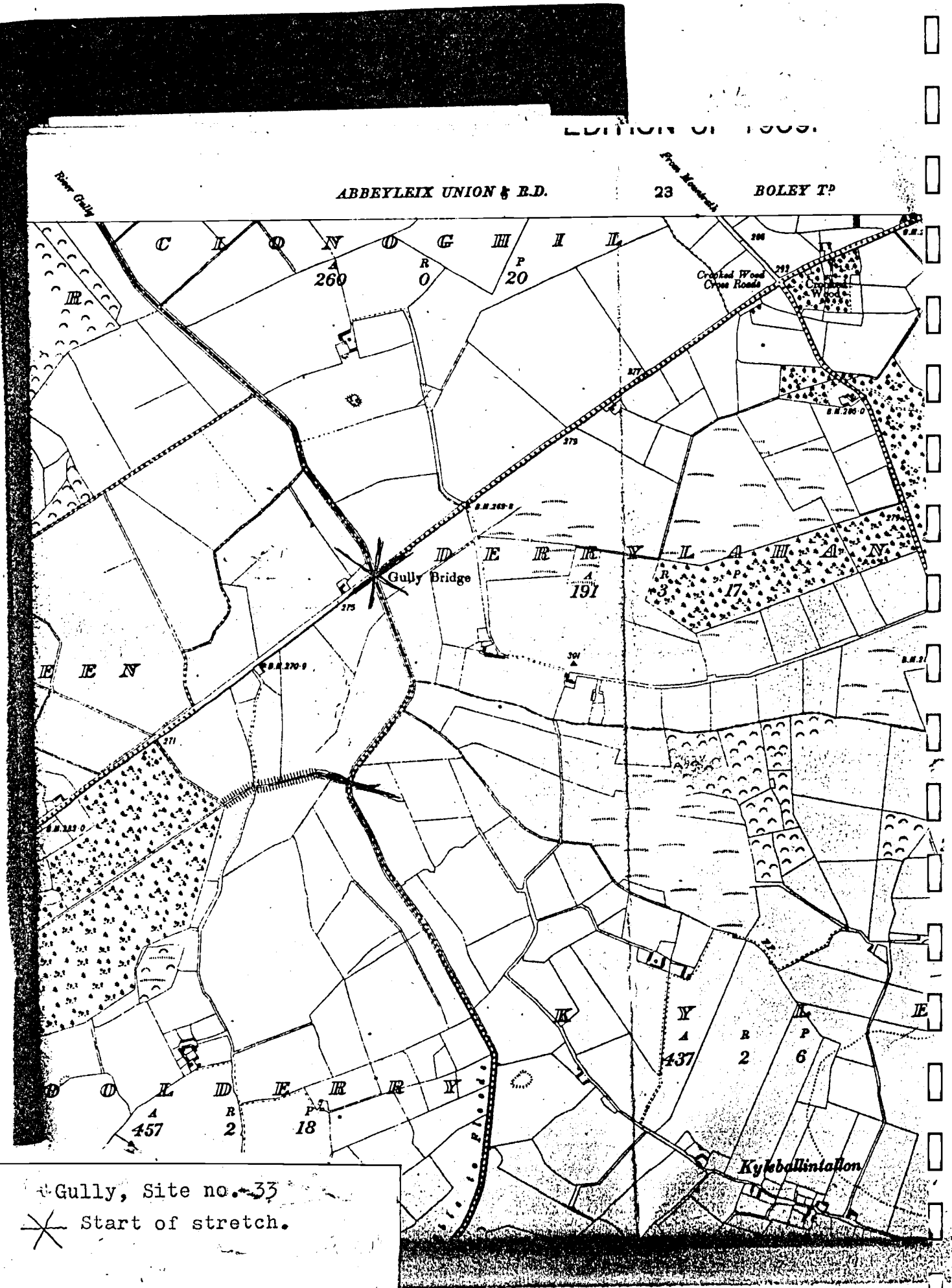
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Juncus acutiflorus
Floating leaf, rooted	<1	Potamogeton polygonifolius
Emerse vascular plant	<1	Sparganium erectum, Oenanthe croccata, Iris.
Submerse bryophyte	<1	Fontinalis antipyretica, Rhynchostegium riparioides.
Emerse bryophyte	<1	Pellia epiphylla
Submerse algae	10	Diatoms & Filamentous green algae
Splash algae	<1	Palmella stage

	Niche type	% Niche cover	Releve no.	Classification
Bed 94%	1	84	-	-
	2	10	21,39	Scapanietum undulatae Rhynchostegietosum
	5	<1	113	Molinio-Arrhenatheretea
	7	<1	126	Calthion
Bank	4	5	50	Pellietum epiphyllae Atrichetosum
	6	1	-	-

Site description and comments

River just below area of forestry.

Glenamoy, Site no. 32. Overall view.



Gully, Site no. 33

Start of stretch.

Name of river: Gully Site no. 33

General information

County: Laois
O.S. ½ inch sheet no. 18
O.S. 6 inch sheet no. 29
Grid ref: S 390 825
Sampling date: 13.7.84
Altitude: lowland
Land use: pasture

Geology: Limestone (5)
Soils: Grey brown podzolics (3)
Water body size: river
Height: 2m
Slope banks: 90
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.025	NH_4^+	-
Total dissolved-P	0.018	NO_3^-	>2.0
Ortho-phosphate	0.015	SO_4^{2-}	-
pH	7.35	Ca^{2+}	70.0
Conductivity	600	Mg^{2+}	21.0
Alkalinity	296	Na^+	7.22
Total hardness	249	K^+	2.05
Ca-hardness	178	Cl^-	12

Channel substrate	
Type	% Cover
Sand	85
Clay & Silt	10
Gravel	5
Rock	<1
Stones	<1

Vegetation

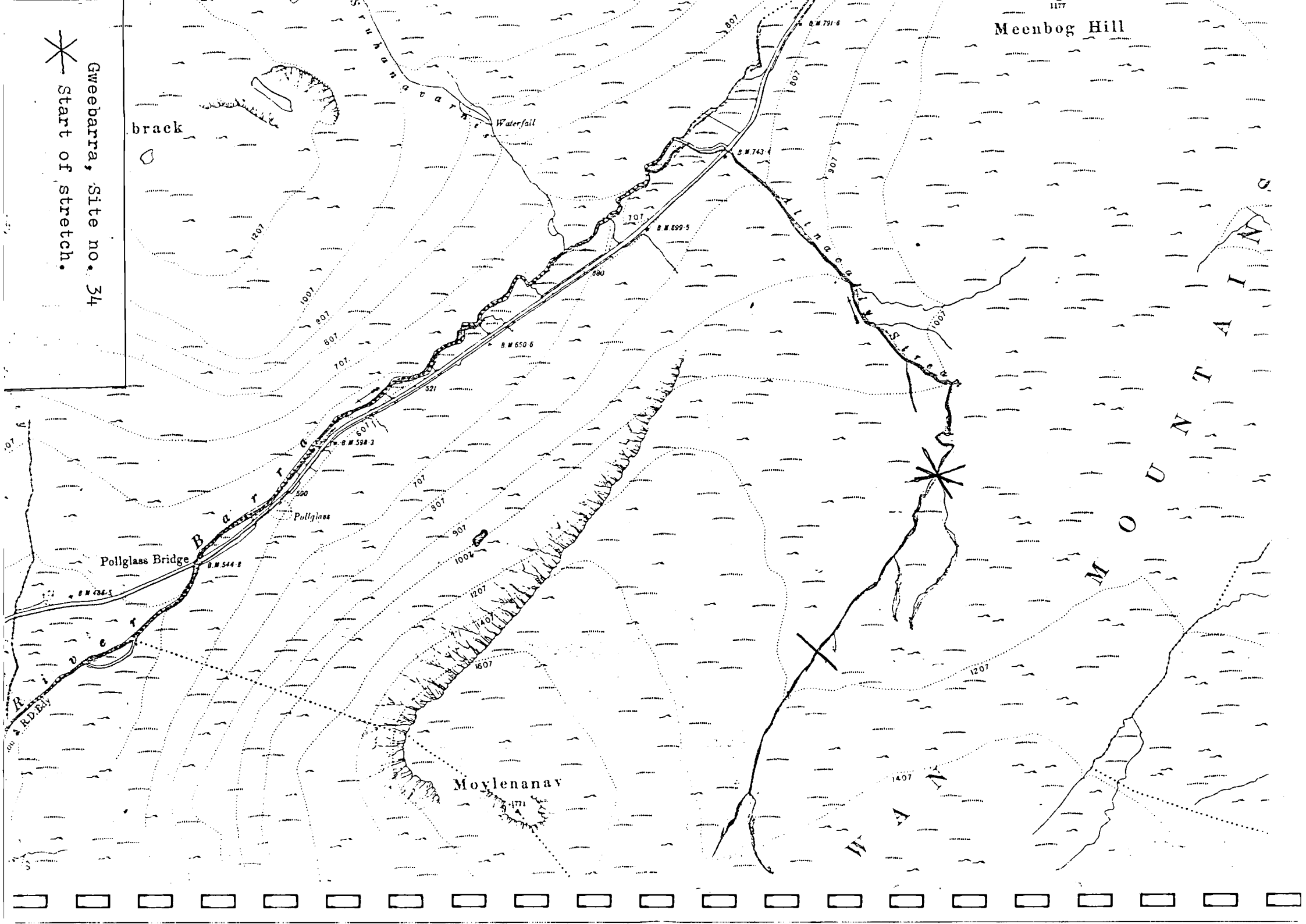
Plant type	% Niche cover	Dominant species
Submerse vascular plant	5	Potamogeton friesii
Floating leaf, rooted	40	Potamogeton natans, Callitriche
Floating leaf, free	<1	Lemna trisulca
Emerse vascular plant	55	Sparganium erectum, Apium nodiflorum
Submerse bryophyte	<1	Fontinalis antipyretica
Emerse bryophyte	<1	Amblystegium riparium
Submerse algae	10	Melosira
Splash algae	<1	Vaucheria

	Niche type	% Niche cover	Releve no.	Classification
Bed 85%	1	20	79	Com. of Batrachospermum
	10	1	88	Apion nodiflori
	14	30	93	Apion nodiflori
	14A	35	85	Apion nodiflori
Bank 15%	4	15	-	Com. of Agrostis stolonifera

Site description and comments

Straight steep sided channel, drained and regularly maintained, not recently dredged. Very few, if any of the lowland streams of the midlands remain in their natural state. A suitable site of this type should be pinpointed by an inventory, if necessary rehabilitated, and conserved in a state as close as possible to the natural state.

Gully, Site no. 33. View of choked channel.


Gweebarra, Site no. 34
Start of stretch.
brack
Meenbog Hill
Waterfall
Allnacally Strea
Pollglass
Pollglass Bridge
Moylenanay
MOUNTAINS

Name of river: Gweebarra Site no. 34

General information

County: Donegal
O.S. ½ inch sheet no. 3
O.S. 6 inch sheet no. 51
Grid ref: B 966 139
Sampling date: 12.8.81
Altitude: mountain
Land use: rough grazing

Geology: Granite (1)
Soils: Climatic peat (1)
Water body size: brook
Height banks: 0.20
Slope banks: various
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.042	NH_4^+	-
Total dissolved-P	0.022	NO_3^-	-
Ortho-phosphate	0.018	SO_4^{2-}	-
pH	7.9	Ca^{2+}	2.3
Conductivity	51	Mg^{2+}	0.81
Alkalinity	-	Na^+	15.5
Total hardness	-	K^+	0.65
Ca-hardness	11	Cl^-	9

Channel substrate	
Type	% Cover
Rock	40
Boulders	25
Gravel	20
Stones	14
Bedrock	1
Sand	1

Vegetation

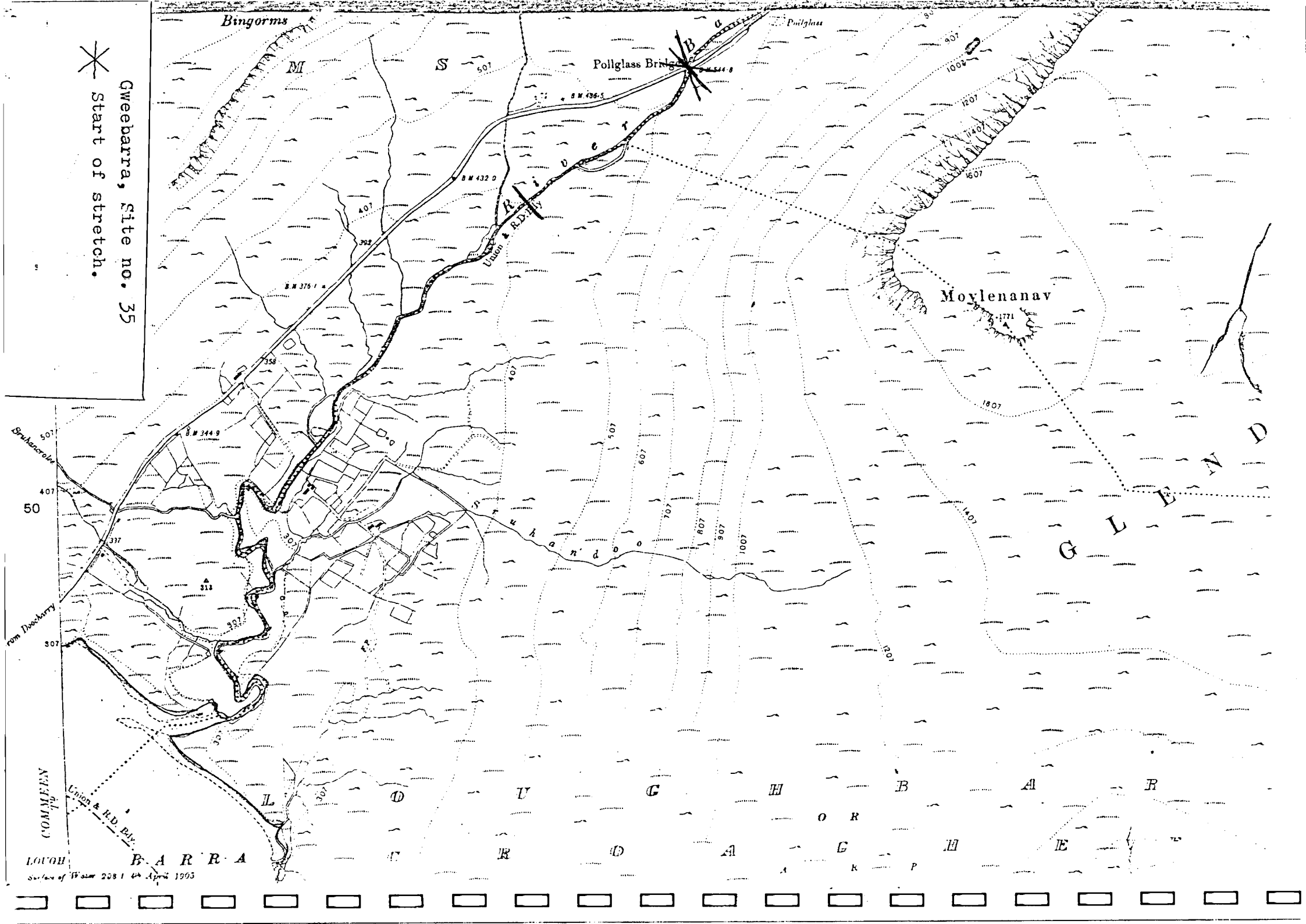
Plant type	% Plant cover	Dominant species
Submerse bryophytes	60	Scapania undulata
Emerse bryophyte		Pellia epiphylla
Submerse algae	1	Ulothrix moniliforme
Splash algae	1	Tetraspora

Classification: Stream bed community is probably Scapanietum undulatae
Community of steep sides is probably Pellietum epiphyllae Atrichetosum

Site description and comments

Steep mossy head water stream, some quite deep pools. No forestry in catchment. Of interest for conservation.

Gweebarra, Site no. 34 . View of stream.


Gweebarra, site no. 35
Start of stretch.
Bingorms
Pollglass Bridge
Pollglass
Moylenanav
Union & R.D. Bdy
Union & R.D. Bdy.
Bruhanoroba
from Docharry
COMMEEN
LOUGH
BARRA
GLENDUGH
HARBOUR
Surface of Water 208 ft 4th April 1995

Name of river: Gweebarra Site no. 35

General information

County: Donegal
O.S. ½ inch sheet no. 3
O.S. 6 inch sheet no. 51
Grid ref: B 945 146
Sampling date: 12.8.81
Altitude: upland
Land use: rough grazing

Geology: Granite (1)
Soils: Climatic peat (1)
Water body size: stream
Height banks: 0-3m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.030	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	-
Ortho-phosphate	0.011	SO_4^{2-}	-
pH	6.6	Ca^{2+}	2.0
Conductivity	41	Mg^{2+}	0.67
Alkalinity	-	Na^+	13.4
Total hardness	-	K^+	2.03
Ca-hardness	8	Cl^-	10

Channel substrate	
Type	% Cover
Bedrock	60
Boulders	20
Rock	10
Stones	9
Gravel	1

Vegetation

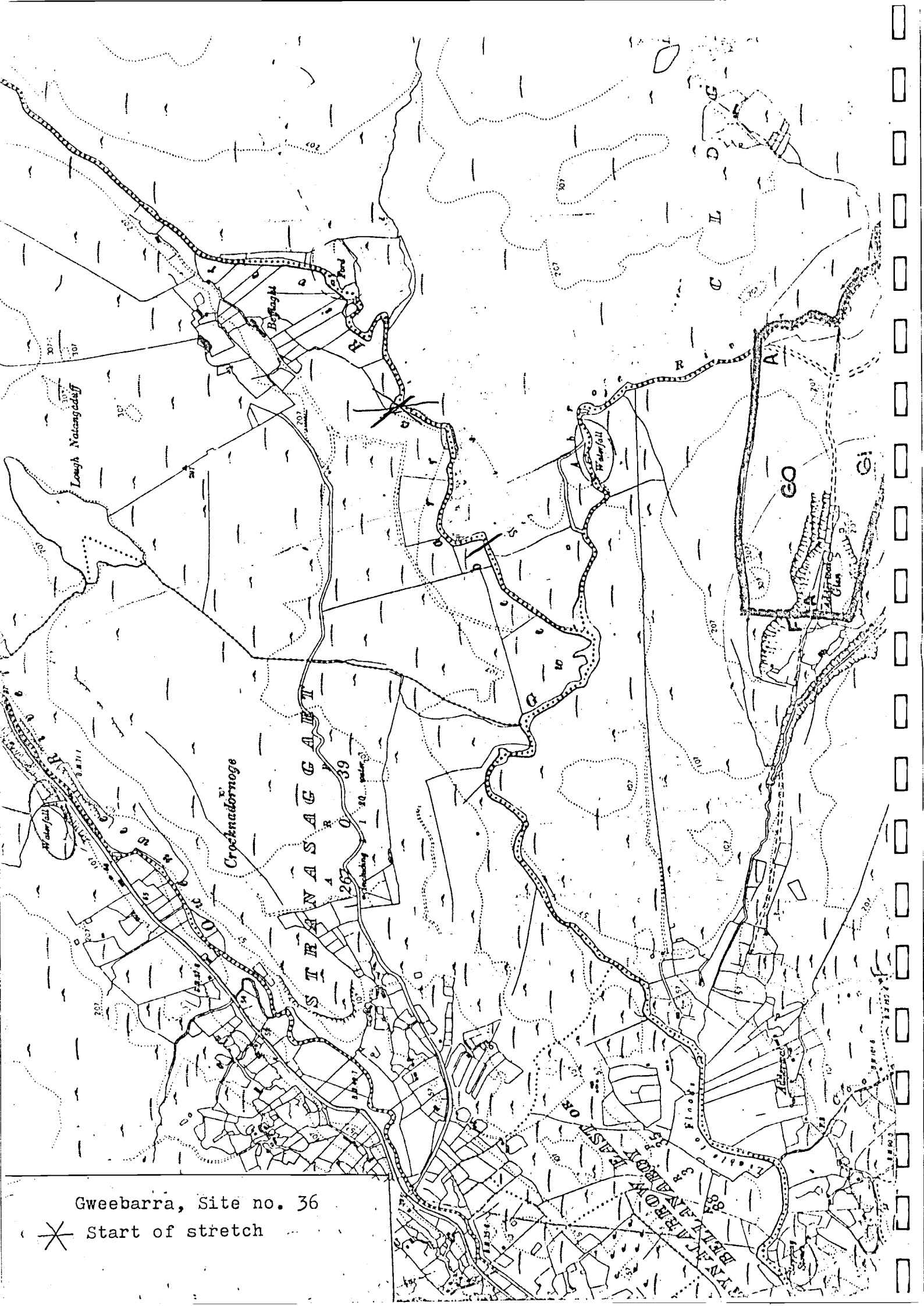
Plant type	% Plant cover	Dominant species
Vascular plant	<1	Mixture
Bryophyte	low	Probably Scapania undulata
Algae	~5	Mougeotia

Classification: Stream bed community is probably Scapanietum undulatae
Community of steep sides is probably Pellietum epiphyllae

Site description and comments

Stream with fast to torrential flow, water level rising rapidly during visit.

Gweebarra, Site no. 35. View of stream.



Gweebarra, Site no. 36

Start of stretch

Name of river: Gweebarra Site no. 36

General information

County: Donegal
O.S. ½ inch sheet no. 3
O.S. 6 inch sheet no. 58
Grid ref: B 894 075
Sampling date: 11.8.81
Altitude: lowland
Land use: rough grazing

Geology: Granite (1)
Soils: Climatic peat (1)
Water body size: river
Height banks: 0.30-0.50m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	-	SO_4^{2-}	-
pH	6.9	Ca^{2+}	1.4
Conductivity	44	Mg^{2+}	0.50
Alkalinity	-	Na^+	12.3
Total hardness	-	K^+	1.43
Ca-hardness	7	Cl^-	13

Channel substrate	
Type	% Cover
Gravel	40
Rock	28
Stones	20
Sand	10
Boulders	1
Bedrock	1
Silt	<1

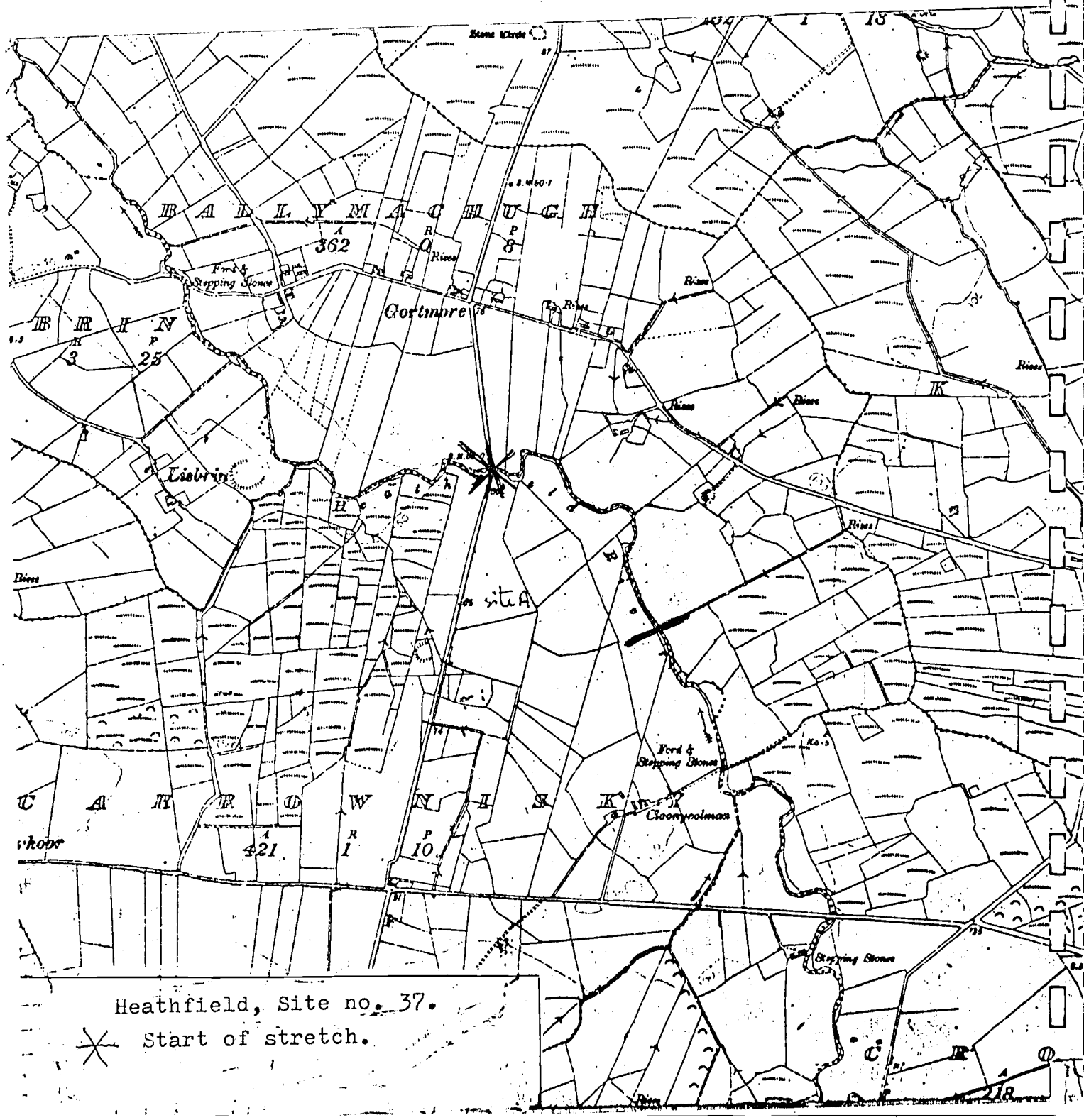
Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Juncus bulbosus, Myriophyllum alterniflorum
Emerse vascular plant	<1	Littorella uniflora
Submerse bryophyte	<1	Scapania undulata
Submerse algae	40	Dichothrix orsiniana, Zygnema, Mougeotia

Classification: River bed community is probably Scapanietum undulatae
Community of steep sides is probably Pellietum epiphyllae

Site description and comments

River consists of shallow stretch (90%) with a few small cascades and small sandy beaches with Littorella uniflora and pools (10%) with Potamogeton natans and Isoetes lacustris fringed by Phragmites and Carex rostrata. The whole Gweebarra system is of conservation interest. The catchment should be managed so that the river is not affected adversely.



Heathfield, Site no. 37.

✳ Start of stretch.

Name of river: Heathfield Site no. 37

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 7
Grid ref: G 115 390
Sampling date: 23.7.85
Altitude: lowland
Land use: pasture, meadow

Geology: Shales & Sandstones, Carboniferous Slate series (6)
Soils: Gleys (4)
Water body size: stream
Height banks: 0.80m
Slope banks: 90°
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.022	NH_4^+	0.1
Total dissolved-P	0.020	NO_3^-	0.2
Ortho-phosphate	0.0001	SO_4^{2-}	6.08
pH	7.25	Ca^{2+}	62.5
Conductivity	110	Mg^{2+}	5.0
Alkalinity	138	Na^+	13.64
Total hardness	178	K^+	1.39
Ca-hardness	175	Cl^-	22

Channel substrate	
Type	% Cover
Rock	85
Sand	5
Gravel	5
Stones	3
Boulders	2

Vegetation

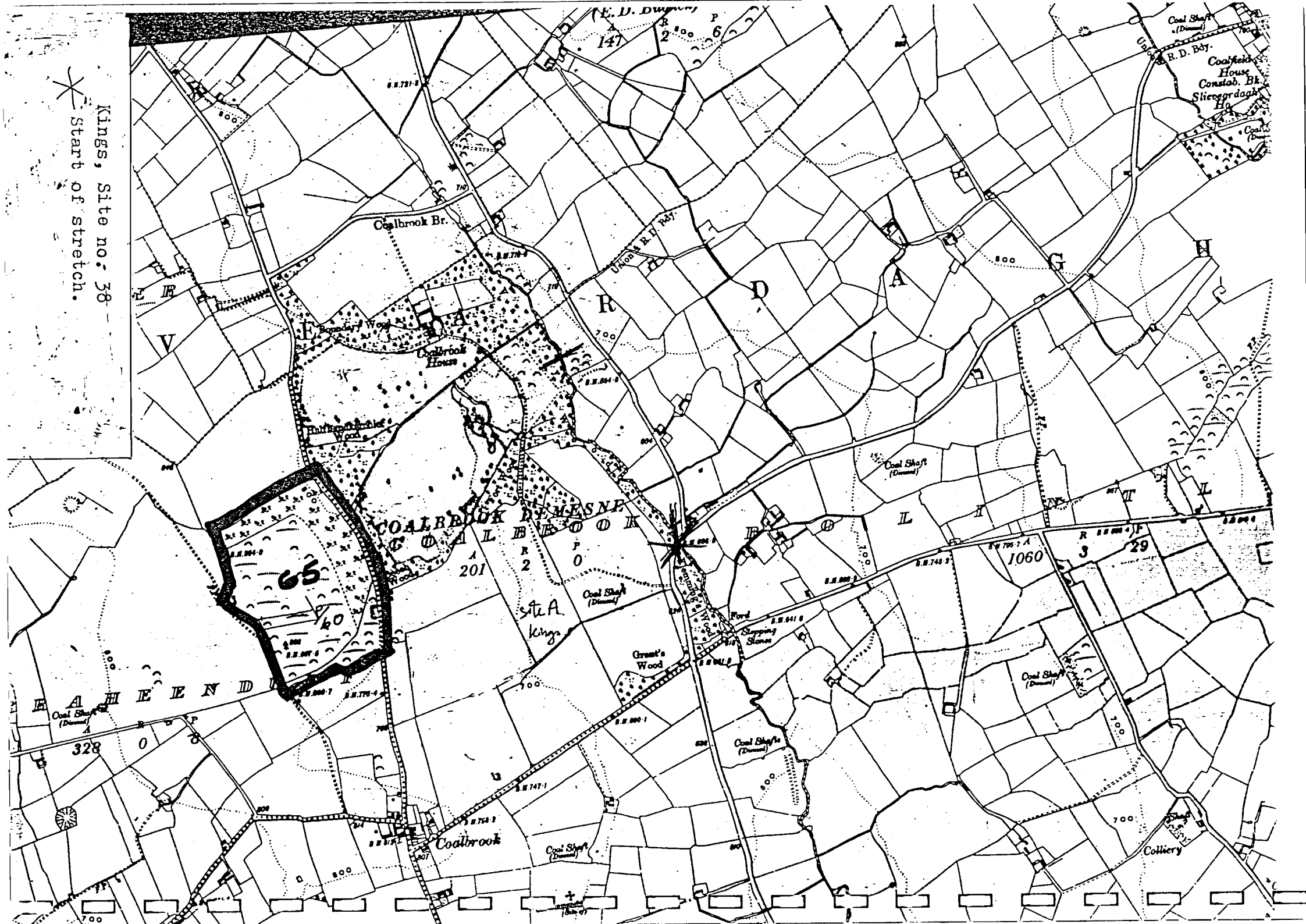
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Agrostis stolonifera
Emerse vascular plant	<1	Iris
Submerse bryophyte	1	Rhynchostegium riparioides
Emerse bryophyte	<1	Pellia endiviifolia
Submerse algae	60	Cladophora
Splash algae	<1	Nostoc

	Niche type	% Niche cover	Releve no.	Classification
Bed 94%	1	79	56	Community of Cladophora
	2	10	57	
	3	5	-	-
	5	<1	102	-
	10	<1	-	-
Bank 6%	4	6	15	Funarietum attenuata
	6	<1	-	-

Site description and comments

Channel drained in the past, steep sides, shallow rocky bottom and a few small pools. Calcium crusts on rocks and peat stained water. Cattle have access.

Heathfield, Site no. 37. View on channel.


Kings, Site no: 38
Start of stretch.
Coalbrook Br.
Coalbrook House
COALBROOK DEMESNE
COALBROOK
Site A
Kings
Great's Wood
Coalbrook
Coal Shaft (Disused)
Ford
Stepping Stones
Colliery
1060'
65
60

Name of river: Kings

Site no. 38

General information

County: Tipperary
O.S. ½ inch sheet no. 18
O.S. 6 inch sheet no. 49
Grid ref: S 292 515
Sampling date: 9.7.85
Altitude: upland
Land use: pasture, tillage

Geology: Coal measures (4)
Soils: Gleys (4)
Water body size: stream
Height banks: 0-1.20m
Slope banks: various
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.030	NH_4^+	0.01
Total dissolved-P	0.057	NO_3^-	0.02
Ortho-phosphate	0.051	SO_4^{2-}	12.32
pH	7.3	Ca^{2+}	27.0
Conductivity	290	Mg^{2+}	5.0
Alkalinity	-	Na^+	7.57
Total hardness	130	K^+	4.7
Ca hardness	123	Cl^-	14.8

Channel substrate	
Type	% Cover
Rock	80
Silt	10
Gravel	5
Stones	3
Sand	2
Clay	<1
Boulders	<1

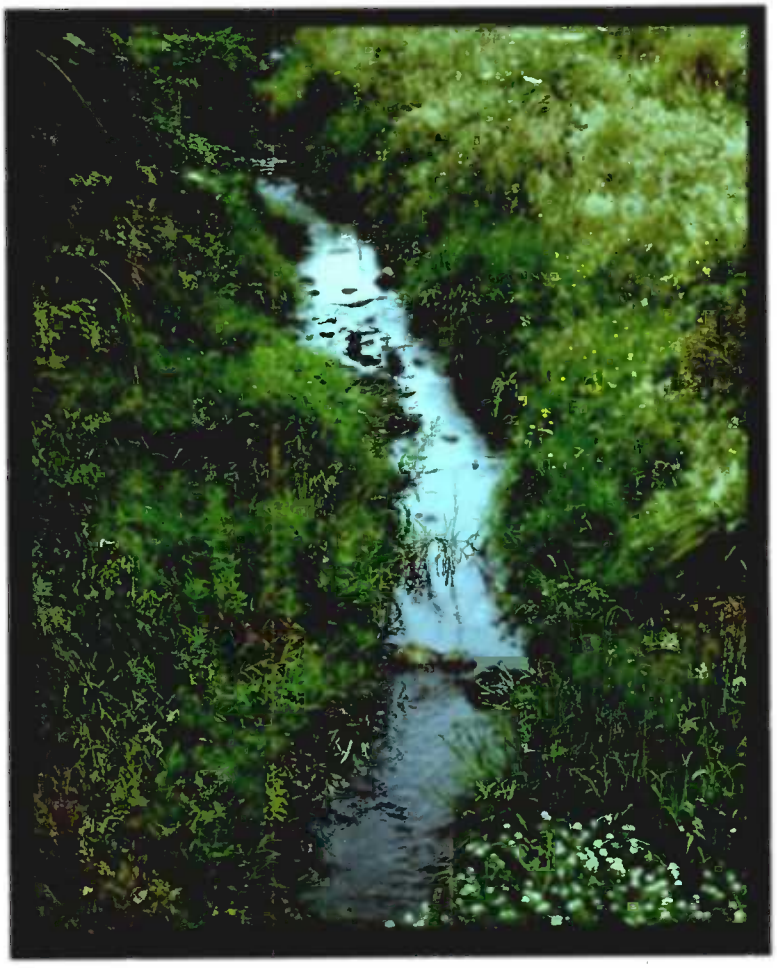
Vegetation

Plant type	% Plant cover	Dominant species
Floating leaf, rooted	<1	Callitriche
Floating leaf, free	<1	Lemna minor
Emerse vascular plant	23	Glyceria fluitans
Submerse bryophyte	<1	Amblystegium riparium
Emerse bryophyte	5	Eurhynchium praelongum v. stokesii E. swartzii, Conocephalum con.
Submerse algae	<1	Cladophora
Splash algae	<1	Vaucheria

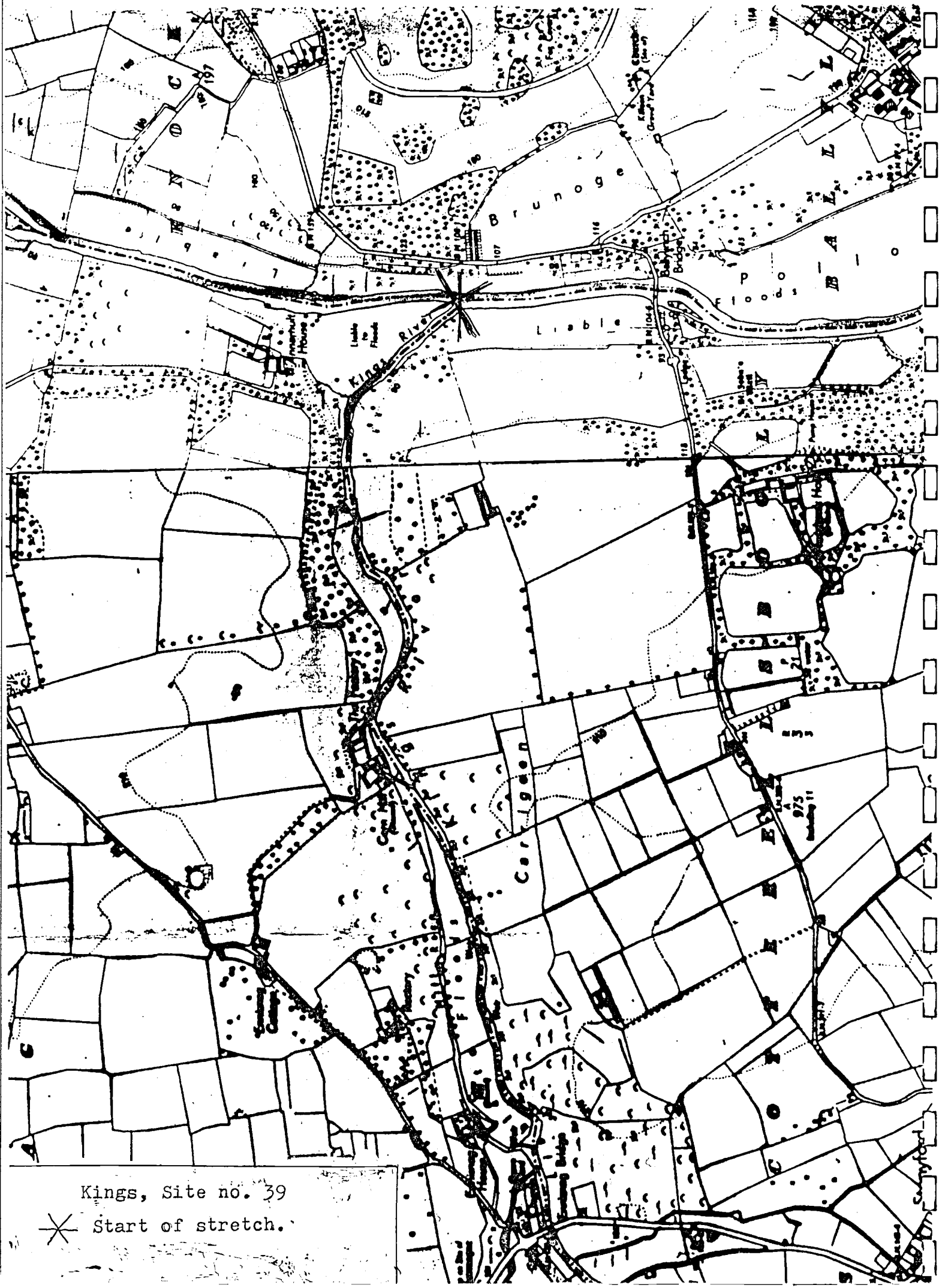
	Niche type	% Niche cover	Releve no.	Classification
Bed 70%	2	60	61	?
	1	10	52	Com. of Cladophora
	5	<1	98	Glycerio-Sparganion
Bank 30%	4	10	11	Conocephaletum
	6	20	99	Glycerio-Sparganion

Site description and comments

Shallow stream, drained in the past, not maintained.



Kings, Site no. 38. Stream flows by field of wheat, hence emergent vegetation undisturbed. Further upstream it flows by pasture, with much evidence of cattle trampling the banks and grazing stream side vegetation. For conservation purposes lifestock should be excluded from rivers and streams except for watering.



Kings, Site no. 39

✳ Start of stretch.

Name of river: Kings Site no. 39

General information

County: Kilkenny
O.S. ½ inch sheet no. 19
O.S. 6 inch sheet no. 27,28
Grid ref: S 545 440
Sampling date: 12.7.85
Altitude: lowland
Land use: pasture, woodland

Geology: Limestone (5)
Soils: Grey brown podzolics (3)
Water body size: river
Height banks: 1m
Slope banks: 90°
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.077	NH_4^+	0.01
Total dissolved-P	0.070	NO_3^-	1.37
Ortho-phosphate	0.072	SO_4^{2-}	4.41
pH	7.05	Ca^{2+}	45.0
Conductivity	420	Mg^{2+}	14.0
Alkalinity	-	Na^+	9.35
Total hardness	249.6	K^+	4.6
Ca-hardness	242	Cl^-	20.0

Channel substrate	
Type	% Cover
Marl	45
Silt	20
Gravel	15
Rock	10
Sand	7
Stones	3
Boulders	<1

Vegetation

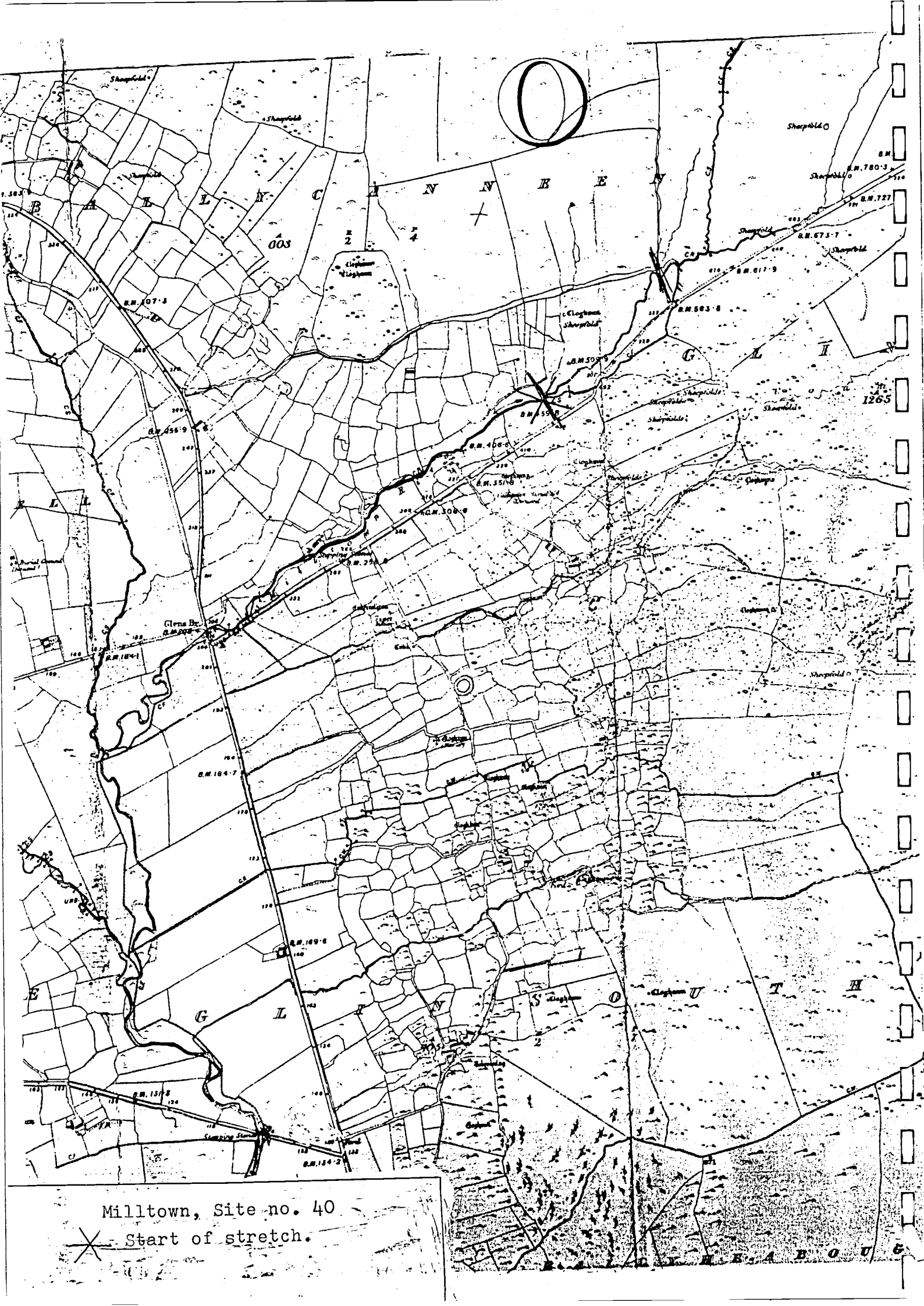
Plant type	% Plant cover	Dominant species
Submerse vascular plant	20	Scirpus lacustris
Floating leaf, rooted	1	Nuphar lutea
Floating leaf, free	<1	Lemna minor
Emerse vascular plant	3	Scirpus lacustris
Submerse bryophyte	2	Riccardia pinguis
Emerse bryophyte	<1	Conocephalum conicum
Submerse algae	65	Cladophora & Vaucheria

	Niche type	% Niche cover	Relevé no.	Classification
Bed 95%	1,1A	64	74,53	Community of
	2	1	73	Cladophora
	3	24	-	-
	10	3	86	prob. Glycerio-Sparganion
	11	3	-	-
	8	<1	-	-
Bank 5%	4	5	16	Conocephaletum
	6	<1	91	prob. Apion nodiflori

Site description and comments

River, wadable stretches with Scirpus lacustris, pools and shallow riffles clad in tufa alternate. Calcarious rivers of this type are of great conservation interest and should not be drained further or polluted. Slight enrichment is noticable.

Kings, Site no. 39. View of channel, fairly deep area. Island in forground not considered in survey.


Milltown, Site no. 40
Start of stretch.

Name of river: Milltown Site no. 40

General information

County: Kerry
O.S. ½ inch sheet no. 20
O.S. 6 inch sheet no. 43
Grid ref: Q 440 070
Sampling date: 25.7.84
Altitude: upland
Land use: rough grazing

Geology: Dingle beds (3)
Soils: Peaty podzols (2)
Water body size: stream
Height banks: 1m
Slope banks: 90°
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.008	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	-
Ortho-phosphate	0.008	SO_4^{2-}	-
pH	6.95	Ca^{2+}	2.8
Conductivity	110	Mg^{2+}	1.1
Alkalinity	30	Na^+	8.54
Total hardness	24	K^+	0.28
Ca-hardness	15	Cl^-	10

Channel substrate	
Type	% Cover
Rock	72
Boulders	20
Stones	5
Gravel	3
Sand	<1

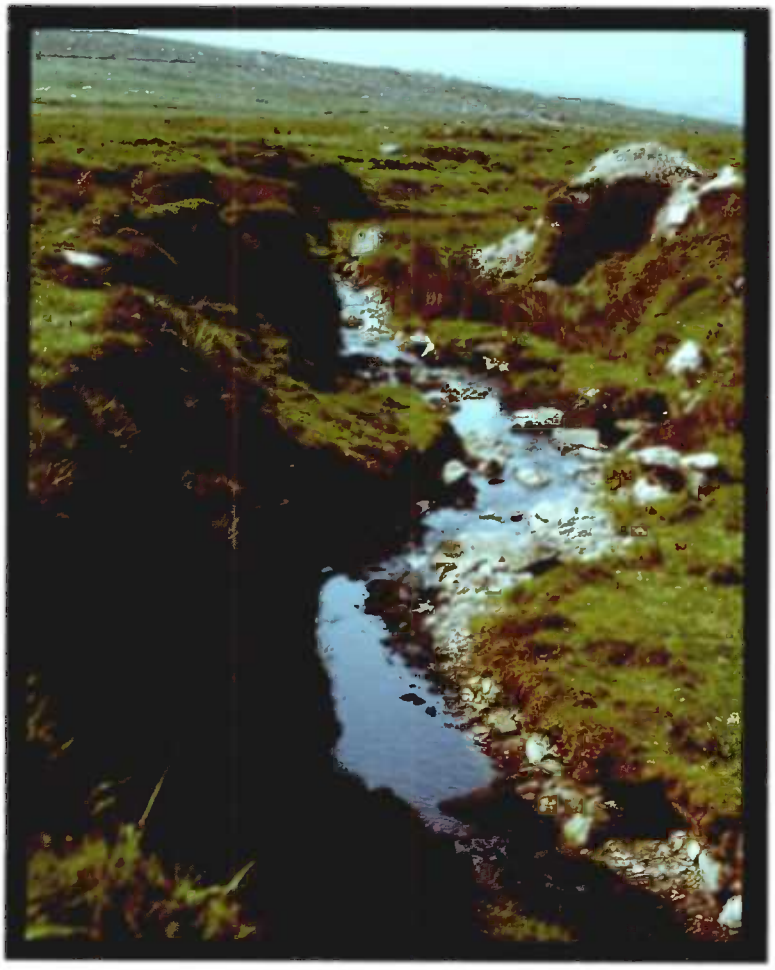
Vegetation

Plant type	% Plant cover	Dominant species
Emerse vascular plant	2	Mixture of species
Submerse bryophyte	5	Scapania undulata
Emerse bryophyte	15	Pellia epiphylla
Submerse algae	20	Spirogyra, Zygnema
Splash algae	<1	Palmella stage

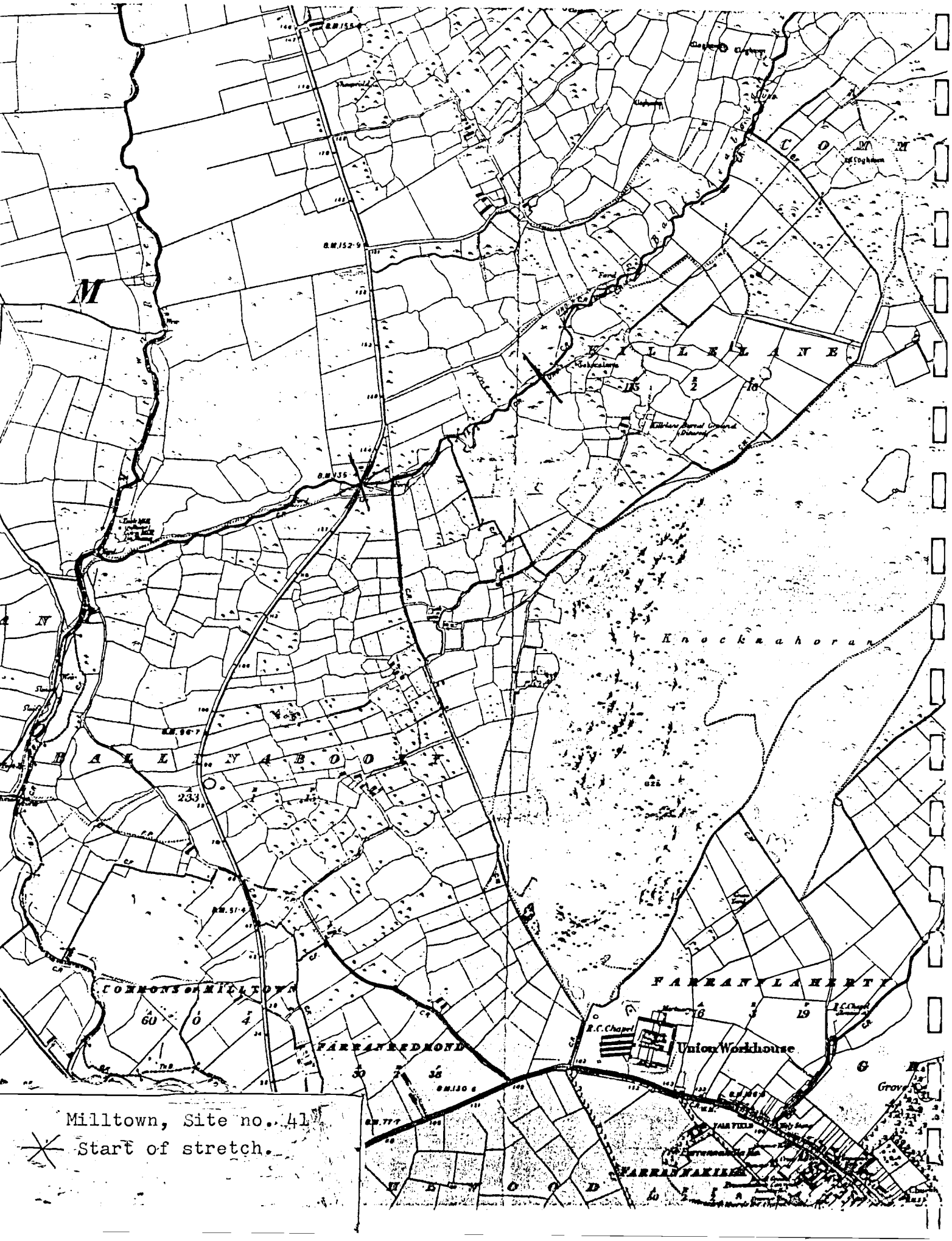
	Niche type	% Niche cover	Releve´ no.	Classification
Bed 75%	1	60	15	Scapanietum undulatae Rhynchostegietosum
	3	5	27	Scapanietum undulatae
	5	2	123	-
	8	5	-	-
Bank 25%	4	23	23,24,25	Pellietum epiphyllae Scapanietosum
	6	2	-	-

Site description and comments

Fast flowing clear stream, flashy. Of conservation interest.



Milltown, Site no. 40. Overall view.


Knockanahoran
KILLELANE
BALLYNABOOLY
COMMONS OF MILLTOWN
FARRANREDMOND
FARRANYLAHERTY
FARRANAKILLEN
Union Workhouse
R.C. Chapel
Grove
Milltown, Site no. 41
Start of stretch.

Name of river: Milltown Site no. 41

General information

County: Kerry
O.S. ½ inch sheet no. 20
O.S. 6 inch sheet no. 43
Grid ref: Q 435 127
Sampling date: 24.7.84
Altitude: lowland
Land use: pasture, tillage, rough grazing

Geology: Dingle beds (3)
Soils: Peaty podzols (2)
Water body size: stream
Height banks: 1m
Slope banks: 90°
Channel shading: medium
Length of stretch: 500m

Physico-chemical information

Total-P	0.010	NH_4^+	-
Total dissolved-P	0.015	NO_3^-	-
Ortho-phosphate	0.008	SO_4^{2-}	-
pH	6.65	Ca^{2+}	2.8
Conductivity	126	Mg^{2+}	24
Alkalinity	15	Na^+	12.8
Total hardness	20	K^+	0.35
Ca-hardness	11	Cl^-	16

Channel substrate	
Type	% Cover
Rock	75
Boulders	10
Stones	5
Gravel	5
Sand	5
Silt	<1

Vegetation

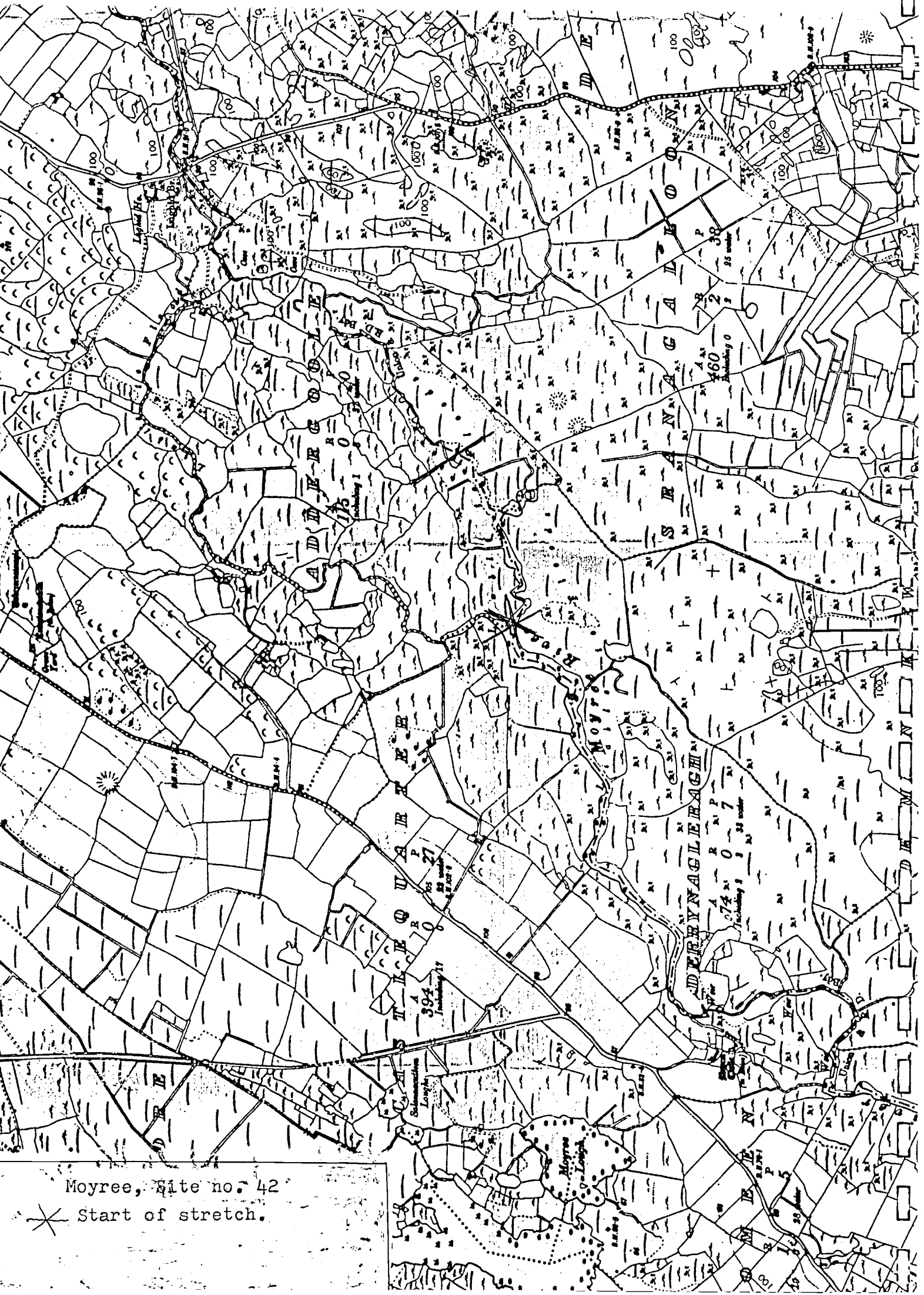
Plant type	% Plant cover	Dominant species
Emerse vascular plant	20	Anthoxanthum odoratum
Submerse bryophyte	10	Fontinalis squamosa
Emerse bryophyte	20	Rhynchostegium riparioides
Submerse algae	30	Chaemaesiphon fuscum & Lyngbya 2u
Splash algae	<1	Palmella stage

	Niche type	% Niche cover	Relevé no.	Classification
Bed 75%	2	60	22	Scapanietum undulatae Rhynchostegietosum
	3	3	28	Scapanietum undulatae
	5	5	118	-
	8	7	34	-
Bank 25%	4	20	42	Pellietum epiphyllae Scapanietosum
	6	5	-	-

Site description and comments

Lowland stream, fast flowing, rocky. Tributary to the main channel of the Milltown river. The latter had sewage fungus growing in it, caused by silage effluent.

Milltown, Site no. 41. Overall view of stream.


Moyree, Site no. 42
Start of stretch.

Name of river: Moyree Site no. 42

General information

County: Clare
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 18
Grid ref: R 390 907
Sampling date: 25.8.81
Altitude: lowland
Land use: rough grazing

Geology: Limestone (5)
Soils: Gleys (4)
Water body size: stream
Height banks: 0-0.20m
Slope banks: gentle
Channel shading: none
Length of stretch: 500m

Physico-chemical information

pH 7.8
Conductivity 355

Channel substrate

Type	% Cover
Silt	80
Peat	20
Clay	1
Rock	1

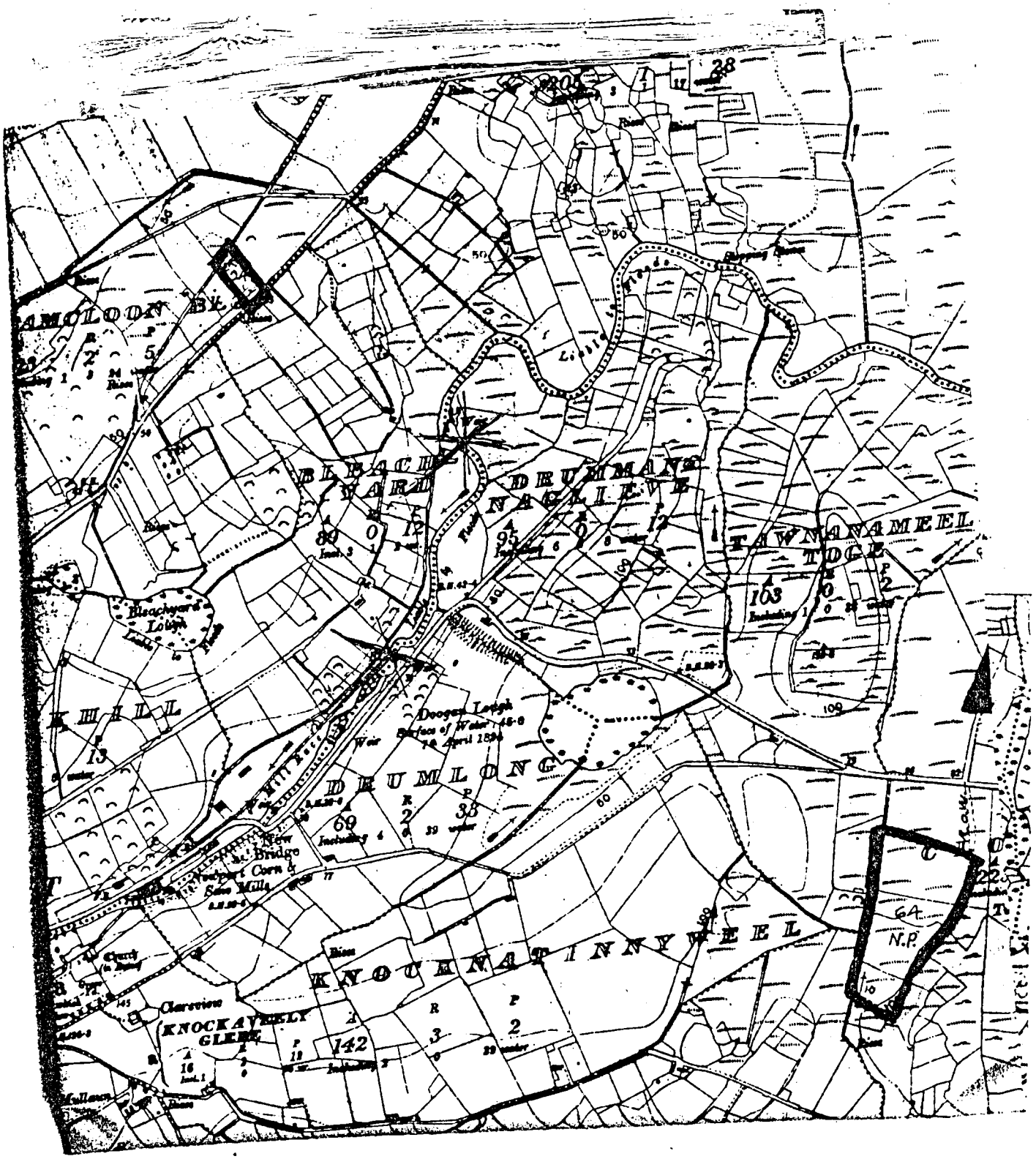
Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant		Nuphar lutea
Floating leaf, rooted	30	Nuphar lutea
Floating leaf, free		Lemna minor
Emerse vascular plant		Menyanthes
Submerse algae	1	Mixture
Splash algae	1	Vaucheria

Site description and comments

Slow flowing stream bordered by floating scraw and extensive fen vegetation. Depth on average 1.5m (0.30-2m). Pool areas, eroding and accumulating banks, meandering stretches. Of considerable conservation interest, especially the floodplain.

Moyree river, Co. Clare, Site no. 42. Pool in foreground. Of conservation interest, especially the floodplain.



Newport, Site no. 43

✳ Start of stretch.

Name of river: Newport Site no. 43

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 68
Grid ref: L 998 943
Sampling date: 11.6.84
14.6.84
Altitude: lowland
Land use: pasture

Geology: Shales & Sandstones (6)
Soils: Gleys (4)
Water body size: river
Height banks: 0.50m
Slope banks: 90°
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	-	NH_4^+	-
Total dissolved-P	-	NO_3^-	-
Ortho-phosphate	-	SO_4^{2-}	-
pH	8.05	Ca^{2+}	5.0
Conductivity	180	Mg^{2+}	1.8
Alkalinity	33	Na^+	13.6
Total hardness	40	K^+	0.87
Ca-hardness	23	Cl^-	30

Channel substrate	
Type	% Cover
Silt, Sand Gravel	50
Stones, rock Boulders	50

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	5	Potamogeton gramineus
Floating leaf, rooted	<1	Callitriche
Emerse vascular plant	1	Juncus effusus
Emerse bryophyte	15	Pellia epiphylla
Submerse algae	70	Oedogonium
Splash algae	<1	Palmella stage, Nostoc

	Niche type	% Niche cover	Releve no.	Classification
Bed 84%	3	79	-	-
	10	<1	-	-
	11	5	62	Com. of Potamogeton gramineus
Bank 16%	4	15	40	Pellietum epiphyllae Scapanietosum
	6	1	135	Valeriano-Filipenduletum (Molinietalia)

Site description and comments

Deep slow flowing stretch of river, with steep sandy banks, subsided in various places. Managed for fishing. The association Scapanietum undulatae grows in shallow areas of this river (examined wier).

Newport, Site no. 43. View of channel.

Str. 1
Str. 2
NP.
52596-D
P75
52595-T
Pho
R
Pho
T
T
T
T
169
Owenboliska, Site no. 44
Start of stretch.

Name of river: Owenboliska Site no. 44

General information

County: Galway
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 67
Grid ref: M 146 356
Sampling date: 14.7.81
21.6.85
Altitude: upland
Land use: rough grazing, forestry

Geology: Granite (1)
Soils: Rock outcrops and peat (1)
Water body size: brook (stretch 1)
river (stretch 2)
Height banks: 0.25m
Slope banks: various
Channel shading: light
Length of stretch: 500m

Physico-chemical information

Total-P	0.009	NH_4^+	0.44
Total dissolved-P	0.004	NO_3^-	1.00
Ortho-phosphate	<0.001	SO_4^{2-}	0.09
pH	6.35	Ca^{2+}	2.0
Conductivity	60	Mg^{2+}	1.0
Alkalinity	14.3	Na^+	7.28
Total hardness	60	K^+	0.16
Ca-hardness	57.6	Cl^-	11.79
Mn	0.0	Fe	0.3
Cu	0.0		

Channel substrate	
Type	% Cover
Stretch 1 (300m)	
Peat	100
Stretch 2 (200m)	
Boulders	85
Rock	4
Stones	4
Bedrock	1
Gravel	1
Sand	<1
Peat	5

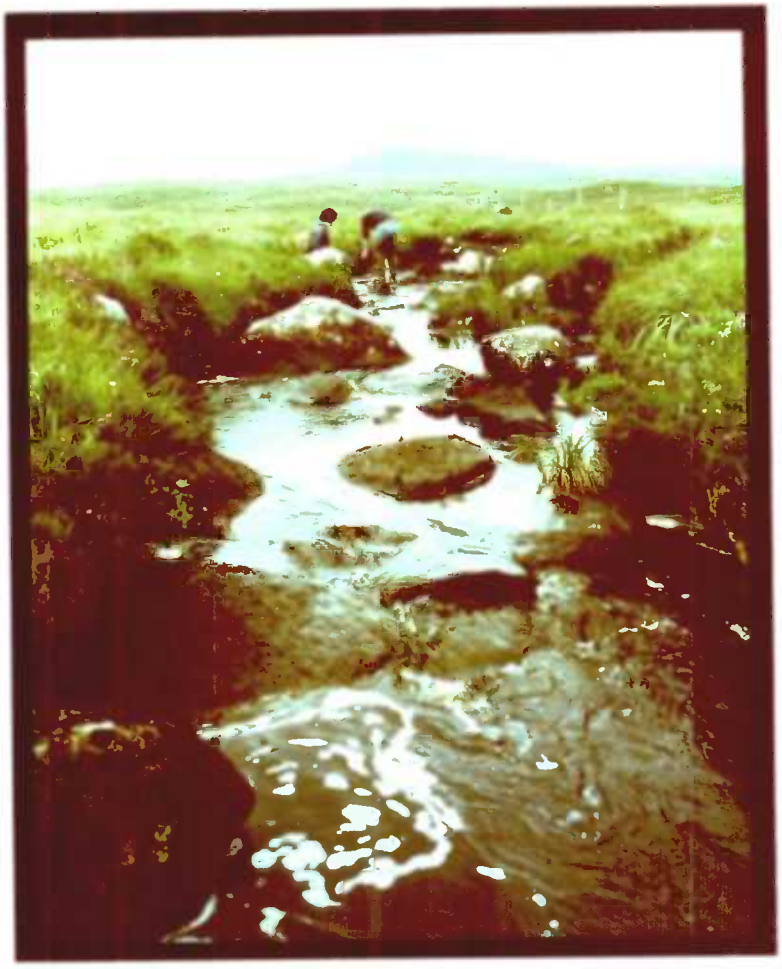
Vegetation

Plant type	% Plant cover	Dominant species
Stretch 1		
Submerse vascular plant	<1	Juncus bulbosus f. fluitans
Emerse vascular plant	<1	Menyanthes trifoliata
Emerse bryophyte	2	Pellia epiphylla
Stretch 2		
Submerse vascular plant	<1	Juncus bulbosus f. fluitans
Floating leaf, rooted	<1	Potamogeton natans
Emerse vascular plant	<1	Equisetum fluviatile
Submerse bryophyte	5	Scapania undulata
Emerse bryophyte	<1	Pellia epiphylla
Submerse algae	10	Microspora amoena
Splash algae	5	Stigonema mamillosa

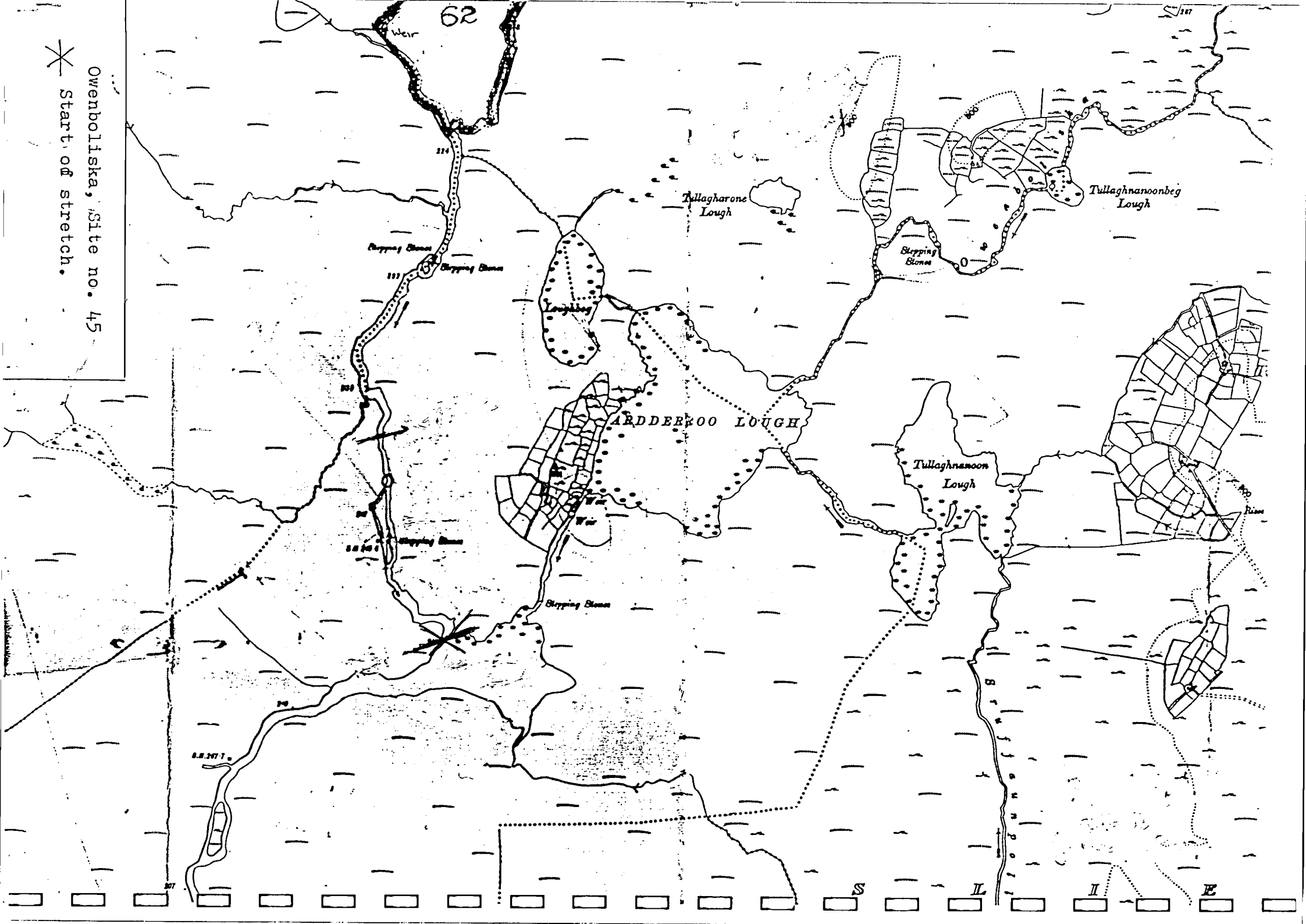
	Niche type	% Niche cover	Releve no.	Classification
Stretch 1				
Bed 66%	1	66	-	-
Bank 34%	4	34	49	Pellietum epiphyllae
Stretch 2				
Bed 93%	1A	1	2	Scapanietum undulatae Juncetosum bulbosi
	2	70	20	Scapanietum undulatae Rhynchostegietosum
	8	15	143	-
	7	7	122	Narthecio-Ericetum tetralicis
Bank 7%	4A	4	59	Pellietum epiphyllae
	6	3	-	-
	6A	marsh at edge of pool between stretch 1 and 2.	139	Rhynchosporion x Caricion curto-nigrae

Site description and comments

Stretch 1 is a narrow meandering steep sided stream deeply cut into the peat, some shallow areas with bare peat also. This flows into a pool (niche type 6A borders the pool). This pool emptish into a steep bouldery stream (stretch 2). Forestry in catchment.



Owenboliska, Site no. 44
Stretch 2. View of channel


62
Owenboliska, Site no. 45
Start of stretch.
Tullagharone Lough
Tullaghnanoonbeg Lough
Stepping Stones
Stepping Stones
Stepping Stones
Stepping Stones
Stepping Stones
Stepping Stones
Longlong
ARDDEBROO LOUGH
Tullaghnanoon Lough
Weir
Weir
Brusnapoll
S I L I E

Name of river: Owenboliska Site no. 45

General information

County: Galway
O.S. ½ inch sheet no. 14
O.S. 6 inch sheet no. 80
Grid ref: M 123 313
Sampling date: 15.7.81
20.6.85
Altitude: lowland
Land use: rough grazing, forestry

Geology: Granite (1)
Soils: Rock outcrops and peat (1)
Water body size: river
Height banks: 0.25m
Slope banks: steep
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.004	NH_4^+	0.08
Total dissolved-P	0.0	NO_3^-	1.13
Ortho-phosphate	<0.001	SO_4^{2-}	0.02
pH	6.0	Ca^{2+}	2.1
Conductivity	70	Mg^{2+}	1.2
Alkalinity	10.7	Na^+	9.0
Total hardness	64.6	K^+	0.21
Ca-hardness	39	Cl^-	16.5

Channel substrate

Type	% Cover
Boulders	80
Rock	15
Stones	4
Gravel	1

(deep area excluded)

Vegetation

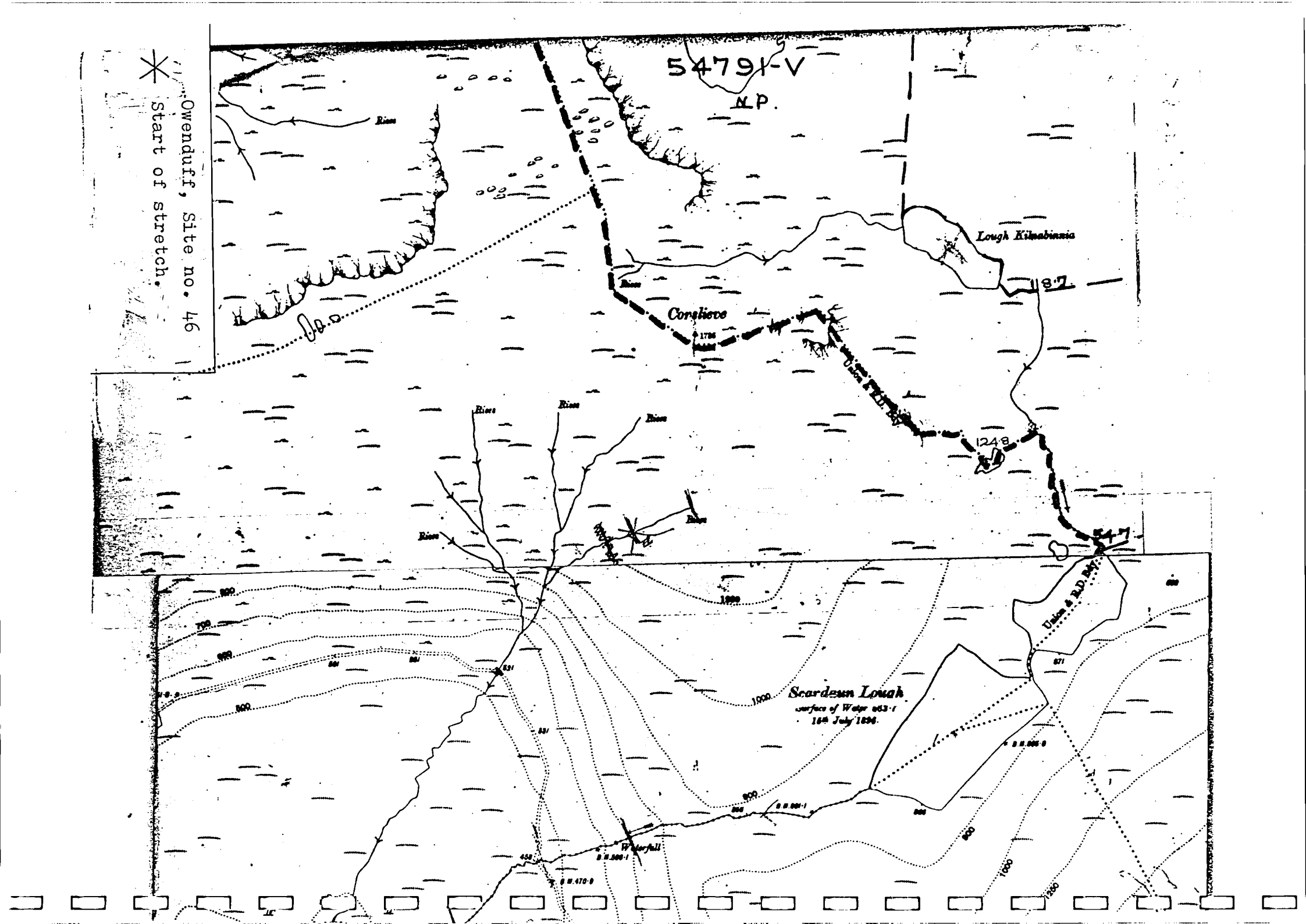
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Myriophylum alterniflorum
Floating leaf, rooted	<1	Potamogeton natans
Emerse vascular plant	4	Molinea coerulea
Submerse bryophyte	45	Scapania undulata
Emerse bryophyte	5	Racomitrium aciculare
Submerse algae	7	Microspora palustris v. minor
Splash algae	<1	Stigonema mamillosa

	Niche type	% Niche cover	Relevé no.	Classification
Bed 93%	2	55	5	Scapanietum undulatae Juncetum bulbosi
	3	33	-	-
	5	<1	43	Littorellion
	11	<1	-	-
	8	5	-	-
Bank 7%	4	4	48	Pellietum epiphyllae Scapanietosum
	4A	2	46	Com. of Racomitrium acicular
	4B	1	47	-

Site description and comments

Bouldery river with a lot of mass, deep areas, and two man made wiers. Forestry in catchment. Large island in stretch.

Owenboliska, Site no. 45. View of shallow stretch.


54791-V
N.P.
Owenduff, Site no. 46
Start of stretch.
Lough Kilsalvanna
Corslieve
1786
Rivers
124·8
8·7
4·7
Union & R.D. Bdy.
Scardaun Lough
surface of Water 653·1
16th July 1896.
Waterfall
1000
900
800
700
600
500
400

Name of river: Owenduff Site no. 46

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 36,45
Grid ref: F 915 120
Sampling date: 5.7.84
Altitude: mountain
Land use: rough grazing

Geology: Quarzite (2)
Soils: Peaty gleys (2)
Water body size: brook
Height banks: 0-0.30m
Slope banks: various
Channel shading: none
Length of stretch: 150m

Physico-chemical information

Total-P	0.045	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	0.178
Ortho-phosphate	0.020	SO_4^{2-}	-
pH	8.15	Ca^{2+}	3.2
Conductivity	110	Mg^{2+}	3.3
Alkalinity	14	Na^+	0.08
Total hardness	35	K^+	0.9
Ca-hardness	11	Cl^-	-

Channel substrate	
Type	% Cover
Rock	75
Bedrock	25
Stones	<1
Boulders	<1

Vegetation

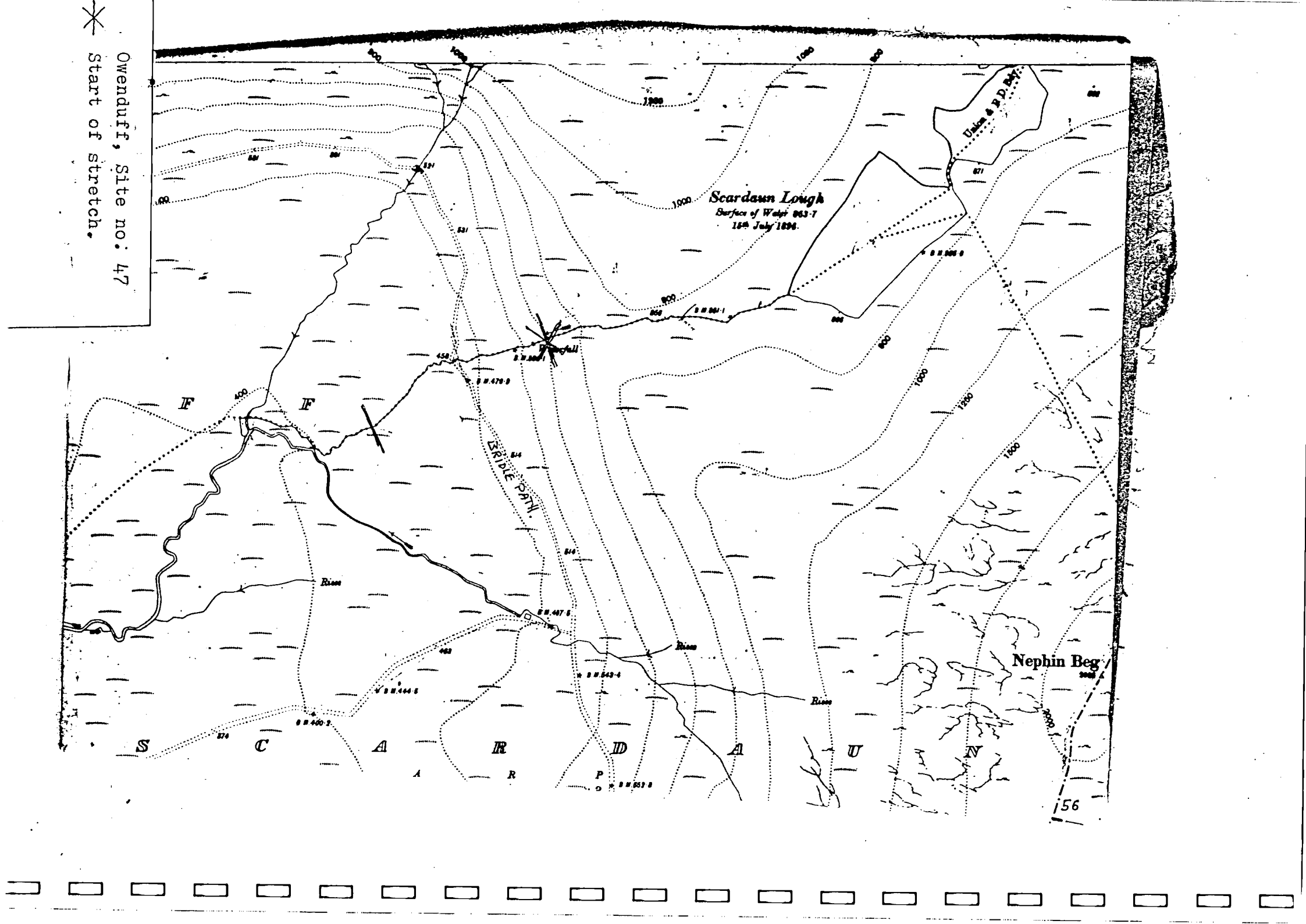
Plant type	% Plant cover	Dominant species
Emerse vascular plant	3	Nardus stricta
Emerse bryophyte	27	Pellia epiphylla
Submerse algae	5	Phormidium
Splash algae	<1	Nostoc

	Niche type	% Niche cover	Relevé no.	Classification
Bed 60%	2	60	18	Scapanietum undulatae Rhynchostegietosum
	8	<1	38	Com. of Racomitrium aciculare
Bank 40%	4	35	29,30,31	Pellietum epiphyllae Scapanietosum
	6	5	-	-

Site description and comments

Small, very steep mountain stream. At time of sampling the stream was almost dry, which explains why the pH was so high (8.15).
Of conservation interest.

Owenduff, Site no. 46. The site is the first stream on the right hand side of the picture, one-fifth down from the top. The whole Owenduff system is of international conservation interest.


Owenduff, Site no: 47
Start of stretch.
Scardaun Lough
Surface of Water 963·7
15th July 1896.
Union & P.D. Boy
Bridle Path
Rivers
Nephin Beg
SCARDAUN
56

Name of river: Owenduff Site no. 47

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 45
Grid ref: F 916 108
Sampling date: 5.7.84
Altitude: upland
Land use: rough grazing

Geology: Quarzite (2)
Soils: Peaty gleys (2)
Water body size: stream
Height banks: 0.30m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.013	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	0.020
Ortho-phosphate	0.005	SO_4^{2-}	-
pH	6.75	Ca^{2+}	1.7
Conductivity	100	Mg^{2+}	1.8
Alkalinity	13	Na^+	9.33
Total hardness	22	K^+	0.49
Ca-hardness	10	Cl^-	-

Channel substrate	
Type	% Cover
Rock	59
Boulders	20
Bedrock	10
Stones	5
Gravel	5
Sand	1
Silt	<1

Vegetation

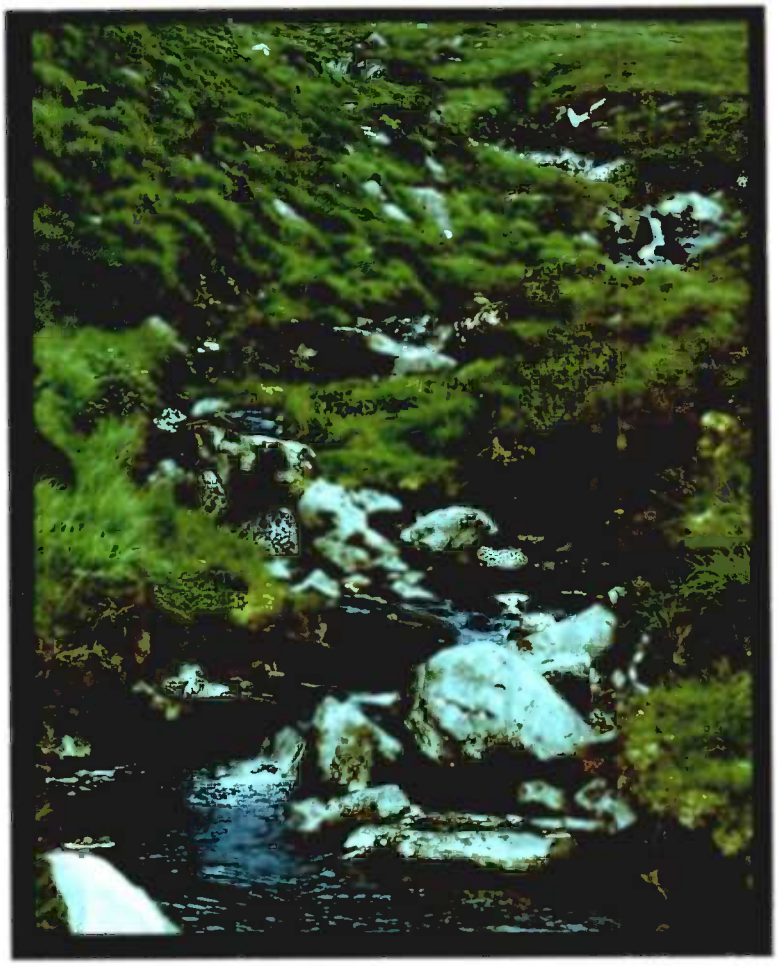
Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Juncus bulbosus f. fluitans
Emerse vascular plant	<1	Mixture
Submerse bryophyte	30	Scapania undulata
Emerse bryophyte	20	Pellia epiphylla
Submerse algae	20	Filamentous greens
Splash algae	1	Stigonema mamillosa

	Niche type	% Niche cover	Releve no.	Classification
Bed 70%	1	15	16	Scapanietum undulatae Juncetosum bulbosi
	2	20	8	
	3	5	-	-
	3A	<1	31	Scapanietum undulatae
	9	15	-	Scapanietum undulatae
	12	3	-	-
	8	10	136	-
Bank 30%	4	30	32	Pellietum epiphyllae Scapanietosum
	4A	<1	-	-

Site description and comments

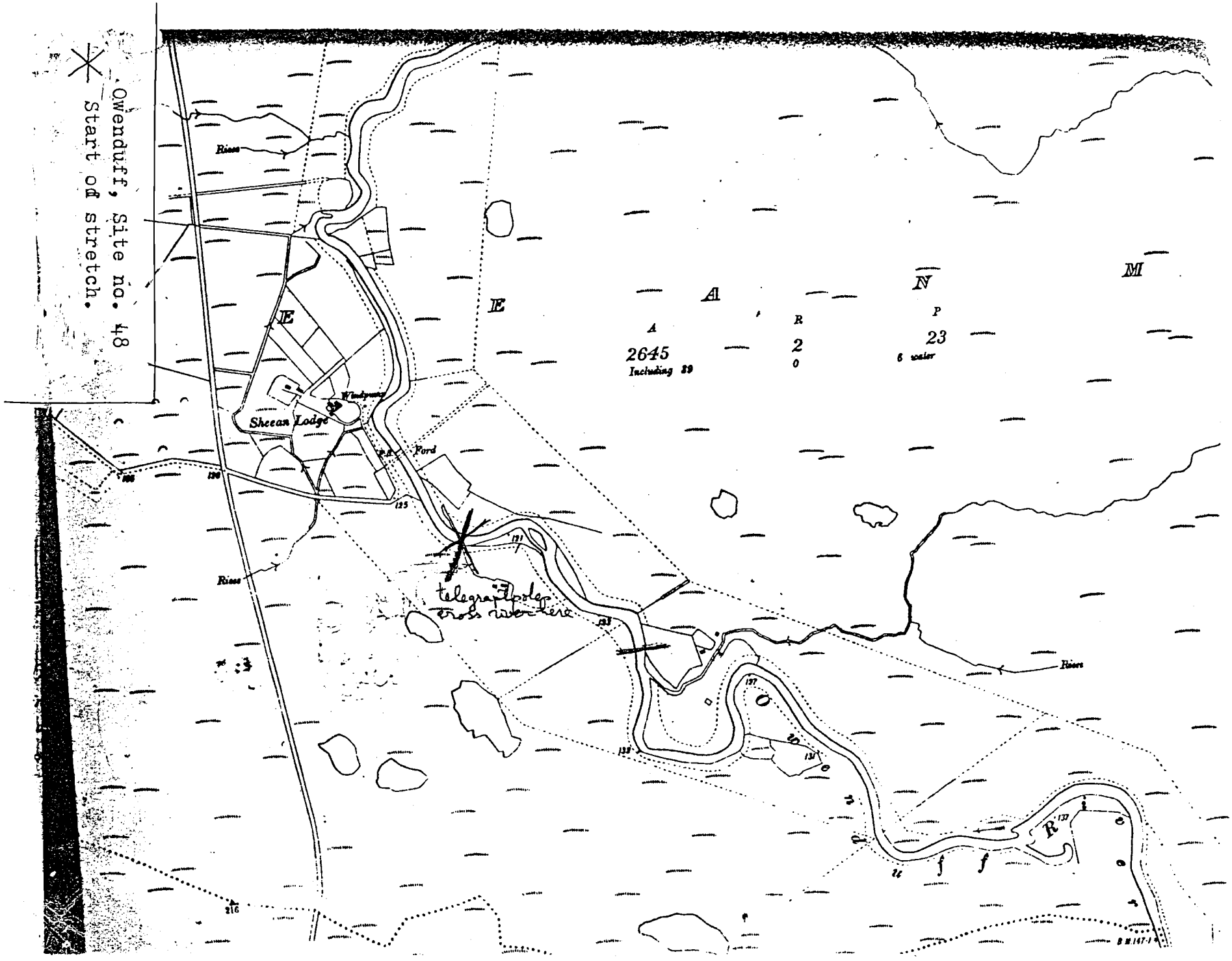
Stream falls quickly to the bridle path (see picture, it goes from left to right, bottom half), cascades and waterfalls are the main feature. Then it flattens out and cuts through peatland forming large meanders. This site is of international conservation interest. It is the only river system in Ireland without habitation and minimal human influence. It is not only of international importance from a biological point of view, but also of physical-geographic and hydrological importance.

Owenduff, Site no. 47. Site in middle forground. Note meanders, and lighter green of the vegetation near the river, caused by the deposition of sand. Both the natural river system and the surrounding blanket bog and heathland landscape are of international scientific importance and should be conserved as a nature reserve.



Owenduff, Site no. 47. View of steep part of channel.

Owenduff, Site no. 47. Meander cutting through bogland, flatter part of channel.


Owenduff, Site no. 48
Start of stretch.
Sheean Lodge
Ford
telegraph pole
cross over here
Rivers
2645
Including 39
23
6 water

Name of river: Owenduff Site no. 48

General information

County: Mayo
O.S. ½ inch sheet no. 6
O.S. 6 inch sheet no. 44
Grid ref: F 843 093
Sampling date: 12.6.84
Altitude: lowland
Land use: rough grazing

Geology: Quarzite (2)
Soils: Climatic peat (1)
Water body size: river
Height banks: 0-1.50m
Slope banks: various
Channel shading: none
Length of stretch: 500m

Physico-chemical information

				Channel substrate	
Total-P	-	NH_4^+	-	Type	% Cover
Total dissolved-P	-	NO_3^-	-	Rock	90
Ortho-phosphate	-	SO_4^{2-}	-	Stones	9
pH	7.05	Ca^{2+}	4.1	Boulders	5
Conductivity	140	Mg^{2+}	3.0	Gravel	1
Alkalinity	21	Na^+	12.78	Sand	<1
Total hardness	28	K^+	0.63		
Ca-hardness	8	Cl^-	26		

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	<1	Juncus bulbosus f. fluitans
Emerse vascular plant	5	Juncus acutiflorus
Submerse bryophyte	1	Racomitrium aciculare
Submerse algae	39	Mixture of species
Splash algae	1	Mougeotia (algal paper)

	Niche type	% Niche cover	Relevé no.	Classification
Bed 85%	1	10	1	Scapanietum undulatae
	2	55	7	Juncetosum bulbosi
	5	20	46	-
	5A	<1	44	-
Bank 15%	4	5	33	Pellietum epiphyllae Scapanietosum
	6	10	133	Violion caninae

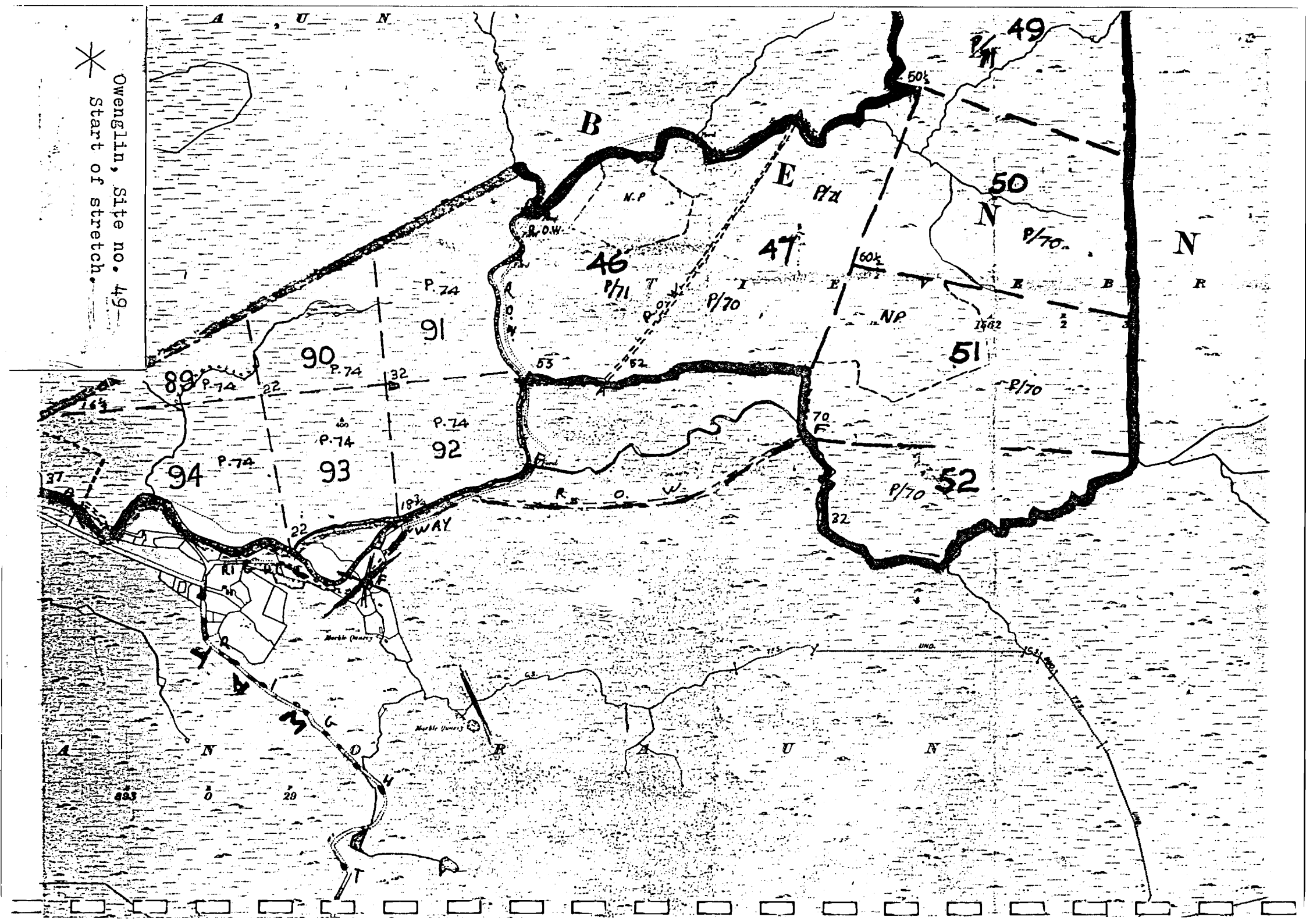
Site description and comments

Meandering river, obviously very flashy. The last complete river system in Ireland and Western Europe without human habitation in its catchment (mouth excluded). It flows through large unforested areas of blanket

bog. The river system and its catchment are of international scientific importance and should be conserved as a nature reserve as soon as possible.

Owenduff, Site no. 48. View of lowland channel.

Owenduff, Site no. 48. Detail of river bed.


Owenglin, Site no. 49
Start of stretch.
A U N
B E L T
R.O.W.
N.P
46
47
49
50
51
52
89
90
91
92
93
94
P/70
P/71
P/72
P.74
NP
1562
Marble Quarry
Marble Quarries
R I G
WAY
M A G O U R A
A U N

Name of river: Owenglin Site no. 49

General information

County: Galway
O.S. ½ inch sheet no. 10
O.S. 6 inch sheet no. 36
Grid ref: L 750 510
Sampling date: 9.7.84
Altitude: upland
Land use: rough grazing

Geology: Quarzite (2)
Soils: Peaty gleys (2)
Water body size: brook/stream
Height banks: 0.50m
Slope banks: 90°
Channel shading: none
Length of stretch: Stretch 1: 300m
Stretch 2: 200m

Physico-chemical information

Total-P	0.013	NH_4^+	-
Total dissolved-P	0.013	NO_3^-	0.075
Ortho-phosphate	0.013	SO_4^{2-}	-
pH	7.35	Ca^{2+}	6.80
Conductivity	185	Mg^{2+}	2.6
Alkalinity	23	Na^+	9.52
Total hardness	32	K^+	0.40
Ca-hardness	25	Cl^-	15

Channel substrate

Stretch 1		Stretch 2	
Type	% Cover	Type	% Cover
Rock	80	Gravel	35
Stones	7	Sand,Silt	55
Gravel	5	Clay	10
Boulders	5	Stones,Rock Boulders Bedrock	<1
Sand,Silt	3		

Vegetation (stretch 1 and 2)

Plant type	% Plant cover	Dominant species
Submerse vascular plant	5	Scirpus fluitans, Juncus bulbosus
Floating leaf, rooted	5	Potamogeton natans
Emerse vascular plant	10	Carex rostrata
Submerse bryophyte	<1	Blindia acuta
Emerse bryophyte	10	Pellia epiphylla
Submerse algae	20	Mixture of species
Splash algae	<1	Palmella stage

	Niche type	% Niche cover	Relevé no.	Classification
Bed 80%	2 (str. 1&2)	30	9	Scapanietum undulatae Juncetum bulbosi
	2A (str. 2)	20	10	Littorellion, with elements of Scap. undulatae
	3 (str. 1&2)	12	12(str.1)	Com. of Juncus bulbosus
	5 (str.1)	3	128	-
	5A (str.2)	15	42	-
	8	<1	-	-

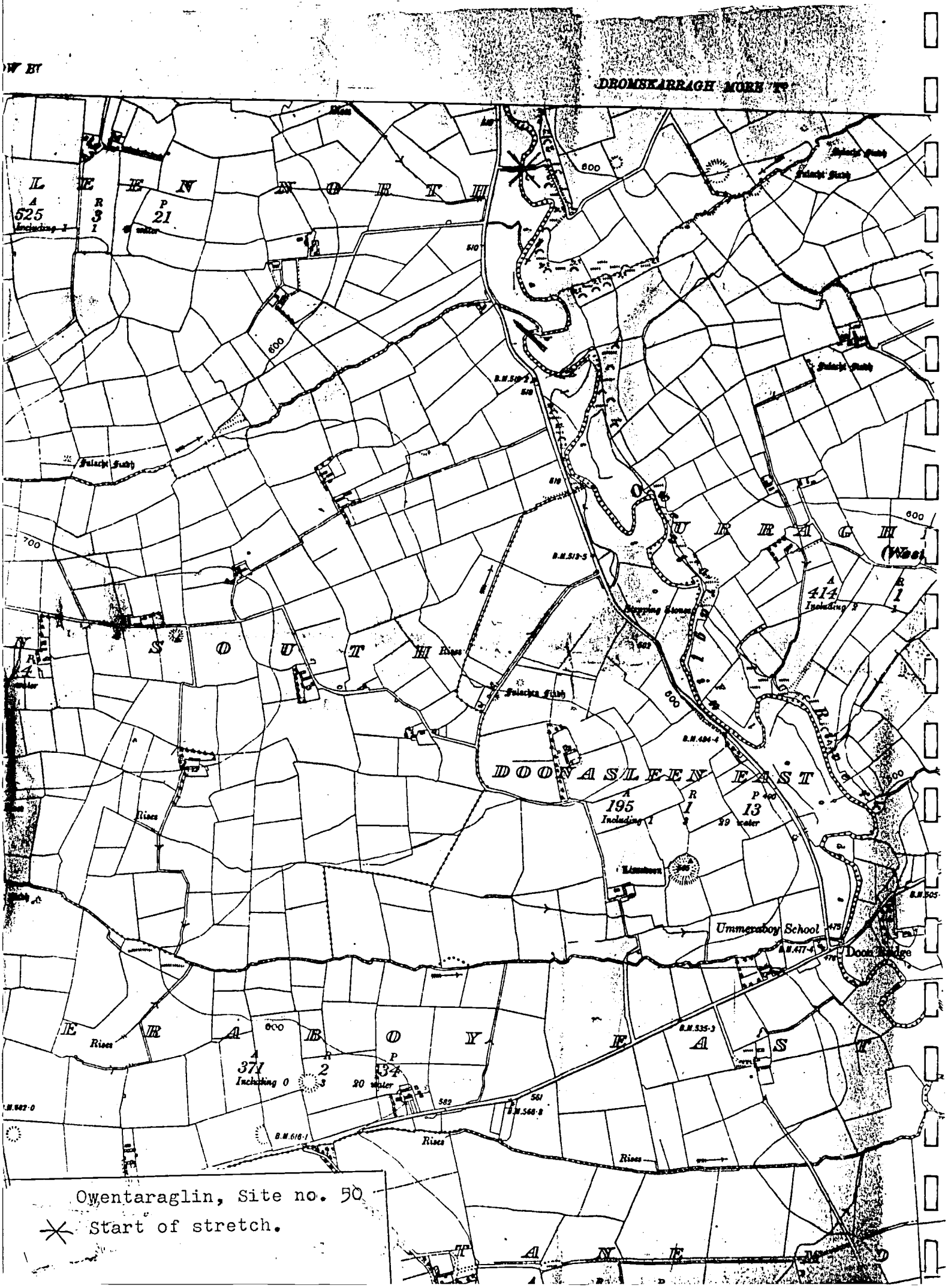
	Niche type	% Niche cover	Releve no.	Classification
Bank 20%	4	15	34,35,36	FUNARIETUM ATTENUATAE
	6	5	-	-

Site description and comments

Narrow stream (stretch 2) cut deeply into peat, substrate of fine material (gravel,clay,sand) with Littorellion species alternate with deeper slower and more barren areas. This stretch changes into a wider shallower and more rocky stream (stretch 1) alternated with areas of shallow pools with moderate flow. No forestry in the catchment above this site. Of potential conservation interest.

Owenglin, Site no. 49. Rocky stream, stretch 1

Cwenglin, Site no. 49. Narrow channel cutting through bog, substrate mineral. Stretch 2.



Owentaraglin, Site no. 50

Name of river: Owentaraglin Site no. 50

General information

County: Cork
O.S. ½ inch sheet no. 21
O.S. 6 inch sheet no. 29
Grid ref: R 220 010
Sampling date: 30.5.85
Altitude: upland
Land use: pasture

Geology: Coal measures (4)
Soils: Gleys (4)
Water body size: river
Height banks: 1.60m
Slope banks: steep
Channel shading: none
Length of stretch: 500m

Physico-chemical information

Total-P	0.048	NH_4^+	0.14
Total dissolved-P	0.035	NO_3^-	3.2
Ortho-phosphate	0.039	SO_4^{2-}	5.33
pH	~	Ca^{2+}	6.2
Conductivity	150	Mg^{2+}	2.6
Alkalinity	30	Na^+	10.8
Total hardness	90	K^+	2.14
Ca-hardness	88	Cl^-	16.6

Channel substrate	
Type	% Cover
Rock	65
Sand	15
Gravel	10
Stones	10
Boulders	<1

Vegetation

Plant type	% Plant cover	Dominant species
Submerse vascular plant	4	Ranunculus penicillata v. penicillata
Floating leaf, rooted	2	Ranunculus pen. v. pen.
Emerse vascular plant	<1	Iris, Oenanthe croccata
Submerse bryophyte	<1	Fontinalis antipyretica
Emerse bryophyte	<1	Pellia epiphylla
Submerse algae	<1	Lemania fluviatile
Splash algae	<1	Vaucheria

	Niche type	% Niche cover	Relevé no.	Classification
Bed 90%	1	75	69	Callitricho-Batrachion
	2	10	65	Callitricho-Batrachion
	3	5	-	-
	5	<1	103	-
Bank 10%	4	10	-	probably Pellietum epiphyllae Atrichetosum

Site description and comments

Meandering river with steep sides. Managed for trout fishing. Note the high nitrate level, probably caused by agricultural runoff. Could be managed for conservation.

Owentaraglin, Site no.50. View of channel.