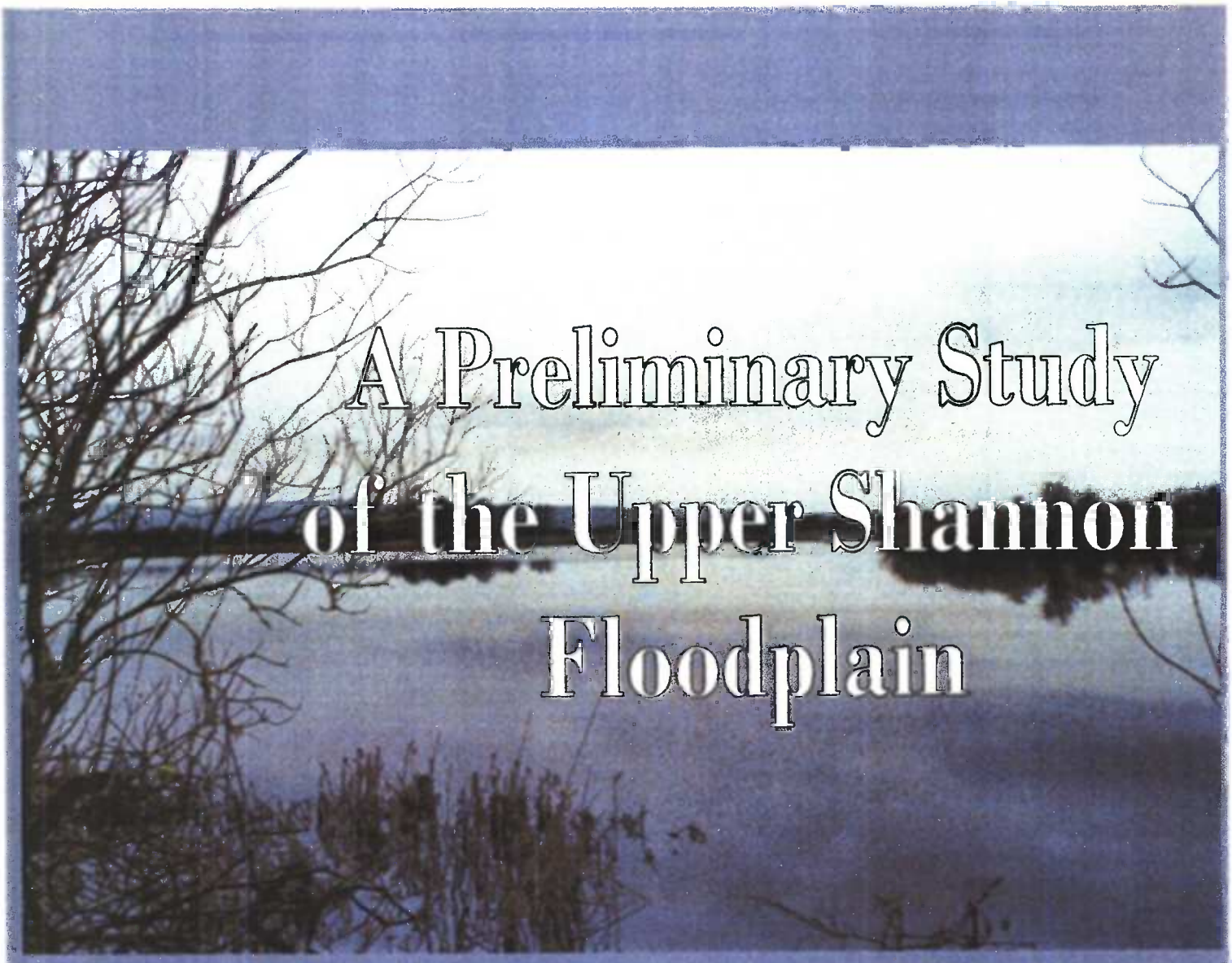

A Preliminary Study of the Upper Shannon Floodplain

Browne Dunne Roche
Consulting Ecologists
May 2002

A PRELIMINARY STUDY

OF THE

UPPER SHANNON FLOODPLAIN

A Report by

Browne Dunne Roche Consulting Ecologists

May 2002

Commissioned by Dúchas The Heritage Service
Department of Arts, Heritage, Gaeltacht and the Islands.

EXECUTIVE SUMMARY

1. This study examines conservation interest in the Upper Shannon catchment. The project area includes the Shannon and its floodplain from Lanesborough, County Longford, to the northern shore of Lough Allen, County Leitrim. It also includes Loughs Key and Drumharlow, County Roscommon, and an area of many small lakes between Strokestown and Elphin in County Roscommon.

2. The main aims of the study are:
   - to map habitats using available aerial photography combined with ground truthing.
   - to identify areas of conservation interest that are not already covered by a conservation designation.
   - to note the important species found in the area and to identify gaps in knowledge of these species.
   - to zone the entire area according to three classes. Zone A highlights areas of greatest conservation interest where development is likely to have adverse impacts. Zone B includes areas of interest where proposals for new developments should be adequately assessed and Zone C indicates areas of least conservation interest.

3. Information on soils, geology, species of conservation interest and planning are collated from published sources, consultations and the Dúchas file archive.

4. A number of conservation areas, mostly NHAs, already exist. These mainly incorporate large lake bodies (e.g. Loughs Boderg and Bofin, Drumharlow) or stretches of lake shoreline and islands (e.g. Lough Allen and Lough Key).

5. Fourteen different habitat types are identified, including raised bog and turlough, both listed in Annex I of the EU Habitats Directive. The most common habitat within the project area is improved grassland. Lakes and wet grassland are the next most abundant habitat types. Broadleaved semi-natural woodland is relatively scarce throughout. Scrub is common, but does not occur extensively. Cutaway raised bog is relatively abundant in the southern half of the project area.

6. The Greenland White-fronted Goose is a species of conservation interest found within the survey area in winter. The two Greenland White-fronted Goose flocks of the Upper Shannon have undergone serious decline.

7. Some rare plant species are recorded from the project area, however, none of these are protected under the Flora Protection Order.

8. Very little information is available for Annex I invertebrate species such as white clawed crayfish or freshwater pearl mussel.

9. Zone A sites (those of greatest potential conservation interest) include:
   - complexes of small lakes between Strokestown and Elphin, where marl lake and *Schoenus* fen may be present.

- the Shannon and Feorish River floodplains near Termonbarry and Lanesborough where callows vegetation may be found.
- Kilgarriff and Rossmore Bay at the northern shore of Lough Allen which includes a complex of lake, reedbed, wet grassland and wet-woodland vegetation types.

10. Increased numbers of applications for planning permission within the Upper Shannon area have been associated with the implementation of the Rural Renewal Scheme. Considerable development is taking place at Carrick-on-Shannon, Leitrim Village, Drumshanbo and Newtown Forbes. Ribbon development of private dwellings along small roads in parts of Roscommon is indicated.

11. In ecologically sensitive areas, residential or industrial development leads to habitat loss and fragmentation.

12. Rhododendron and other invasive species, such as cherry laurel, threaten the ecological diversity of woodlands and cutaway bog, particularly around Castleforbes and Rockingham demesnes.

13. The invasive species, zebra mussel is a serious threat to aquatic life of the Shannon. When zebra mussels occur in large numbers they can dramatically alter a lake ecosystem causing a shift of energy flow from pelagic (middle or surface level dwellers) to benthic (bottom dwellers).

14. The study recommends extensions to some existing NHAs to include areas of winter flooding, good quality semi-natural habitat and / or known feeding sites of Greenland White-fronted Geese.

15. Many of the Zone A sites were flooded during the timeframe of the present project so further, detailed, summer surveying is recommended for these areas to determine conservation interest and whether they qualify for NHA status.

16. Detailed survey and monitoring are recommended for Greenland White-fronted Geese, white-clawed crayfish and fresh water pearl mussel to determine more accurately population status and distributions. The reasons for the decline of Greenland White-fronted Geese should be elucidated.

17. Within NHA and SAC woodlands, a programme of invasive species removal in cooperation with landowners, would be ideal.

18. Additional Dúchas field staff should be appointed to monitor the Upper Shannon area in its entirety.

19. Dúchas needs a policy on the levels of amenity/leisure activity that can take place within designated areas to facilitate conservation management decisions.

20. It is recommended that all planning developments for marinas/jetties are forwarded to Dúchas for comment, regardless of whether the proposed development is situated in a designated conservation area.

21. The River Shannon and its catchment is a hugely important biodiversity resource. It retains extensive areas of semi-natural vegetation in its floodplain, as well as a number of species of conservation interest. However, systematic survey and monitoring of rare species, further designation of conservation areas, and appropriate assessment of proposed developments in sensitive areas are required to ensure that this conservation interest is maintained. The Upper Shannon may be suitable for designation as a National Park, or as a single large NHA/SAC, since management of current areas of conservation along the Shannon cannot be seen in isolation from the rest of the river system.

Acknowledgements
Browne Dunne Roche Consulting Ecologists would like to acknowledge the assistance of Dúchas staff. We would also like to thank all consultees who contributed to the project (see Appendix 2).

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1.0 Introduction

1.1 River Shannon

The River Shannon catchment is the largest in Ireland covering an area of 14,700 km^2 from its source in County Cavan to the Shannon estuary in County Limerick (Figure 1.1).

The River Shannon does not fall significantly throughout much of its course (from Lough Allen in Leitrim to Killaloe in Clare it only drops 17m). This results in an extensive floodplain and slow, meandering course for most of the river's length.

One-fifth of the land area of Ireland drains inwards through various lakes, rivers and streams in to the Shannon system. The river catchment consists of a series of small rivers and lakes. The river produces valley topography in only a few places. Summer water levels over most of the area are only a metre or less below the level of the surrounding fields so any rise in the water levels produces extensive flooding (Delaney 2000).

The Shannon system is navigable, and has been for almost 200 years, with a channel maintained along much of its course. A number of canals facilitate navigation at certain points and also allow access to lake systems such as Lough Erne.

1.2 Study Area

The project area takes in parts of counties Longford, Roscommon and Leitrim, extending from Lanesborough to the northern shore of Lough Allen. It also includes an area of small lakes between Rooskey and Strokestown, and the Boyle River west to, and including, Lough Key (Figure 1.2).

The area is generally low lying (highest point is 137m OD at Kiltrustan, north of Strokestown), but drumlins are a prominent landscape feature. The mountains surrounding Lough Allen are outside the survey boundary.

Lakes are an important element of this study. Lough Allen is the largest lake (approximately 65km^2) and marks the northern boundary of the survey area. The Electricity Supply Board uses Lough Allen as a reservoir and control the level by sluice. The water level can fluctuate by as much as 2.5m (O'Reilly 1998). Loughs Eidin (Drumharlow), Boderg, Bofin and Forbes are important areas of conservation. Lough Key on the western edge of the survey area covers an area of 8.5km^2 and some sections of its shoreline and one island are covered by NHA designations. A network of other lakes which include Grange and Kilglass Loughs, occurs in the western region of the survey area between Strokestown and Elphin. These water bodies are connected by a series of rivers and streams. This intricate hydrological system supports an interesting complex of habitat types such as marl lake, fen and bog. The lakes throughout the survey area are particularly important habitats for overwintering wild fowl.

Carrick-on-Shannon is the main town within the survey area. This is one of the smallest Irish County Towns with a population of 2,500, but many new developments are evident on its outskirts.

The principal land use throughout the survey area is agriculture, predominantly grazing by cattle and sheep. Due to soil and environmental constraints agriculture is practised less intensively toward the north of the project boundary. Afforested areas are scattered throughout the survey area but the most significant plantations are centred around Lough Key. This lake also has a Forest Park on its southern shore which is an important amenity area for the region (Brady Shipman Martin 1981). There are occasional, large industrial developments such as Masonite, south of Carrick-on-Shannon.

1.3 Fishing on the Shannon

The Shannon catchment is considered a high quality fishery and it makes a significant contribution to the economy of the region (K. Giffen *pers.comm.)*. The Shannon and its tributaries contain some game and an abundance of coarse fish. Salmon and sea trout are categorised as game fish. The number of salmon caught has declined, however, since the construction of the hydro-electric station at Ardnacrusha in the 1920's (Delany 2000).

Large lakes such as Lough Allen and Lough Key support both coarse and trout fisheries but smaller lakes are usually coarse fisheries only. Lakes with dense reed vegetation (such as Loughs Allen, Key and Forbes) are likely to support large stocks of pike (*Esox lucius*) (Delany 2000).

Roach (*Rutilus rutilus*) and bream (*Abramis brama*) are plentiful throughout the project area (Delany 2000). Roach are prolific breeders and can overrun a system, often quickly reducing the size of other species. Transferring roach from one water body to another is prohibited.

Perch (*Perca fluviatilus*) are widespread but are less abundant where roach occur. Other coarse fish such as tench (*Tinca tinca*) and rudd (*Scardinius erythrophthalmus*) tend to favour weedy, slow-flowing sections (Delany 2000).

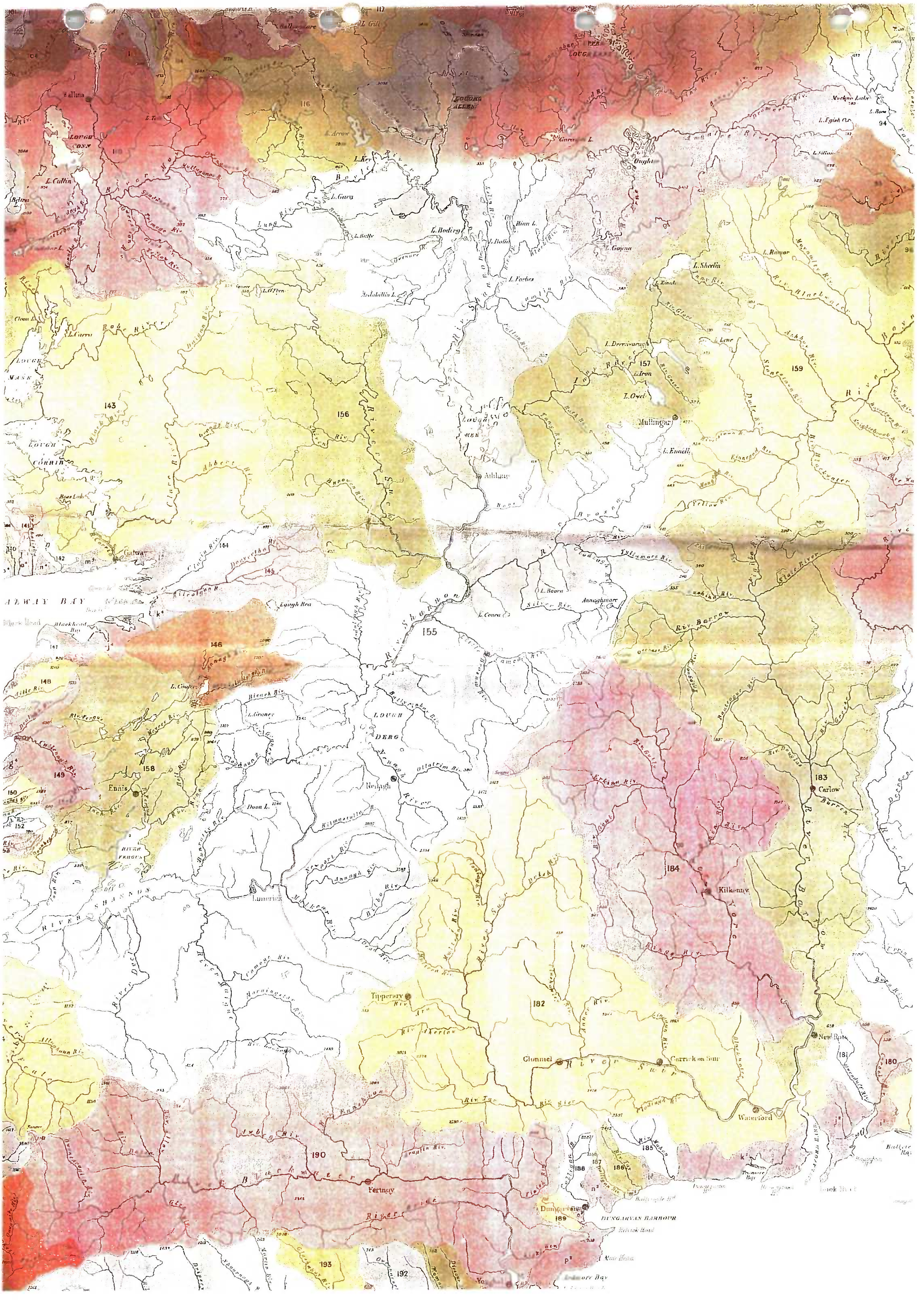
Brown trout (*Salmon trutta*) are also found, but mainly when predators such as pike are absent. Eels (*Anguilla anguilla*) are common throughout the Shannon system (Delany 2000).

The Shannon Regional Fisheries Board is responsible for maintaining the angling interests of this waterway. Management carried out by the Fisheries Board includes moving pike between lakes to regulate numbers (subject to health checks). The Fisheries Board also constructs infrastructure for anglers, such as board walks or access roadways (K.Giffen *pers.comm.*).

The main potential threats to the Shannon fishery are from the introduced species zebra mussel (*Dreissena polymorpha*), dace (*Leucisus leucisus*) and any deterioration in water quality (K.Giffen *pers.comm.*)

1.4 Designated Conservation areas

A number of areas within the survey boundaries have been designated as conservation areas under the EU Habitats Directive, Birds Directive and the Wildlife Acts (1976, 2000) (Appendix 1). Lists of the conservation areas according to habitat type may be found in section, *3.0 Habitats found in the Upper Shannon Catchment.* Appendix 1 contains a complete list of the designated conservation areas occurring within the survey boundaries.



Ballina
LOUGH CONN
L. Cullin
River Moy
116
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L. Arrow
L. Key
Boyle River
L. Gara
Lung Riv.
L. Bodirg
LOUGH ALLEN
L. Gill
Annalee River
Dromore Riv.
Muckno Lake
L. Egish
L. Ross
94
L. Sillan
L. Ramor
L. Sheelin
L. Kinale
Inny Riv.
Riv. Blackwater
Moynalty Riv.
River Boyne
L. Gowna
Rinn L.
L. Bofin
L. Forbes
Camlin Riv.
L. Derravaragh
157
L. Iron
L. Owel
Mullingar
L. Ennell
159
Stonyford Riv.
Athlone
Robe River
Clare River
Abbert Riv.
Black Riv.
LOUGH MASK
LOUGH CORRIB
143
156
River Suck
Galway
144
145
GALWAY BAY
Blackhead Bay
146
L. Cooter
148
149
150
152
158
Ennis
RIVER FERGUS
RIVER SHANNON
Limerick
LOUGH DERG
Nenagh
Nenagh River
155
River Shannon
Brosna
Tullamore Riv.
Silver Riv.
L. Boora
Annaghmore L.
L. Coura
L. Graney
Doon L.
Kilmastulla R.
Newport Riv.
Annagh Riv.
Bilbo Riv.
Mulkear Riv.
Dead Riv.
River Deel
River Maigue
Camoge Riv.
Tipperary
Riv. Ara
Riv. Aherlow
Allaghaun Riv.
River Feale
Awbeg Riv.
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Fermoy
Blackwater
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River Suir
Clonmel
Carrick on Suir
Waterford
Riv. Tar
Riv. Nier
Anner Riv.
Lingaun Riv.
Kilkenny
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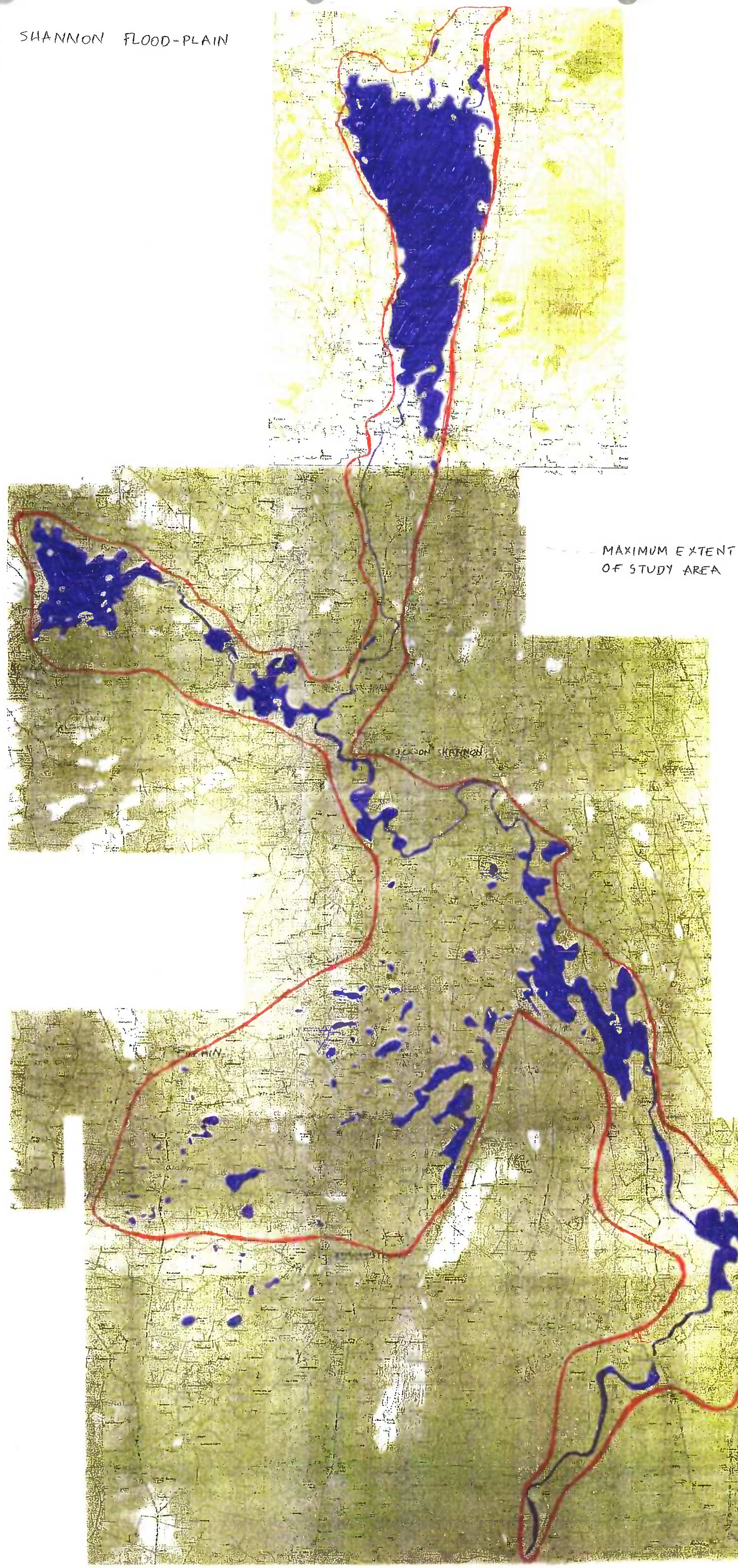
Nore
Kings Riv.
Erkina Riv.
Riv. Gully
Riv. Barrow
River Barrow
Slate River
Yellow Riv.
Riv. Douglas
Riv. Greese
183
Carlow
Burren Riv.
New Ross
181
180
185
186
187
188
189
Dungarvan
DUNGARVAN HARBOUR
Colligan R.
Riv. Mahon
Tramore Bay
Hook Head
Youghal
Ardmore Bay

Figure 1.2 Map showing the entire study area, with boundary in red and the River Shannon and lakes marked in blue.

UPPER SHANNON FLOOD-PLAIN STUDY



2.0 Study parameters

2.1 Aims

The purpose of the study was to produce a preliminary report on the nature conservation interest of the Shannon floodplain area from Lanesborough northwards.

It is perceived that this area has had minimal scientific survey and has relatively few designated areas such as SACs and NHAs. It is also an area that has recently come under developmental pressure owing to tax incentive schemes.

This study will produce a document which will

- inform local authorities of areas of importance for nature conservation
- identify areas for further survey for possible NHA designation
- highlight information deficits
- inform NPW field staff in relation to assessment of planning applications.

This report does not purport to be a fully comprehensive study of the Upper Shannon region, merely a precursor to more detailed investigations into the most interesting sites. The boundaries provided for Zones in Appendix 6 are not definitive and may change when more detailed survey information becomes available.

2.2 Project time frame and consultations

This study was conducted from January to March 2002. Owing to (a) time constraints and (b) seasonality, a limited amount of data were collected during field surveys, but these were augmented by information collected from a range of sources including stakeholders, researchers and State bodies. A full list of all consultations is provided in Appendix 2. Consultations were an important element in the selection of sites of high conservation interest.

Every effort was made to contact national experts and others with local knowledge within the timeframe of the project.

Information in this report is based on publications, Dúchas files and data provided by consultees. It does not purport to be an exhaustive treatment of all the conservation issues in the Upper Shannon.

3.0 Habitats recorded in the Upper Shannon

A number of habitats were recorded in the survey area (Table 3.1). These can be divided into two broad categories, aquatic and terrestrial.

Table 3.1. List of habitats identified in the Upper Shannon Floodplain Study, using ASI habitat nomenclature (Lockhart *et al.* 1993) and including Heritage Council habitat codes in brackets (Fossitt 2000). Priority Habitats under the Habitats Directive are indicated with *, in the case of raised bogs only active ones are Priority Habitats. Non-marine islands are not treated as a separate habitat type. Instead, these are classified according to the vegetation type they support.

Habitat type
Lakes (FL2, FL3, FL4)
Rivers and streams (FW2)
Canals (FW3)
Reedbeds and other swamps (FS1)
Turloughs (FL6) *
Freshwater marsh (GM1)
Lowland wet grassland (rush dominated fields) (GS4)
Improved grassland (GA1)
Raised bog (PB1)*
Cutover bog (PB4)
Fens (PF1)
Dry broadleaved semi-natural woodland (WN2)
Wet, broadleaved, semi-natural woodland (WN6, WN7*)
Mixed woodland (WD1)
Commercial forest (WD4)
Hedge (WL1)
Scrub (WS1)

3.1 Methodology

Habitats were identified from colour aerial photographs (2000 series). Once identified from the aerial photographs, ground-truthing in the field was carried out during February and March 2002.

The information was then collated and used to construct a habitat map at a scale of 1: 30,000, on maps provided by Dúchas GIS Section.

Field visits and initial surveys were conducted in February and March 2002, mainly to sites that, from discussions with interested parties or from aerial photographs, may have had some conservation value.

The habitats described in the following sections correspond to those highlighted in habitat maps in Appendix 3.

For sources of information on rare species see Section 7. General habitat information was derived from Dúchas file sources and field survey.

3.2 Constraints

The field work was carried out in winter so a substantial portion of the survey area was flooded. Within these flooded areas, field work was not possible and habitats or features identified from aerial photographs could not be verified. Flooded areas are demarcated on maps (Appendix 4).

Although detailed field surveys were beyond the scope of this project, where a species list was taken from the field, it is unlikely to be complete since the survey work was carried out during winter. Many annual plants had not emerged and perennials had died back, which may mask their presence and/or abundance within the vegetation.

3.3 Nomenclature

Habitat nomenclature follows that of the national ASI survey (Lockhart *et al.* 1993), with reference to the classification used by the Heritage Council (Fossitt 2000) and the EU Habitats Directive.

Nomenclature for higher plants and ferns follows Webb *et al.* (1996). Nomenclature for bryophytes and lichens follows Smith (1978) and Purvis *et al.* (1992).

3.4 Aquatic habitats

Aquatic habitats recorded in the present survey include rivers, lakes and streams, ditches and canals. During winter many discrete waterbodies merge to form larger complexes, since both the Shannon and its lakes flood extensively. Many of the small lakes near Strokestown, in the south west of the survey area, are interconnected by rivers and some merge to become larger lakes in the winter. This is illustrated in the flooding maps (Appendix 4).

Water quality within the study area is moderate, with sampling stations recording Q-values that range from 4-5 unpolluted, to 2-3 moderately polluted (EPA data). Water quality appears to deteriorate from north to south, possibly reflecting the increase in human settlements and increasingly intensive agriculture. A gradual deterioration in water quality has been recorded in Loughs Ree and Derg, further south in the Shannon catchment, during the past 20 years (Kirk McClure Morton 1999). This deterioration is likely to be mirrored in the present, more northerly study area.

3.4.1 Lakes

Lakes in the survey area range from large water bodies such as the Lough Bofin/Boderg complex to small waterbodies such as Black Lough. Lakes cover an estimated 30% of the project area. Those with conservation designations are listed in Table 3.2. Particularly important complexes of small lakes are present in the Strokestown/Elphin area.

Lakes typically support reedbeds and swamp along their edges, and along periodically inundated shorelines, wet grassland or wet woodland / willow scrub may be found. Certain lakes on limestone bedrock have developed *Schoenus* fen vegetation along their shores.

The lakes in the area range from oligotrophic (FL2) to mesotrophic (FL4). Marl lakes (FL3) may be found in the south west sector, on limestone bedrock, possibly supporting charophytes. Further detailed survey work is required to confirm the status of such lakes.

Rare plant species associated with lakes and lake edges within the study area include elongated sedge (*Carex elongata*), slender tufted sedge (*Carex acuta*), floating water plantain (*Luronium natans*) and water germander (*Teucrium scordium*). Water germander is almost confined in its Irish distribution to the Shannon Lakes (Webb *et al.* 1996).

The lakes and associated wetlands are a vital habitat for wildfowl, particularly species that over-winter in Ireland. The most important of these is the Greenland White-fronted Goose (*Anser albifrons flavirostris*), listed as an Annex I species in the EU Birds Directive. Nationally important populations of teal, pintail, shoveler and lapwing have been recorded within the area (Section 6.0). Some of the lakes and rivers, particularly those on limestone bedrock, may also support populations of the white-clawed crayfish (*Austropotamobius pallipes*), an Annex II species in The EU Habitats Directive. Otter (*Lutra lutra*), another Annex II species, is likely to be common in many of the lakes.

The presence of the zebra mussel (*Dreissena polymorpha*), an exotic bivalve, is a potential threat to the ecology of larger Shannon lakes. Another threat to the lakes is eutrophication from agricultural and domestic sources. Infilling and excavation may take place during developments on lakeshores. Disturbance to wildfowl, such as the Greenland White-fronted Goose, by leisure and construction activities is another potential problem.

Table 3.2. Lakes and their conservation designations within the project area.

Name	Designation	Location
Lough Forbes	SAC (part SPA)	Longford/Roscommon
Lough Bofin	NHA	Leitrim/Roscommon
Lough Boderg	NHA	Leitrim/Roscommon
Lough Allen	part of shoreline NHA	Leitrim/Roscommon
Grange Lough	NHA	Roscommon
Kilglass Lough	NHA	Roscommon
Lough Nablasbarnagh	NHA	Roscommon
Annaghmore lough	NHA	Roscommon
Lough Key	Islands and part of shoreline NHA	Roscommon
Fin Lough	NHA	Roscommon
Lough Eidin (Drumharlow)	NHA, proposed SPA	Roscommon

3.4.2 Rivers and streams (FW2)

Significant rivers apart from the main artery, the River Shannon, include the Boyle River, the Rinn River, the Feorish and Camlin rivers (Table 3.3). There are numerous streams.

Larger rivers often have fringes of reedbeds and woodland along their banks. Where the floodplain is relatively intact, wet grassland (callows) occurs which may be inundated during the winter months or during flood events. Smaller rivers typically have less reedbed and wet grassland associated with them and little woodland.

Rare species associated with river habitat in the study area include the liverwort (*Riccia fluitans)*, slender tufted sedge (*Carex acuta*) and the freshwater snail (*Viviparous viviparous)*. The Annex II species, otter (*Lutra lutra*) and salmon (*Salmo salar*) are common.

Threats to river habitats in the area include pollution, typically from agricultural or domestic sources, and physical alteration of the river such as dredging, drainage or infilling.

Table 3.3 Main rivers and their conservation designations within the project area.

Name	Designations	Location
River Shannon		Leitrim/Roscommon/Longford
Diffagher River		Leitrim
Eslin River		Leitrim
Owengar River		Leitrim
Stony River		Leitrim
Yellow River		Leitrim
Camlin River		Longford
Rinn River	NHA	Longford
Arigna River		Roscommon/Leitrim
Boyle River		Roscommon
Clooncraff River		Roscommon
Feorish River		Roscommon
Finlough River		Roscommon
Mountain River		Roscommon
Owenur River		Roscommon

3.4.3 Canals (FW3)

There are a number of canals in the survey area. The Jamestown Canal, the Ballinamore Canal, the Royal Canal, Cloondara Canal and the Lough Allen Canal.

Among the species of interest found in canals of this area is greater spearwort (*Ranunculus lingua*).

3.4.4 Reedbeds and swamps (FS1)

This habitat occurs in shallows of lakes and rivers and occasionally along drains in the Shannon floodplain. The most abundant species forming this vegetation community is common reed (*Phragmites australis*), which forms both extensive reed beds or thin fringes. Although for the most part, these stands are monodominant, there are occasional patches of bulrush (*Typha latifolia)* and common club-rush (*Schoenoplectus lacustris*).

One lake, Black Lake near Oakport in County Roscommon, also supports large sedge swamp vegetation of tussock sedge (*Carex paniculata)*, as well as *Phragmites australis* and *Typha latifolia* (see Section 8).

The extent of reedbed and swamp habitat was difficult to assess at the time of surveying, since much of the vegetation had died off over the winter and new growth had not yet commenced. Extensive flooding also meant that much of the swamp vegetation was submerged.

3.4.5 Turloughs (FL6)

Turloughs are ephemeral lakes that occupy basins or depressions in limestone areas, and where the water levels fluctuate markedly during the year, filling and emptying through underground drainage systems. Turlough vegetation is characterised by a concentric

zonation pattern, which reflects changes in the water table. Turloughs are a Priority Habitat in Annex I of the EU Habitats Directive.

Some turloughs have been recorded within the survey area, notably in the region north of Strokestown, where they are found (1) south east of Caldragh, (2) east of Lough Nablasbarnagh and (3) north of Moneyboy (Colhoun 2001). These turloughs were not large enough (>10ha) to be included in the turlough survey (Goodwillie 1992).

An additional turlough may be present at Ardconra / Farranagalliagh (G 875 010). This could be confirmed by further study.

3.5 Terrestrial habitats

A range of terrestrial habitats were recorded. These were predominantly woodlands, grassland and bog.

3.5.1 Woodlands

Woodland generally occurs in isolated fragments within the survey area. At most, broadleaf or mixed woodlands cover approximately 5% of the project area. One of the most extensive areas of woodland is at Castleforbes Estate, on the eastern shore of Lough Forbes, County Longford. Several woodland types are found in this demesne, including semi-natural broadleaf woodland, mixed woodland with native and exotic broadleaves, and conifer plantations. Other significant areas of woodland include those along the shores of Loughs Bofin and Boderg, as well as the woodlands of Rockingham Demesne and Lough Key.

Wet woodland with willow, alder and birch is a common woodland type in the project area, though it rarely forms extensive patches and is often low growing with a scrubby appearance. It occurs throughout the survey area, along the shores of the large lakes (Allen, Key, Forbes, Boderg, Bofin, Kilglass).

3.5.1.1 Dry broadleaved semi-natural woodland

Dry, semi-natural broadleaf woodlands (generally oak-ash-hazel woodland, WN2) are uncommon within the survey area, usually occurring on demesnes, inaccessible slopes or on lake islands. Any extensive areas of this woodland type are designated either SAC or NHA (see Table 3.4). Dry, semi-natural woodland usually develops on brown earths and brown podzolics (see Section 4.0).

The most significant area of woodland occurs at Castleforbes Demesne (SAC), where there is a mixture of semi-natural broadleaf woodland with non-native woodland (mixed broadleaf and conifer woodland). The dry semi-natural woodland on the estate is typically oak-ash-hazel woodland. Pedunculate oak (*Quercus robur*) and ash (*Fraxinus excelsior*) are the main canopy forming trees.

A number of rare species have been recorded from the woodlands within the study area. Species include the lichen *Cladonia parasitica*, the moss *Plagiomnium cuspidatum*, bird cherry (*Prunus padus*) and the parasitic higher plants toothwort (*Lathraea squamaria*) and ivy broomrape (*Orobanche hederae*).

Dry semi-natural broadleaf woodlands in demesnes are particularly threatened by invasive exotics such as *Rhododendron ponticum* and beech (*Fagus sylvatica*). Certain woodlands also have abundant cherry laurel (*Prunus laurocerasus).*

Table 3.4 NHA Woodlands within the project area

Name	Location
Drumhierney wood (1412)	Leitrim
Owengar wood (1419)	Leitrim
Castleforbes Demesne (1818)	Longford
Drumman's Island (1633) Lough Key	Roscommon
Hog's Island (1638) Lough Key	Roscommon
Tawnytaskin wood (1651) Lough Key	Roscommon

3.5.1.2 Wet, broadleaved semi-natural woodland

Wet woodland occurs more frequently than dry broadleaf woodland within the survey area, although its stands are typically scrubby, reflecting the fact that growth is stunted by regular inundation. This woodland type is usually found in narrow strips along lake shores and on river floodplains. Soil types are generally gleys or poorly–drained grey-brown podzolics (see Section 4). In wet willow-alder-ash woodland (WN6), alder (*Alnus glutinosa*) and willows (*Salix* spp.) are often the main canopy formers. Around Lough Forbes in particular, willow-alder-ash woodland has developed on the alluvial soils of the lake shore. Some of the habitat recorded as wet woodland may be more correctly fen carr but this could not be established from aerial photographs (see Fen vegetation below). The distribution of fen peat has been mapped for County Leitrim only, but most of these areas were inundated at the time of survey so accurate vegetation mapping could not be carried out.

The wet woodland communities at Lough Forbes support two rare plants, the bird cherry (*Prunus padus*) and elongated sedge (*Carex elongata*) (Browne Dunne Roche 2000). The rare black poplar (*Populus nigra*) is present in woodland along the eastern shore of Lough Allen (D. Kelly, D. Cotton *pers. comm.*, Hobson (1993))

The main threat to wet woodland along the lakes and rivers is drainage and clearance for the construction of dwellings and/or marinas.

Birch woodland occurs on cutover bogs or around the dried edges of remnant raised bogs. Extensive areas of birch woodland occur on cutover bogs near Lough Allen and along the edge of Ballykenny Bog, near Lough Forbes. Birch woodland also regenerates naturally in areas cleared of commercial coniferous forestry, such as Oakport demesne. The overall area of birch woodland is likely to increase as industrial and other cutover bogs are abandoned and natural regeneration takes place.

Bog woodland (WN7), principally of birch occurs in a flush on Clooneen bog, an NHA (Site code: 445). Bog woodland is a Priority Habitat under the Habitats Directive.

3.5.1.3 Mixed woodland

Mixed woodland (WD1) usually dominated by beech and/or sycamore is occasionally found in the survey area. The most extensive area of mixed woodland occurs around Castle Forbes. Other significant areas of mixed woodland are found at Loughs Boderg and Bofin and at Lough Key.

3.5.1.4 Commercial forest

Conifer plantations (WD4) are relatively common, particularly around Lough Allen and on many of the cutover bogs. There are extensive plantations to the south and east of Lough Key, at Lough Key Forest Park and Rockingham Demesne.

Plantations are typically dominated by one or two conifer species. There is low diversity of field and understorey species and the overall woodland structure is also poor. Within the survey area plantations usually occur on gleys, however, on the northern side of Lough Allen there is a plantation on blanket peat within the survey area. Some conifer plantations have abundant rhododendron, particularly around Lough Forbes and Oakport.

3.5.1.5 Scrub

Patches of scrub (WS1) are scattered throughout the survey area. Willow scrub is common in the floodplains of the Shannon and its larger lakes. This scrub is often found in mosaic with wet grassland and wet woodland. Scrub of drier areas, consisting of hawthorn, hazel and blackthorn is less common. A combination of birch and gorse (*Ulex europaeus*) scrub develops along the margins of cutover raised bogs.

3.5.1.6 Hedgerow

Hedgerows (WL1) are common throughout the survey area, particularly in the south. The species present usually reflect the natural climax woodland vegetation for the soil type. In areas south of Newtownforbes, for example, where intensive agriculture takes place on grey brown podzolics, hedgerows are dominated by ash. In wetter gley soils, such as those of Lough Allen, willow species are often present.

3.5.2 Grassland

Grassland is the most common vegetation type in the survey area. Two main types of grassland are present:

1. Improved agricultural grassland generally used as pasture for cattle or sheep.
2. Wet grassland, including fields dominated by rushes (mainly soft rush *Juncus effusus*).

The relative abundance of wet grassland is greatest on gley soils around Lough Allen, whereas improved grassland increases in relative abundance from north to south.

3.5.2.1 Improved grassland(GA1)
This vegetation is widespread throughout the area and is used as pasture or for silage production. Few of the soils types within the survey area are sufficiently productive to support dairy farming, instead, drystock and sheep grazing are the most common farming methods. Improved grasslands tend to occur on brown earth and brown podzolic soils but may be found on heavier gley soils where intensive drainage work has taken place. Perennial rye grass (*Lolium perenne*) is the most common grass species in this vegetation type and other grasses such as cocksfoot (*Dactylis glomerata*) and Yorkshire fog (*Holcus lanatus*) are also abundant. Rare plant species are unlikely to be recorded on improved grassland.

Some improved pasture within the floodplain of larger lakes and the Rinn River may be used as feeding grounds by wildfowl including Greenland White-fronted Geese (Appendix 5).

3.5.2.2 Lowland wet grassland (including rush dominated fields)(GS4)
This vegetation type is abundant throughout the project area. It is found in the floodplain of the Shannon and major lakes, where "callows" may be formed. It is particularly abundant on marginal, badly drained gley soils around Lough Allen.

Wet grasslands are not usually intensively managed but may be used for low-level grazing and hay production.

Much wet grassland is dominated by purple moor grass (*Molinia caerulea*). The proportion of flowering herbs, sedges and rushes within the sward may vary, depending on the habitat quality and management. Wet grassland may also be dominated by rush species, typically soft rush (*Juncus effusus*) or occasionally sharp-flowered rush (*Juncus acutiflorus*).

Within the project area, wet grassland supports a number of rare species including elongated sedge (*Carex elongata*), pale sedge (*Carex pallescens*) and marsh stitchwort (*Stellaria palustris*).

Flooding and access difficulties prevented an accurate assessment of this habitat type during the present survey. Many of the species had died back and new growth had not yet commenced. Species identification had to be made primarily on the dead remains of perennial species.

Threats to this habitat are primarily losses through drainage and development.

3.5.3 Freshwater marsh (GM1)
This habitat is likely to occur within the survey area. It was not recorded due to high water levels.

3.5.4 Fen vegetation (PF1)

Fen vegetation occasionally occurs on lake edges. Fen dominated by black bog rush (*Schoenus nigricans*) was recorded around some of the small lakes near Strokestown, such as Annaghmore Lough (NHA) and Fin Lough (near Strokestown, not an NHA) The larger lake systems do not appear to support much fen vegetation but inundation may have prevented accurate habitat identification. Some of the habitat recorded as wet woodland may be more correctly fen carr but this could not be established from aerial photographs. The distribution of fen peat has been mapped for County Leitrim only, but most of these areas were inundated at the time of survey so accurate vegetation mapping could not be carried out.

Rare species associated with fen vegetation in the present project area include broad-leaved cotton grass (*Eriophorum latifolium*), fen violet (*Viola persicifolia*), bee orchid (*Ophrys apifera*), fly orchid (*O. insectifera*), marsh helleborine (*Epipactis palustris*) and greater spearwort (*Ranunculus lingua*).

3.5.5 Raised Bog (PB1)

Raised bogs are uncommon in the northern half of the survey area but are found throughout the southern half. The best examples of raised bog are already designated as NHA. These are Ballykenny/Fisherstown (1818) and Clooneen Bog (1818) in County Longford. Active raised bog is a Priority Habitat under the EU Habitats Directive.

Although no raised bogs remain intact, those that are NHAs have had only small amounts of hand cutting along the edges. On the raised bogs and bog remnants in the area there has been a spectrum of turf cutting intensities from handcutting, to the use of machine, to large scale industrial cutover.

Raised bogs are wet domes of peat, raised above the landscape. They have abundant heathers (*Calluna vulgaris* and *Erica tetralix*), bog cottons (*Eriophorum angustifolium* and *E. vaginatum*) and a dominance of *Sphagna*. They have a characteristic micro-topology of raised hummocks and wet hollows.

Where the bog's hydrology is compromised through drainage and or turf-cutting, the abundance of Sphagna is dramatically reduced and there is a corresponding increase in ling heather (*Calluna vulgaris*). Often the lichen (*Cladonia impexa*) or bog cotton (*Eriophorum vaginatum*) become locally dominant. With frequent burning, purple moor grass (*Molinia caerulea*) may become dominant.

3.5.6 Cutover Bog (PB4)

Cutover bog is relatively common in the area. There are two main types: (a) industrial cutover, where a vast area of raised bog has been removed, and (b) less intensive cutover resulting from systematic hand or small scale mechanised cutting. The less intensive type generally re-vegetates to support heath or scrub communities. Thickets of gorse (*Ulex*

europaeus) and birch (*Betula pubescens*) are common. Where drainage is poor, soft rush (*Juncus effusus)* dominates.

3.5.7 Heath (HH1)

Heath communities are uncommon throughout the area. They typically occur on shallow peaty soils, in areas of cutover bog or on small hillocks around Lough Allen. Typical species are ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), purple moor grass (*Molinia caerulea*) and gorse (*Ulex europaeus*).

4.0 Soils

The only county within the survey area which has been mapped in detail by the Soil Survey Unit of Teagasc (formerly An Foras Talúntais) is County Leitrim (An Foras Talúntais 1973). This county borders the north-west, north, and east shores of Lough Allen, and the county boundary runs along the River Shannon as far south as Rooskey. The other two counties, Roscommon and Longford were covered by preliminary soil surveys in the 1970's and 1980's (Walsh *et al.* 1974, Finch 1984). Details of these preliminary soil surveys are outlined below. In brief, from north to south, soil types grade from heavy gleys around Lough Allen to a mosaic of Grey Brown Podzolics and Peats.

4.1 Leitrim (see Figure 4.1)

Mountcollins Series – Brown Podzolic (Map code 55)

Where: This is found on the western shore of Lough Allen at Cartronbeg Townland, further inshore (west) and along the border with Co. Roscommon. However, this soil series was not mapped across the county boundary in Roscommon during the preliminary soil survey there.

Soil description: A glacial drift derived from shales, with some sandstone influence. The soils are well to imperfectly drained with loamy to clay loam texture.

Topography and use: Topography consists of rolling lowland and drumlins with some very steep slopes. They are generally suitable for grass production.

Habitat types: Improved grassland with some mixed broadleaved woodland. The natural woodland type is dry oak-ash (broadleaved) woodland.

Mortarstown-Kinvarra Complex – Grey Brown Podzolics (Map code 165)

Where: This occurs south of Leitrim village on the banks of the Shannon and on the north bank of the Shannon at Jamestown.

Soil description: The parent material consists of shallow glacial drift derived from Carboniferous limestone which frequently contains chert bands. The soils are moderately to imperfectly drained. Textures are loam, clay loam, silt loam and clay texture.

Topography and use: Topography consists of undulating lowland but some areas have many short steep slopes due to frequent rock outcrops. The suitability of the soil for agriculture depends on the extent of rocky outcrops, but they are good grassland soils where topography is suitable.

Habitat types: Improved grassland.

Peat

Peaty soils occur throughout the county. These are divided into different types depending on the process of formation and mineral status. Blanket peat has formed at high altitude and generally forms as a result of high rainfall and humidity. Basin peats have formed in lake basins, hollows, river valleys or where the subsoil is sufficiently impermeable to give a high water table. Basin peats are divided into two sub-types: Fen and Raised Bog.

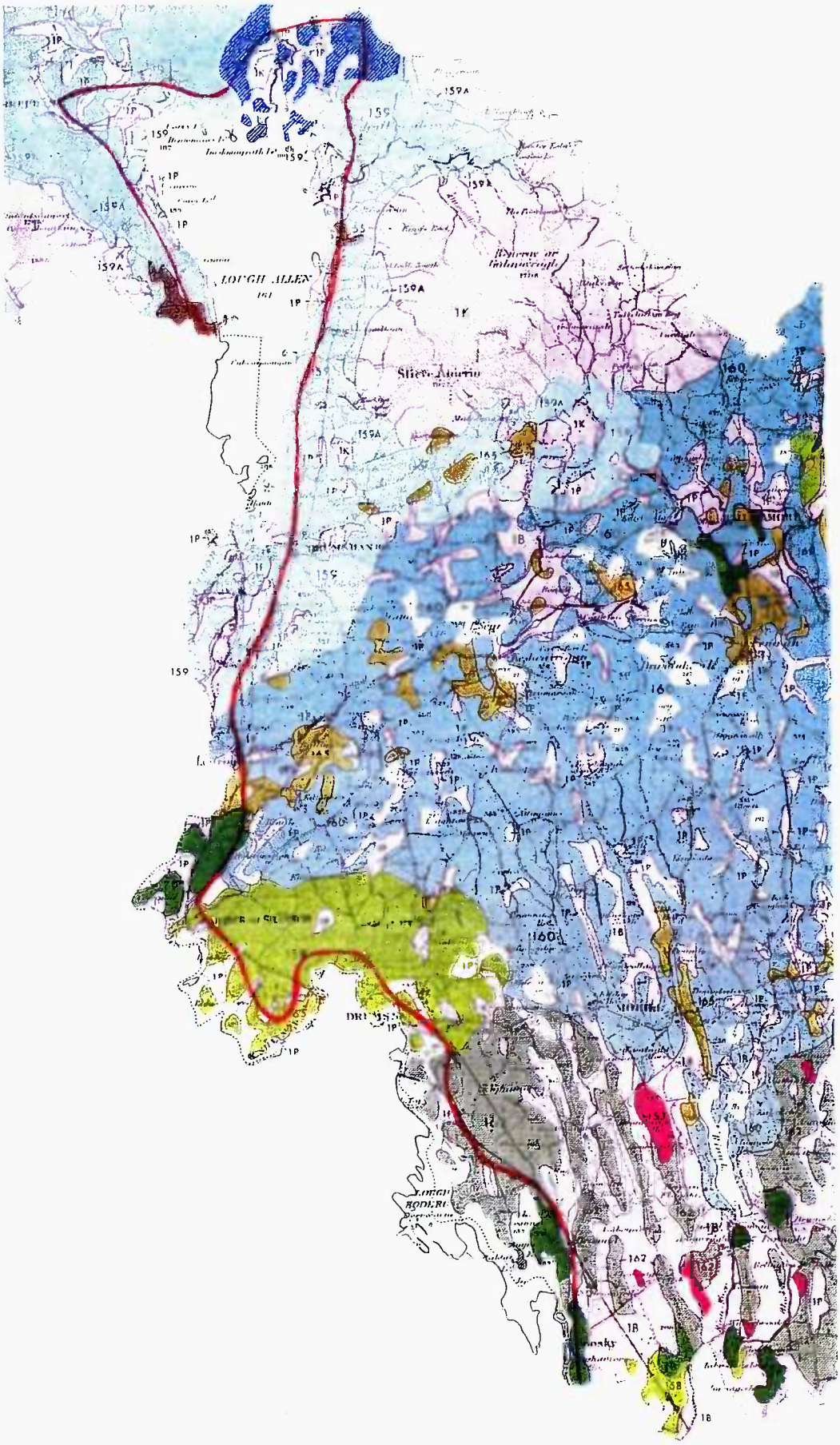


Figure 4.1 Soil Map of the project area, County Leitrim (adapted from An Foras Talúntais, 1973).

Aughty Series – Peat (Map code 1K)

Where: The only blanket peat found within the survey area is situated in the vicinity of Maghanagh Lough at the northern end of Lough Allen.

Soil description: The Aughty Series blanket peat is composed of humified cyperaceous remains with some *Sphagnum* species.

Topography and use: The Aughty Series blanket peats are found on upper regions of the mountains of Leitrim County but in only one location within the survey area. *Aughty Series* soils are considered best for non-intensive grazing, although near Mahanagh Lough much of this soil type is used for forestry.

Habitat types: At Mahanagh Lough where Aughty Series blanket peat is found, much of the area is afforested. Draining may have been carried out in unafforested parts where heathland vegetation is found.

Ardrum Association – Peat (Map code 1P)

Where: The fen peat type known as the Ardrum Association (Map code 1P) occurs throughout the project area but deposits are not extensive. This peat type is likely to occur in Longford and Roscommon but it has not been mapped in preliminary soil surveys of the two counties.

Soil description: The Ardrum Association consists of two main soils – fen peats and peaty alluvium. Fen peat has formed under the influence of a base-rich, ground water supply, but because of periodic flushing, an acid peat layer has never formed on the surface.

Topography and human use: The Ardrum Association occurs in interdrumlin flats and valleys throughout the county. It is particularly evident in hollows along the Shannon basin and along the shores of Lough Allen. In an agricultural context the soils are suitable for grassland farming and vegetable growing in summer. There was little evidence of vegetable crops on this soil type in the survey area. Many areas dominated by this soil type are typified by winter inundation.

Habitat types: Most of the areas of Ardrum Association of fen peat and peaty alluvium are inundated during winter and habitat types could not be accurately deduced during the time-limits of the present survey. However, it is possible that callows vegetation may be evident during the summer.

Allen Series – Peat (Map code 1B)

Where: The raised bog peat type is known as the Allen Series. Within the project area in County Leitrim this is found only towards the south near Rooskey. Some raised bogs which can be assigned to the same soil series are also found in Counties Longford and Roscommon.

Soil description: The Allen Series is characterised by a basal layer of fen, woody fen or wood-fen peat overlain by a layer of acid ombrogenous peat. There is a high content of *Sphagnum* mosses. Bog cotton and *Calluna* are also often present. Much of the Allen Series - raised bog has been cutover in Leitrim. In an undisturbed state peat depth may exceed 10m.

Topography and human use: The Allen Series is found in depressions towards the south of the county where many raised bogs are elongated in a north-south direction, in hollows left after the last glaciation. In its natural state, raised bog is not suitable for

agriculture. Raised bogs can be used for peat extraction although the scale of extraction have been higher in Counties Roscommon and Longford (see Industrial Peat below).
Habitat types: Within Leitrim County there are some relatively intact raised bogs, the edges of which have been cut-away, but these are outside the boundaries of the present survey. Also, many have been drained and now either support heathland communities or have been reseeded and are used as improved grassland for agriculture.

Drumkeeran Soil Series – Gley (Map code 159)
Where: North, west and eastern shores of Lough Allen are dominated by the Drumkeeran Soil Series. This soil type is also found around Drumshanbo and almost as far south as Leitrim village. In places, this corresponds to the Peaty Podzols of County Roscommon that border the River Shannon on its west side at Battlebridge (see below).
Soil description: The Drumkeeran Soil Series is a Gley. It is a glacial drift derived from non-calcareous and calcareous shales with some conglomerate and sandstone. The soils are poorly drained and with a silty clay to clay texture. Horizons underlying the A1 are generally gleyed and the clay content is typically very high. Occasional peats are also associated with the Drumkeeran Soil Series, these are generally found in more upland areas than the present project.
Topography and use: The topography of the area is undulating with many drumlins. In an agricultural context, the soils are considered to have a limited use-range. A high degree of management is required to derive reasonable yields and a long in-wintering period is required for cattle to prevent poaching.
Habitat types: The Drumkeeran Soil Series roughly corresponds to the presence of wet, rushy grasslands. These grade into willow and alder scrub at the shores of Lough Allen and hedgerows tend to be composed of these species, as well as ash, unless drainage and soil improvement works have been carried out.

Kiltyclogher Series - Gley (Map code 161)
Where: This soil type occurs in patches between Dowra and the north eastern shore of Lough Allen. It is found at Kilgarriff Lough and Mahanagh Lough. It is a relatively limited soil type in Leitrim County.
Soil description: The parent material generally consists of glacial drift derived from sandstone, conglomerate and shale. These soils are poorly drained, with sandy loam to clay texture. Soil horizons below the A1 are generally gleyed, massive and sticky. Sandstone boulders are plentiful in the soil and at the surface. These can be seen on the hills surrounding Mahanagh Lough.
Topography and use: Lowland drumlin topography. The soils have a limited use-range. The soils are poorly to moderately suitable for grassland farming. High boulder density, high organic matter content and weak structure inhibit intensive stocking. The soils are considered best suited to low intensity grazing or forestry.
Habitat types: Wet rushy grassland is the dominant habitat type in the area. However, much of the area surrounding of Kilgarriff Lough has been afforested. In wet low-lying areas prone to waterlogging, wet woodland dominated by willow and alder have developed.

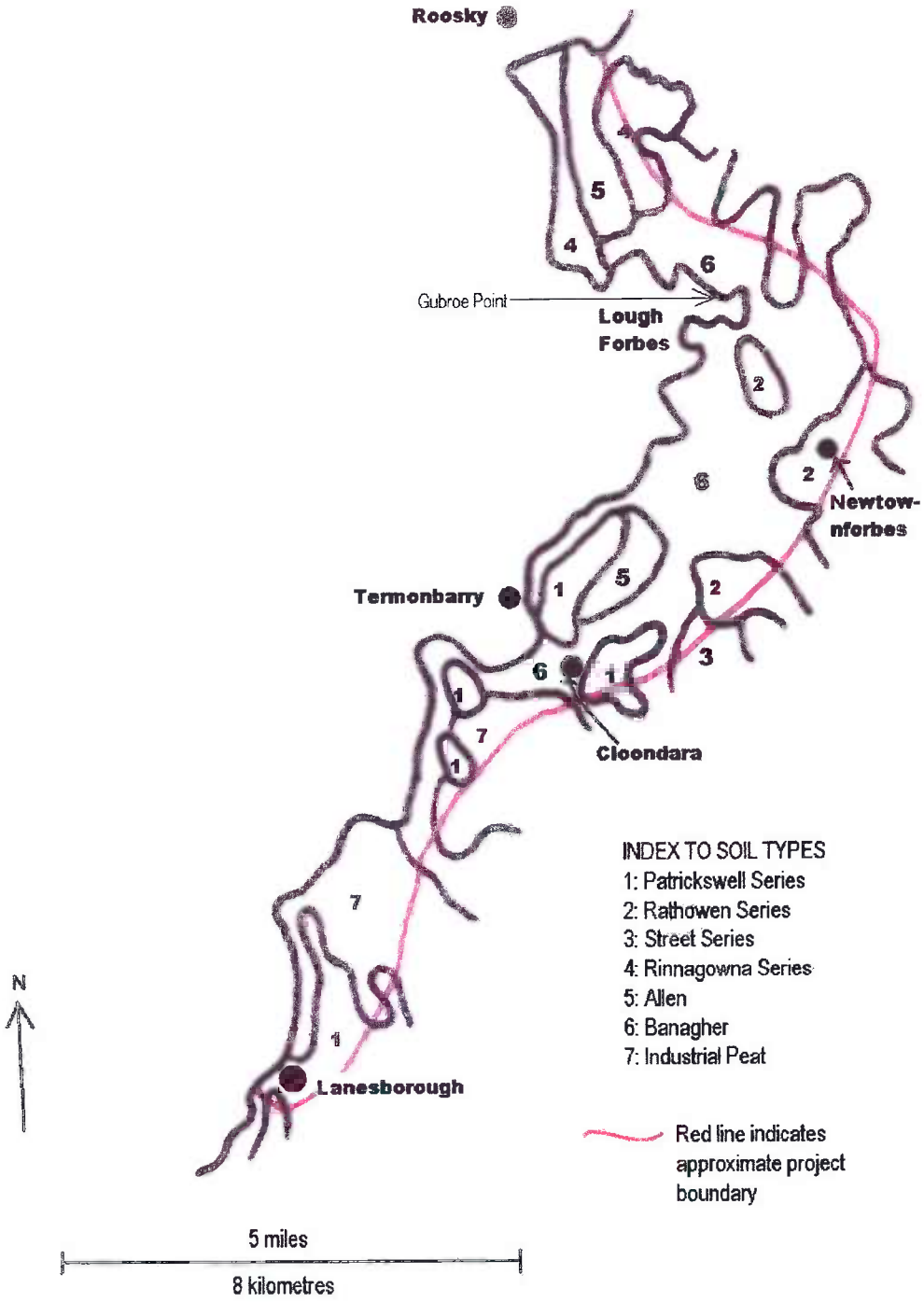
Garvagh Series – Gley (Map code 160)
Where: This has limited coverage in the present survey. It occurs north of Leitrim village and the NHA Drumhierny Wood is situated on this soil type.
Soil description: The parent material is glacial till derived from siliceous limestone with some sandstone and shale influence. The soils are often poorly drained of cherty loam to clay texture.
Topography and use: The topography consists of lowland drumlins. This soil is described as having a limited range of uses
Habitat types: Improved grassland, oak-ash (dry broadleaved) woodland.

Howardstown – Gley (Map code 70)
Where: This soil type is found on raised ground around Coryolus townland at Carrick-on-Shannon and also at the eastern shore of Lough Bofin at Drumsna and north of Rooskey.
Soil description: The parent material is glacial drift derived from Carboniferous limestone, shale and sandstone. The soils are poorly drained of sandy loam to clay texture and of medium to high base status.
Topography and use: Topography consists of undulating lowland with some drumlins. The soils have a limited range of uses and they are poorly suited to tillage. They are good grassland soils, however, and are suitable for forestry.
Habitat types: Wet grassland and rushy fields, some areas are inundated in winter.

Ballinamore – Gley (Map code 158)
Where: Within the project area, this is found on undulating land around and to the east of Carrick-on-Shannon.
Soil description: The parent material consists of sticky glacial till derived from Carboniferous limestone and shaley limestone with some sandstone influence. The soils are poorly drained, of clay loam to clay texture and of medium base status.
Topography and use: Topography consists of drumlins and approximately 20% of the area has slopes over 13°. The soils have a limited range of uses. Poor drainage, adverse soil structure, high rainfall and steep slopes inhibit tillage. They are suitable for grassland farming or forestry.
Habitat types: Mixed woodland and wet grassland.

Rinnagowna - Gley (Map code 162)
Where: This is found along the eastern shores of Lough Boderg and between Lough Boderg and Lough Scannal.
Soil description: The parent material is composed of glacial drift derived from Carboniferous calcareous sandstone, conglomerate arkose and grit. The soils are poorly drained of sandy loam to clay loam texture. Boulders are common.
Topography and use: Topography consists of lowland, gently sloping drumlins. The soils have a limited range of uses and are best suited to grassland farming.
Habitat types: Wet and improved grassland with demesne (mixed) woodland.

Figure 4.2: Soil map for project area, County Longford, adapted from Finch (1984).



4.2 Longford (see Figure 4.2)

A preliminary reconnaissance soil survey was completed in County Longford but it was not mapped in detail by the Soil Survey Department of An Foras Taluntais. The results of the survey were published by T. Finch in 1984. The part of Longford included in the present project is a narrow strip which borders the eastern shore of the Shannon, from Rooskey south to Lanesborough. Longford has been heavily glaciated and drumlins dominate the landscape. Where there are no drumlins there are usually deep drift deposits except on hill tops.

Patrickswell Series – Grey Brown Podzolic (Map code 1)

Where: Within the present survey, this soil type is found north of Cloondara, close to the Shannon banks. The Patrickswell series is also found in a strip north of Lanesborough between the bog and the river's edge.

Soil description: This is described as a Grey Brown Podzolic formed over a parent material of Carboniferous limestone. It is well drained.

Topography and use: Large areas of industrially exploited peat occur in close proximity to this soil type near Lanesborough. It is generally low-lying. It is considered to produce excellent grassland which is capable of high production.

Habitat types: Improved agricultural grassland, wet grassland.

Rathowen Series – Grey Brown Podzolic (Map code 2)

Where: This is found in two lenses within the project area, one to the south east of Gubroe Point on Lough Forbes, and the other at Cleghill Townland south of Newtown Forbes.

Soil description: This is a moderately well drained Grey Brown Podzolic formed from a parent material of Carboniferous limestone and shale. The soil is normally up to 100cm deep. It has poor drainage and poor structure in places.

Topography and use: It is used extensively for pasture and is a productive grassland soil.

Habitat types: Mainly improved agricultural grassland. Hedgerows of the area are dominated by ash trees indicating that the semi-natural vegetation type would be mainly dry ash (broadleaved) woodland.

Street Series - Gley (Map code 3)

Where: A small section of this soil type is located on the boundary of the survey area, east of Termonbarry, adjacent to the Rathowen series soil type.

Soil Description: This soil type is derived from Carboniferous limestone and shale. This gley is a wet soil with a weak structure.

Topography and use: The use range of this soil type is limited to pasture.

Habitat types: Improved grassland.

Rinnagowna Series – Gley (Map code 4)

Where: This is found south of Rooskey, bordering the Shannon, and further inland it is found on the project boundary.

Soil description: This soil type is derived from Lower Palaeozoic Shale. This gley is poorly drained and has a weak structure.

Topography and use: This soil type is best suited, in an agricultural context, to pasture.
Habitat types: Intensive grassland with some wet grassland.

Peats
While there are several peats described from Leitrim – fen, raised bog and blanket peats, in County Longford peats have been assigned to a different series depending on the level of human use.

Allen Series – Peat (Map code 5)
Where: The raised bog peat type is known as the Allen Series. This peat is found in a strip east of the Shannon from Rooskey to the northern tip of Lough Forbes. It is also found east of the Shannon and north of Cloondara, adjoining the Patrickswell Series. For further details on the Allen Series see Leitrim (Section 4.1) above.

Banagher Series – Peat (Map code 6)
Where: This is widespread in the project area in Longford. It is found along the north and eastern edges of Lough Forbes, stretching inland to the limits of the project boundary. It is also found immediately bordering the River Shannon at Cloondara and it stretches as far south as Cloonkeel townland.
Soil description: This is a soil type derived from organic parent materials. It is grouped among histosols but it is not described in detail by Finch (1984).
Topography and use: The Banagher series is generally used for pasture. The mapping of this soil type probably requires further refinement since, in the preliminary survey for Co. Longford, it covers areas of grey brown podzolics along with raised bog.
Habitat types: Cutaway raised bog, improved grassland, mixed woodland and semi-natural broadleaved woodland.

Industrial Peat (Boora Series) (Map code 7)
Where: In County Longford, within the confines of the present survey, this soil type is found slightly east (inland) from the Shannon at Knappoge/Cloonard townlands and a large area of industrial peat can be found north of Lanesborough.
Soil description: This is the drained and cutaway remains of raised bog (see Allen Series above).
Topography and use: Very flat industrialized landscape. Used by Bórd na Mona as a natural resource to create electricity at the Lanesborough power generating station.
Habitat types: Formerly raised bog, occasional birch/gorse scrub regeneration but generally devoid of plant life.

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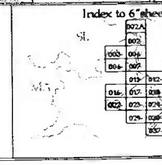

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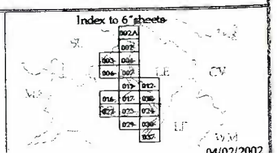

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General Purpose 1:30,000 NPW Map

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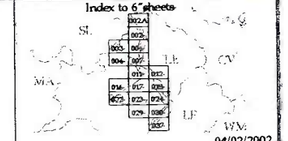

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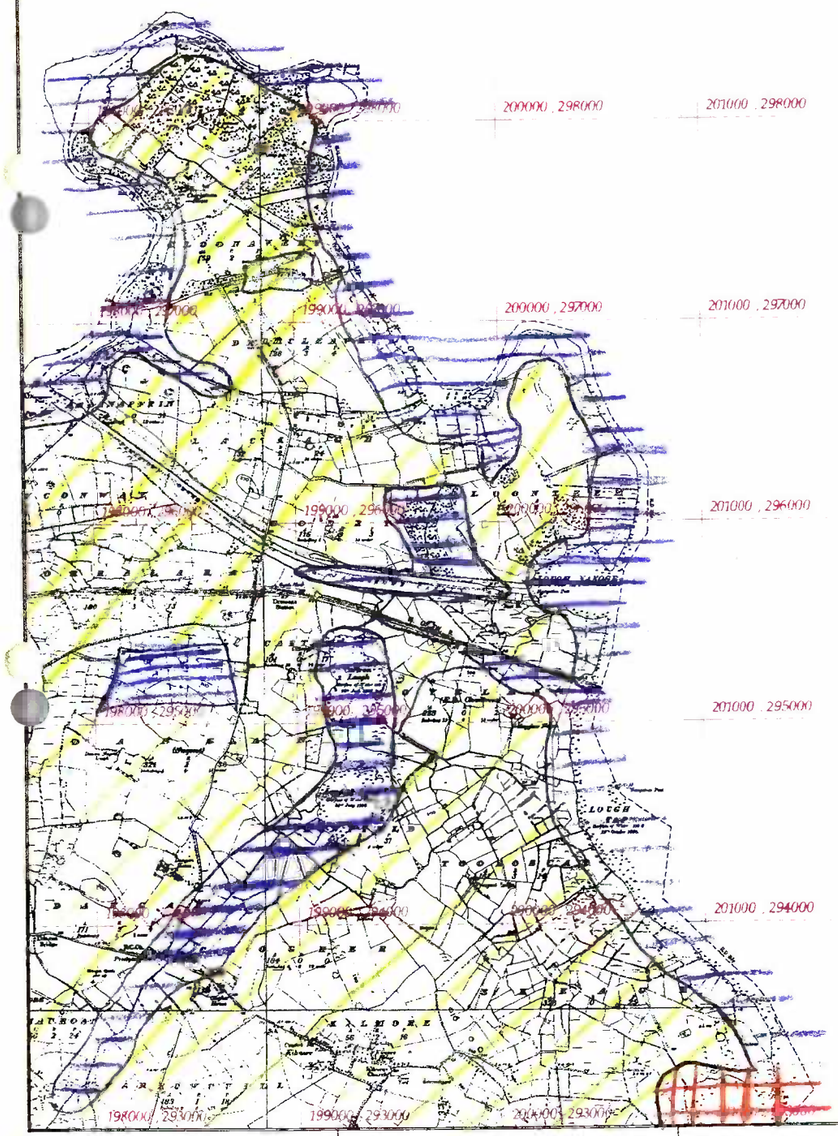

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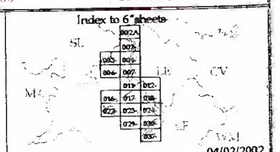

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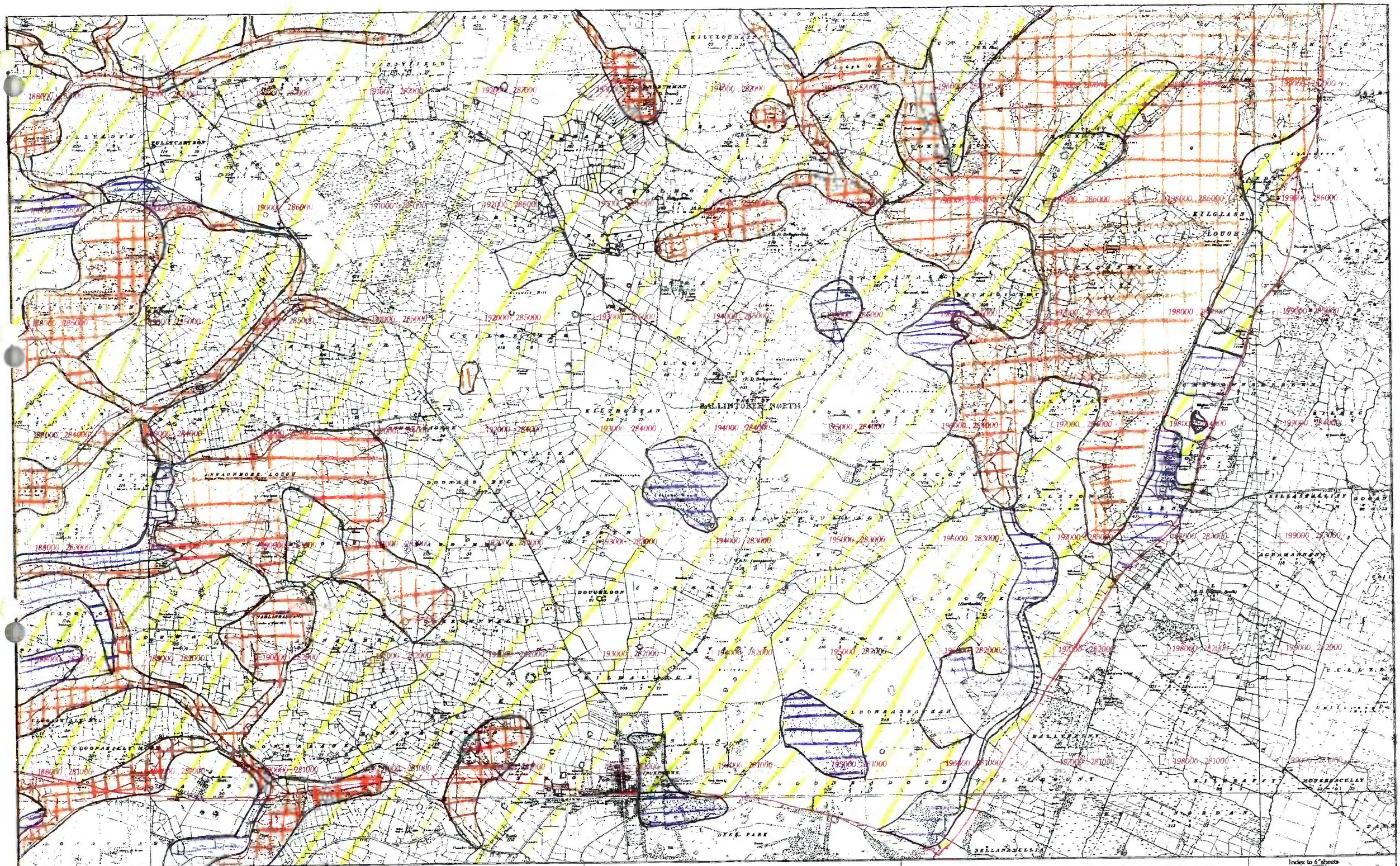

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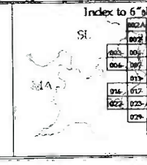

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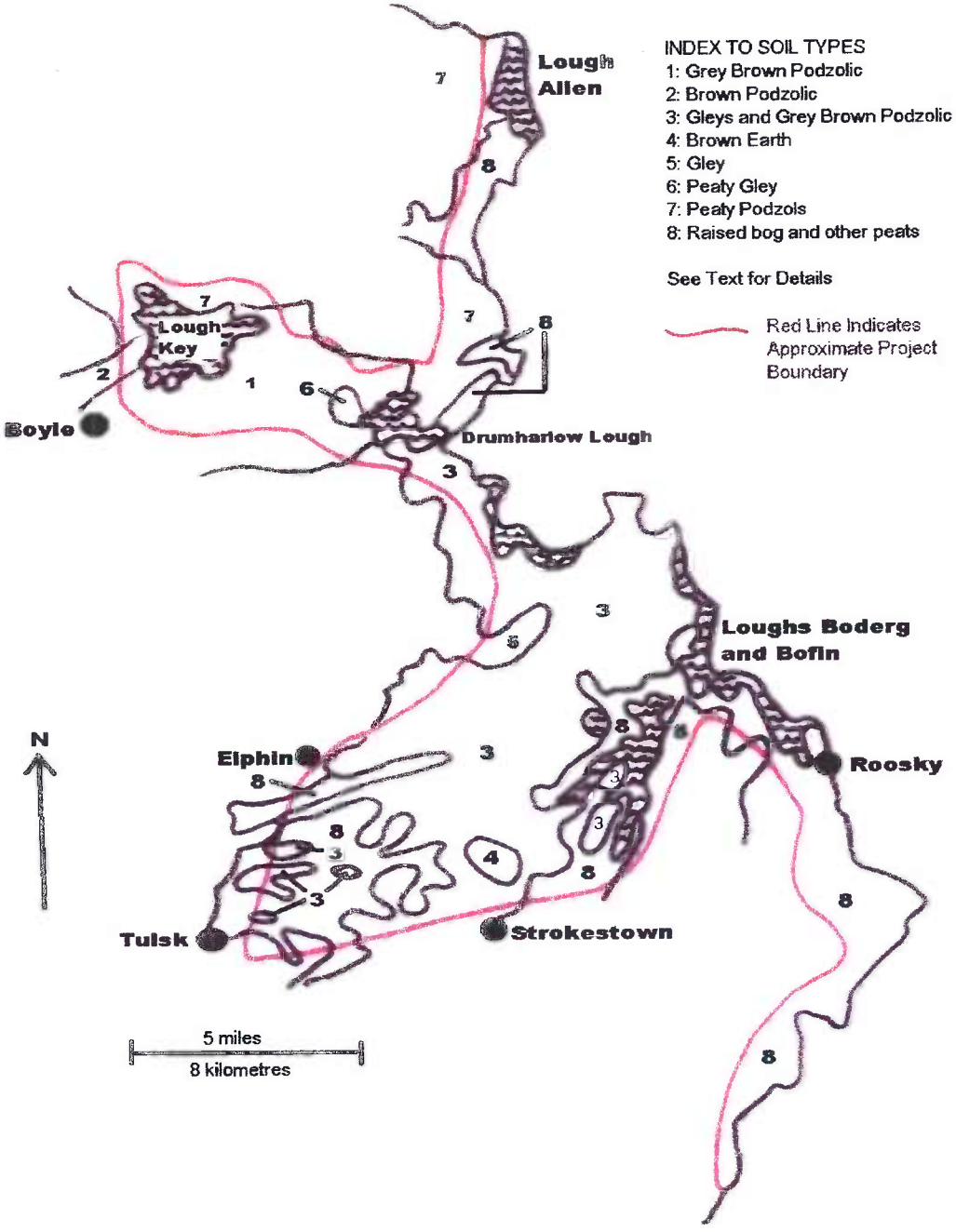
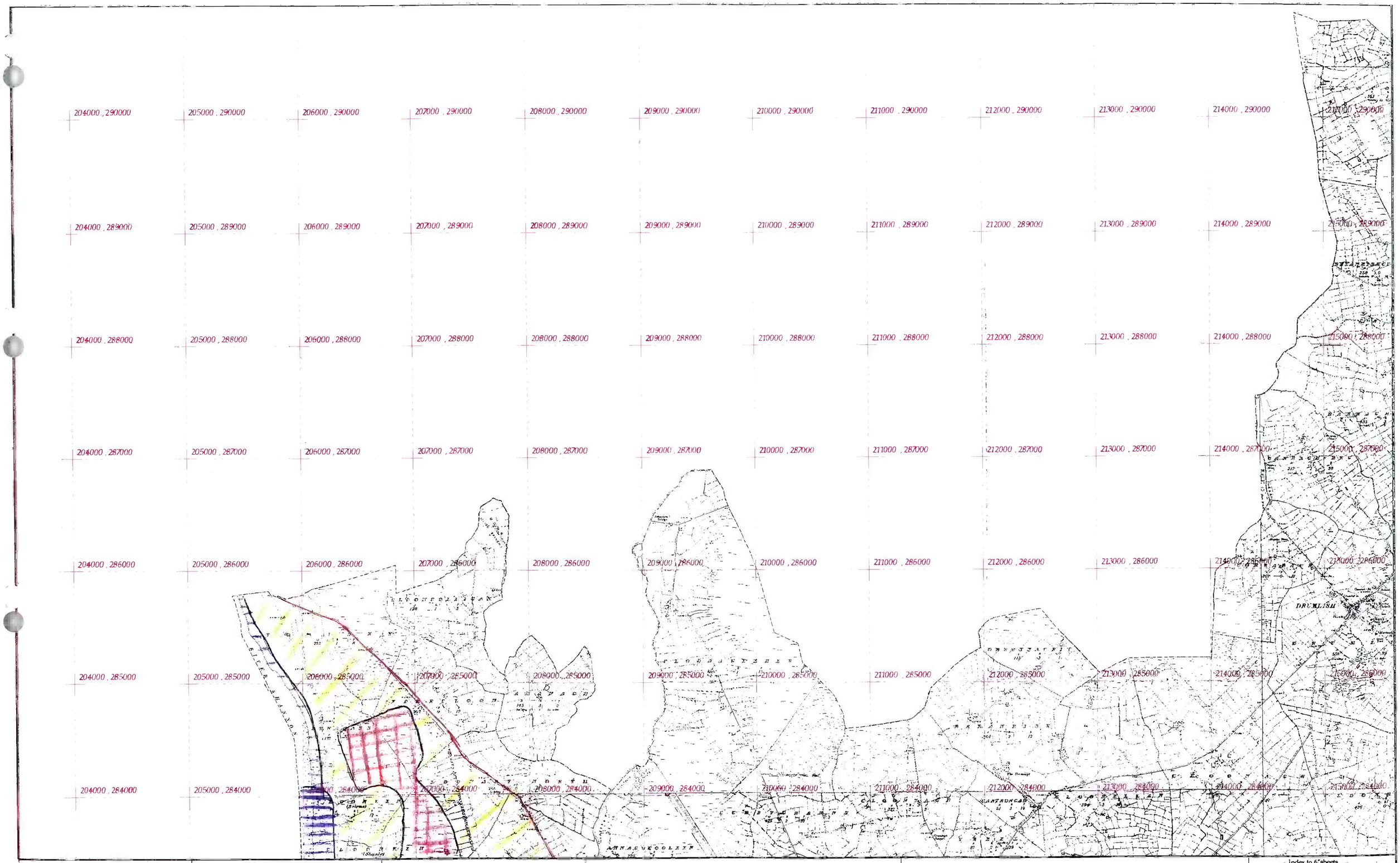
Figure 4.3: Soil map for project area, County Roscommon, adapted from Walsh *et al.* (1974).





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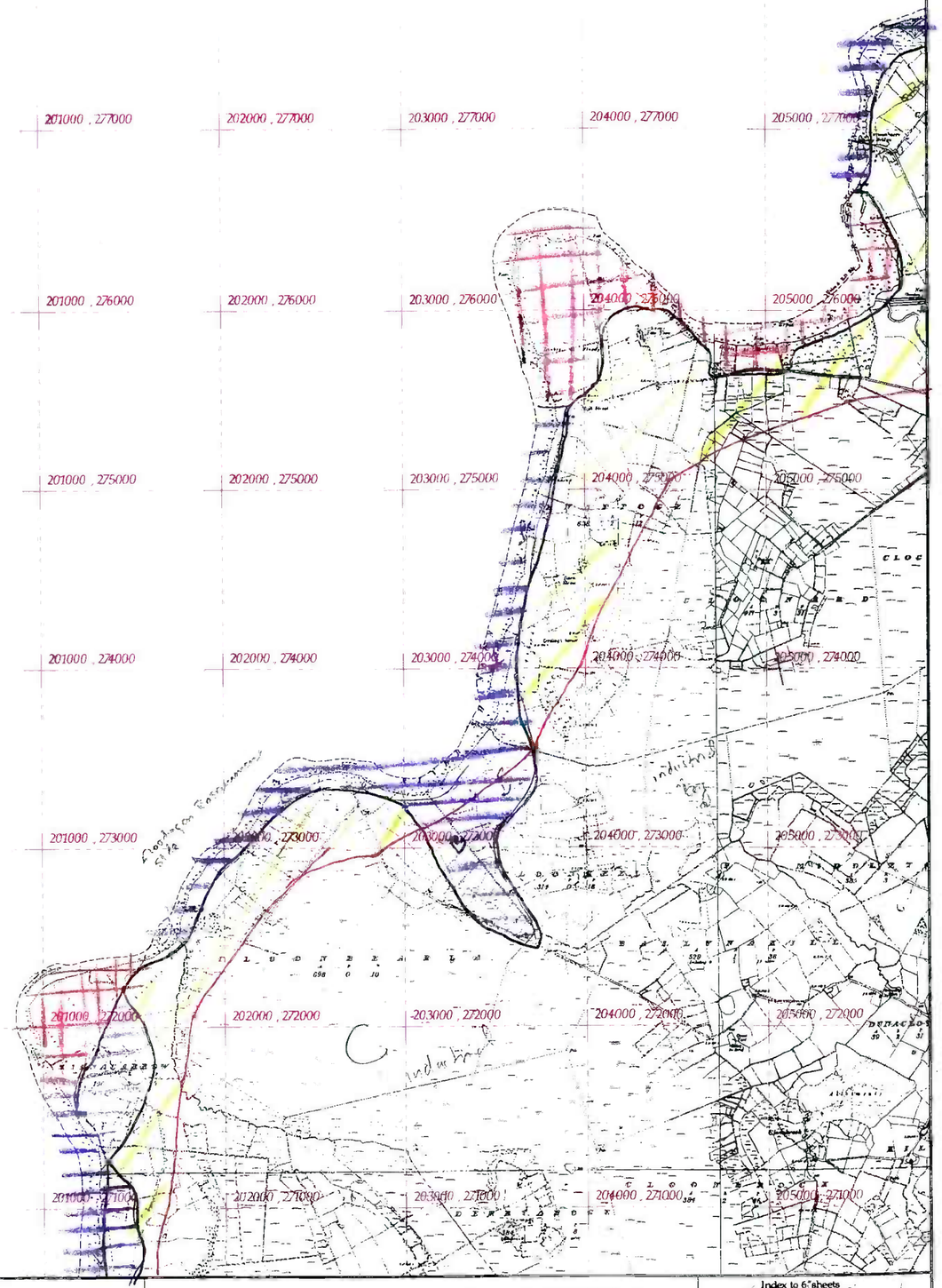

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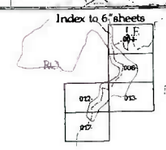

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General Purpose 1:30,000 NPW Map

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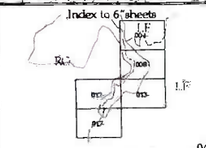

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APPENDIX 7: PLANNING INFORMATION

Table 1. The volume of planning permissions granted in Longford townlands within the project area.

Townland Name	No. of Permissions
Lanesborough	4
Aghamore	4
Cloonbony	1
Knappoge	3
Cloondara	4
Fisherstown	1
Brianstown	1
Ballykenny	1
Corry	2
Newtownforbes	16
Cloonart South	1
Edercloon	1

Table 2. Details of planning permissions granted in Roscommon townlands within the project area from October 2001 to March 2002.

Townland	Address	Dwelling	Extension	Marina	Townhouses & apartments	Grouped dwellings	Shop/Retail	Other
Lurgan	Battlebridge	1						
Rockingham	Boyle		2					
Boyle	Boyle		1				1	
Clooneigh	Carrick		2					
Corralara	Carrick	2						
Cortober	Carrick	Retention + 2			1	17	1,+retention, +extension	
Kilbride	Carrick	1	1					
Cleaheen	Cootehall	1						
Foxhill	Cootehall	2						
Gortleck	Cootehall	1						
Knockadaff	Cootehall	1		Retention				
Lismulkeare	Cootehall	1						
Paddock	Cootehall	1						
Cootehall	Cootehall	1						
Aghacarra	Corrigeenroe, Boyle		1					School extension
Cloonavery	Drumsna		1					
Corry	Drumsna	2						
Caldragh	Elphin	1						
Caldymoran	Elphin	Retention						
Creeve	Elphin	1						
Creggs	Elphin	1						
Drumullin	Elphin		1					
Kye	Elphin	1						Septic tank
Drumamoodan	Hillstreet	1						
Liscolvan	Hillstreet							Slatted shed
Toomore	Hillstreet		1					
Carrigeen	Kilglass	1						

Townland	Address	Dwelling	Extension	Marina	Townhouses & apartments	Grouped dwellings	Shop/Retail	Other
Carrownskeheen	Kilglass		1					
Rooaun	Kilglass, Strokestown	1						
Cloonfad	Rooskey		1					
Crunkill	Rooskey	1						
New Rooskey	Rooskey	1						
Rooskey	Rooskey				1		1 +extension	Existing industry
Cartron (outside boundary)	Strokestown		1					
Cloncullane	Strokestown	1						
Clooneen	Strokestown							Workshop and extension
Cloonfree	Strokestown	2						
Cloonglasny Beg	Strokestown	1						
Cloonglasny More	Strokestown	Retention						
Corraslira	Strokestown	1						
Cuilmore	Strokestown	2						
Grange	Strokestown		1					
Moyglass	Strokestown	2						
Muckanagh	Strokestown		1					
Strokestown	Strokestown		1			13	2	
Ballytoohey	Tarmonbarry	Retention+1				16	1	
Corraun	Tarmonbarry		1					
Tarmonbarry	Tarmonbarry		1					
Ardkeenagh	Tulsk	1						
Lack	Whitehall, Rooskey	1						
Newtown	Whitehall, Rooskey		1			4		

APPENDIX 8: PHOTOGRAPHS

1: Mahanagh Lough, north end of Lough Allen

2: Rossmore to Kilgarriff, north end of Lough Allen

3: Rossmore to Kilgarriff, north end of Lough Allen

4: Rossmore to Kilgarriff, north end of Lough Allen

5: Shannon exit from Lough Allen, taken from Holly Island

6: Bodorragha, north west of Drumshanbo

7: Bodorragha, north west of Drumshanbo

8: Drumhierny Wood NHA, near Leitrim Village

9: Corrigeenroe Marsh NHA, Lough Key

10: Drum Bridge NHA, Lough Key

11: Drum Bridge NHA, Lough Key

12: Tawnytaskin Wood NHA, Lough Key

13: Hogs Island NHA, Lough Key

14: Erris Bay, Lough Key

15: Tinnarinnow Peninsula, Lough Key

16: Islands on Lough key (Castle, Green and Orchard)

17: Fin Lough NHA, near Lough Key

18: Drumharlow

19: Drumharlow

20: Drumharlow

21: Cloongownagh (whooper swans), Drumharlow, South of N4

22: Cloongownagh North of N4

23: Cleaheen Bog Drumharlow NHA

24: Corryolus Drumharlow NHA

25: Drumman Beg Lough, Lough Bofin Boderg NHA

26: Drumkeeran to Rinnacurreen (near Carrick-on-Shannon)

27: Cornacoroo, south east of Carrick-on-Shannon

28: Rinn River NHA

29: Ballinphuill, flooding of Feorish River

30: Highstreet, near Cloondara

31: Kilnacarrow, north east of Lanesborough

32: Kilnacarrow, north east of Lanesborough

33: Cloonmustra/Cloontuskert, north west of Lanesborough

34: Kilglass Lough NHA

35: Mountain River in flood, south of Kilglass

36: Clooneen, near Kilglass

37: Finlough River (Lough Nablahy Complex)

38: Lough Nablahy

39: Lough Nahincha (Lough Nablahy Complex)

40: Lough Lea (Lough Conny More Complex)

41: Cartronbeg, western shore of Lough Allen

42: Corry Strand, northern shore of Lough Allen

43: Derragallion Bog, north west of Drumshanbo

44: Acres Lake, near Drumshanbo

45: Dromore Bog

46: Dereenasoo Bog

47: South east shore of Lough key

48: Poteen Hill Bog, view to north

49: Poteen Hill Bog, view to south

50: Black Lake

51: Laundry Lough

52: Farranagalliagh, possibly a small turlough

53: Charlestown

54: Flooded forestry at Cartron Lough

55: Cartron Lough

56: View of Lodgetown channel, near Cloondara

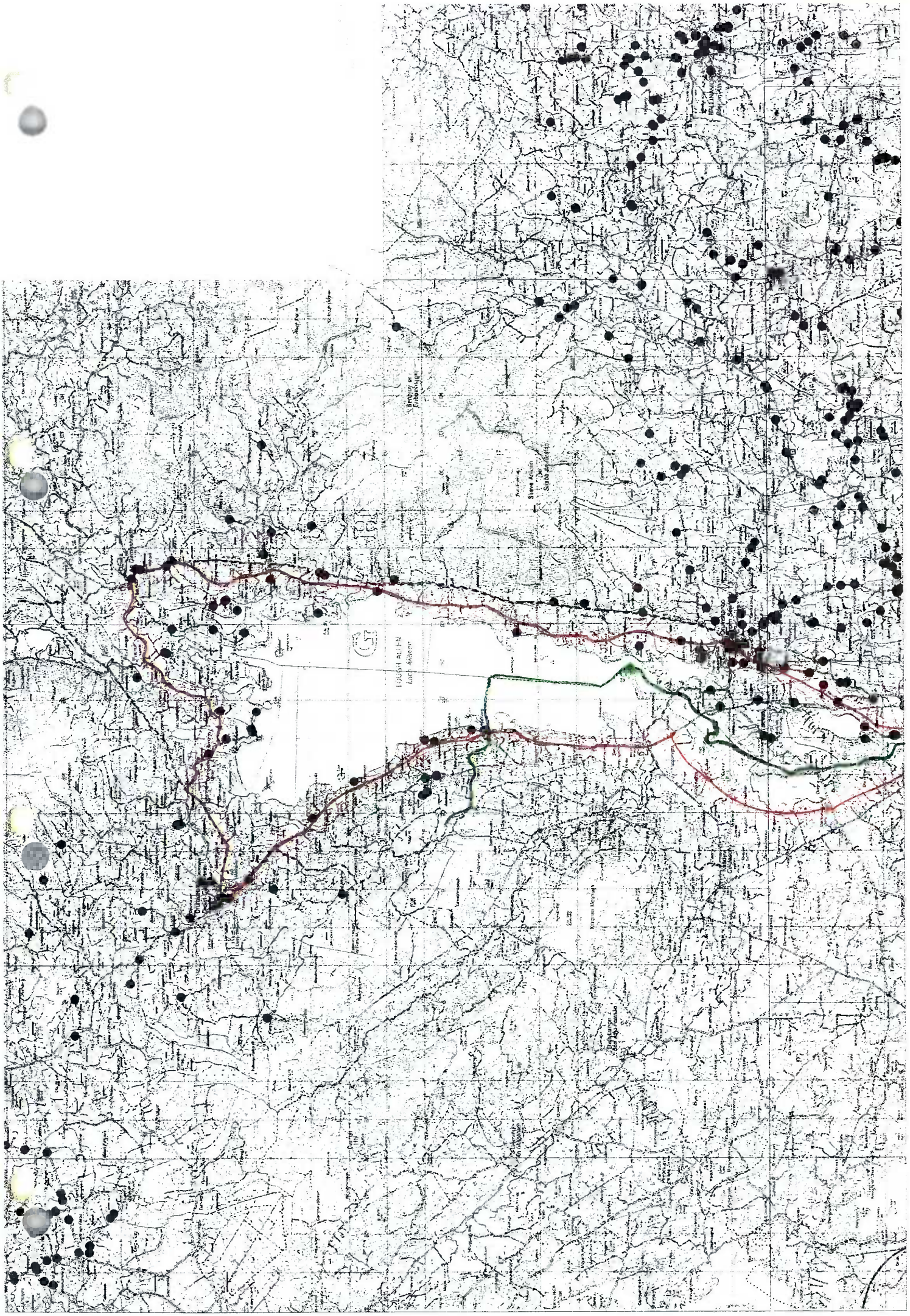
57: Derrycashel, cutaway bog

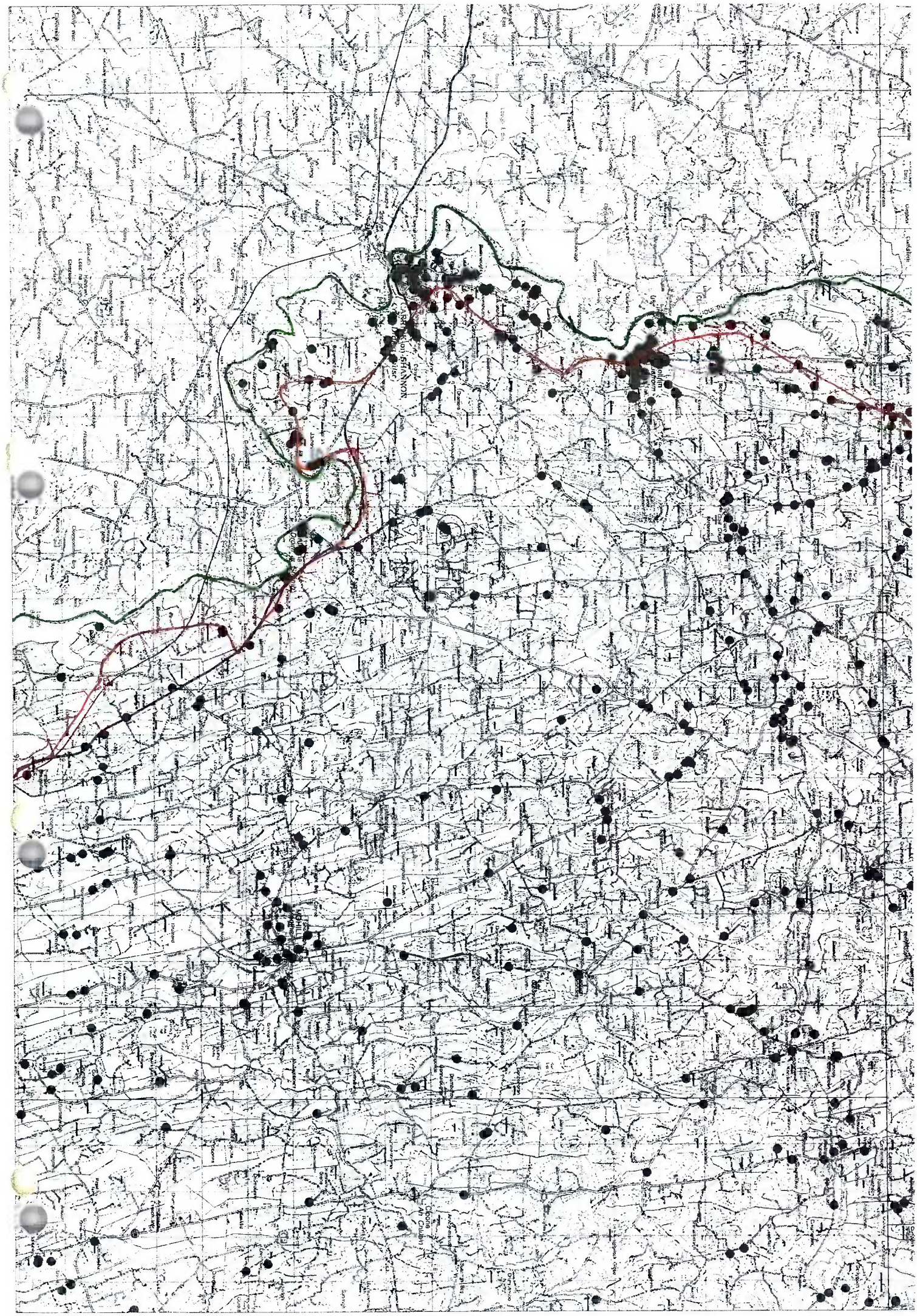
58: Knappogue, south west of Cloondara

59: Kiltrustan Hill, near Strokestown

Figure 1 (3 pages). Planning applications in Leitrim indicated by dots (October to March 2002). County boundary indicated in green (—) and project boundary in red (—).

Figure 2 (4 pages). Clusters of rural planning applications in Roscommon (based on information from N. McKeon *pers. comm.*) indicated in solid ( ) or cross hatched purple ( ).





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Dromad
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Ruscaigh
River Shannon
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Lough Bofin
Loch Bó Finne
Lough Boderg
Loch Bó Deirge
Rinn Lough
Kilglass
Cill Ghlais
Kilmore
Gortinee
Derrywillow
Faulties
Killyfad
Furnace or Bleankillew
Drumod Beg
Drumod More
Clooncolry
Cloonturk
Corrascoffy
Moherrevan
Cloonboniagh South
Gubagraffy
Corracramph South
Pinnagowna
Carrickawanny
Cloonoagh
Meelragh
Acres
Drumard
Cornagillagh
Killinaker
Knockmacrory
Georgia or Gorteenoran
Aghamore
Aghnahunshin
Tomisky
Moheenbog
Glebe
Rooskey New
Derrylara
Drumman More
Derrycnogh
Aughry
Lough Scannal
Derrycarne Demesne
Derrymacslur
Rushport
Meelick
Milltown
Derreen
Lavagh
Scornagh
Crunkill
Derryfeacle
Drumman Beg
Rinnafarna
Kilgarve
Mullaghmacormick
Carrigeen
Barravally
Ballykilcline
Knockhall
Aghoo
Slattagh Beg
Slattagh More
Cloonaufill
Pipers Town
Cloonfad
Clooneen
Bunanass
Edercloon
Cloonart North
Ahanagh
Aghinteeduff
Cloonmorris
Cloonagеehel
Curryglanny
Annaghcooleen
Johnsonsbridge
Knockadrinan
Cloontumpher
Aghnamona
Clooncolligan
Bellageeher
Cashel
Tooman
Fearglass South
Fearglass
Clooncumber
Foorcrossagh
Cloonlaughil
Cloontubbrid
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Carrongar
Cloontagh
Treel
Farnaght
Farnocht
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Ross Beg
Ross More
Gortletteragh
Drumbad
Tulcon
Lisclooneadea
Rooskynamona
Cloonсommon Beg
Kilcock
Annagh
Ballycummin
Roo
Legan
Kilbeg
Killegan
Kenagh
Lecarrow
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4.3 Roscommon (see Figure 4.3)

A preliminary reconnaissance soil survey was completed in County Roscommon in 1974 but it has not been mapped in detail by the Soil Survey Department of Teagasc (formerly An Foras Talúntais). Soils are derived mainly from limestone debris which has been deposited by ice sheets. A small amount of sandstone derived material is also present. During the preliminary soil survey of County Roscommon soils were not assigned to Series as in Counties Leitrim and Longford above. Instead, soils were simply assigned to divisions.

Grey Brown podzols (Map code 1)

Where: In the present survey, the area between Loughs Key and Drumharlow is mostly assigned to this soil type (however, a more detailed soil survey would pin-point a number of peatlands).

Soil description: This soil is generally 50cm to 80cm deep and has a surface texture of 'heavy' or more commonly, clay loam. Natural drainage is usually good soil is moderately well structured. Limestone outcrops occur at various locations throughout this soil type.

Topography and use: Topography found on this soil type is usually gently undulating lowland. These soils are usually used as grassland for quite intensive grazing and hay/silage production.

Habitat types: Improved grassland. Naturally occurring ash woodland vegetation along hedgerows.

Brown Podzolics (Map code 2)

Very little information is available on this soil type which is found in a small area to the south west of Lough Key. Tawnytaskin Wood (NHA at the south western corner of Lough Key) appears to be situated on this soil type. It consists of free draining soil with sandy loam texture varying in depth from 20cm to 50cm. It occurs mainly on rolling lowland. There are many boulders on the surface and within the soil.

Gleys and Grey Brown Podzolics (Map code 3)

Where: This soil type is widespread throughout the project area. It is found to the west of the Shannon and south of Drumharlow Lough. It is also the most abundant soil type in the area of small lakes between Elphin and Strokestown.

Soil description: These are poorly drained mineral soils. Soil depth is generally from 75cm to 100cm. Surface textures are clay loams which increase to clays in slowly permeable subsoils. The Grey Brown Podzolics occur within this division on steep drumlin slopes.

Topography and use: Areas dominated by this soil type are typically undulating. Drumlins are an important feature. The soils are moderately good to poor grassland soils.

Habitat types: Wet and improved grasslands. Alder and willow scrub occurs in waterlogged or periodically flooded areas.

Brown Earths (Map code 4)

Where: This soil type is found in the present survey area only at Kiltrustan hill, north of Strokestown.

Soil description: The soil description for Brown Earths is the same as Brown Podzolics above.
Topography and use: This soil type usually occurs on rolling lowland. This soil type has the potential to form good grassland, in an agricultural context.
Habitat types: Broadleaved woodland, improved grassland.

Gleys (Map code 5)
Where: This soil type is found in the area of rolling drumlins and small lakes to the south west of Rooskey between Strokestown and Elphin.
Soil description: These are poorly drained mineral soils which vary in depth from 75cm to 100cm. This soil type is usually poorly drained and has a surface texture of clay loam. The texture increases to clay in slowly permeable subsoils. On the steeper drumlin slopes this soil type grades into better drained Grey Brown Podzols.
Topography and use: Topography is rolling upland, however, higher regions with this soil type are not included in the present project area. This soil forms moderate to poor agricultural grassland.
Habitat types: Wet grassland in hollows and improved grassland in well drained areas.

Peaty Gleys (Map code 6)
Where: These occur on alluvial plains but within the present survey boundary this soil type is found only at the north western end of Lough Drumharlow.
Soil description: This soil type occurs in areas with high water tables and is liable to periodic flooding.
Topography and use: They are best suited, in an agricultural context, to rough grazing.
Habitat types: Wet woodland/scrub.

Peaty Podzols (Map code 7)
Where: Peaty Podzols border the north of Lough Drumharlow and the west of the Shannon at Battlebridge.
Soil description: This is a wet soil type. It has an abundance of boulders and frequent outcropping of bedrock.
Topography and use: Mixed rolling upland and lowland. These soils are not very well suited for agriculture.
Habitat types: Improved grassland, wet grassland, conifer plantation.

Peat (Map code 8)
Where: This soil type is found bordering the west side of the Shannon at Annaghbeg and Cleaheen (north of Drumharlow). It is, however, most extensive from Rooskey south as far as Lanesborough where extensive raised bogs, many of which are now industrial cutaway bogs, were once present.
Soil description: See Allen Series (Section 4.1) above.
Topography and use: Low lying soil type, in intact raised bogs the peat may be raised above its surroundings. Used for large scale peat extraction between Rooskey and Lanesborough, but some relatively intact areas are untouched. Some areas have been reclaimed for agriculture.
Habitat types: Raised bog.

5.0 Geology

5.1 Sheet 8 Leitrim (MacDermot et al. *1996).*
The bedrock of the shores of Lough Allen is dominated by Carboniferous shales. In places these are interbedded with limestone. As a result of the impervious shale bedrock the main soil type of this part of Leitrim is heavy gley (see Section 4).

In the area surrounding Dowra, underlying the River Shannon to the north and the eastern shore of Kilgarriff Lough, the bedrock is categorised as the Carboniferous **'Glenade Sandstone Formation'**. This is a pale orthoquartzitic sandstone. One of the few records for white clawed crayfish for the project area, is from the River Shannon at Dowra bridge, where this sandstone is the underlying bedrock type.

To the south of Lough Allen, close to Drumshanbo the **'Bricklieve Limestone Formation'** outcrops at Mahanagh. This limestone outcrop is protected by a conservation designation (Lough Allen South End and Parts 427). The 'Bricklieve Limestone Formation' is also the underlying bedrock at the opposite shoreline, where it does not, however, outcrop prominently within the project boundaries. This bedrock type is also found further south within the project area.

The area around Drumshanbo is underlain by various, mostly sedimentary, rock types. Mudbank limestones lie directly under the village while the **'Kilbryan Limestone Formation'** of dark nodular calcarenites and shales, and the **'Boyle Sandstone Formation'** of sandstones and red green conglomerates can be found to the southwest and southeast of the village, respectively. The 'Boyle Sandstone', found at Drumshanbo, also strikes in a southwest - northeast direction between Boyle and north of Leitrim village / Battlebridge. This bedrock type lines the south western shore of Lough Key and the north eastern shore of the same lake.

From Lough Allen the River Shannon runs south over the Devonian **'Keadew Formation'** of quartz rich sandstones and thin mudstone. This bedrock type is found south of Drumshanbo and can also be found along the north-western shores of Lough Key bedded alongside 'Boyle Sandstone'.

At Leitrim village and around Lough Naseer the 'Bricklieve Limestone Formation' (see above) is the underlying rock type.

The Boyle River and the eastern shore of Lough Key is underlain by the **'Kilbryan Limestone Formation'** described above.

At Oakport Lough, however, the **'Oakport Limestone Formation'** of dark crinoidal calcarenites and shales is the bedrock type. This bedrock also lines the north-western shore of Drumharlow (Eidin) Lough.

Most of Drumharlow Lough's shoreline is underlain by **'Croghan Limestone Formation'**. This is a blue muddy, cherty and shaley limestone. It is found along the north-eastern and southern shore, but a small amount of **'Ballymore Beds'** rock type is found lining the south-western shore. This is a black calcarenite and shale. The **'Croghan Limestone Formation'** is found under the River Shannon at Hartley's Bridge, Coryolus, Carrick-on-Shannon and further south to the northern half of Lough Corry.

5.2 Sheet 12 Longford-Roscommon (Geraghty et al. *1999)*
The southern half of Lough Corry and the River Shannon from here to Lough Tap is underlain by the **'Ballymore Limestone Formation'** (described above as 'Ballymore Beds'). A small section of **'Oakport Limestone Formation'** rocks underlie the Shannon from the southern half of Lough Tap to the northern tip of Lough Boderg.

The entire small lake area between Strokestown, Elphin and Hillstreet is underlain by undifferentiated Carboniferous limestone which is called **'Visean Limestones'**.

A fault line which runs in a northeast - southwest direction from Lough Boderg alongside the eastern shore of Kilglass introduces different rock types, but those within the project boundaries are mainly Carboniferous. Older, Ordovician volcanic rock types may be found on hills to the east of Kilglass, but these are largely outside the boundaries of the present survey.

Much of Lough Boderg and the western shore of Lough Bofin are underlain by the Carboniferous **'Fearnaght Formation'** of pale conglomerates and red sandstone.

The eastern shore of Lough Scannal is underlain by the **'Meath Formation'** of limestone and calcareous sandstone. Similar muddy and dark Carboniferous limestones and shales are found underlying the area between Rooskey and the northern shores of the Shannon to Lough Forbes.

The southern banks of the Shannon between the townland Cloonaufill/Piperstown and east to Newtown Forbes, are underlain by the undifferentiated 'Visean Limestones' described above. In fact, the remaining project area south of Newtown Forbes, to Lanesborough, is underlain by this rock type.

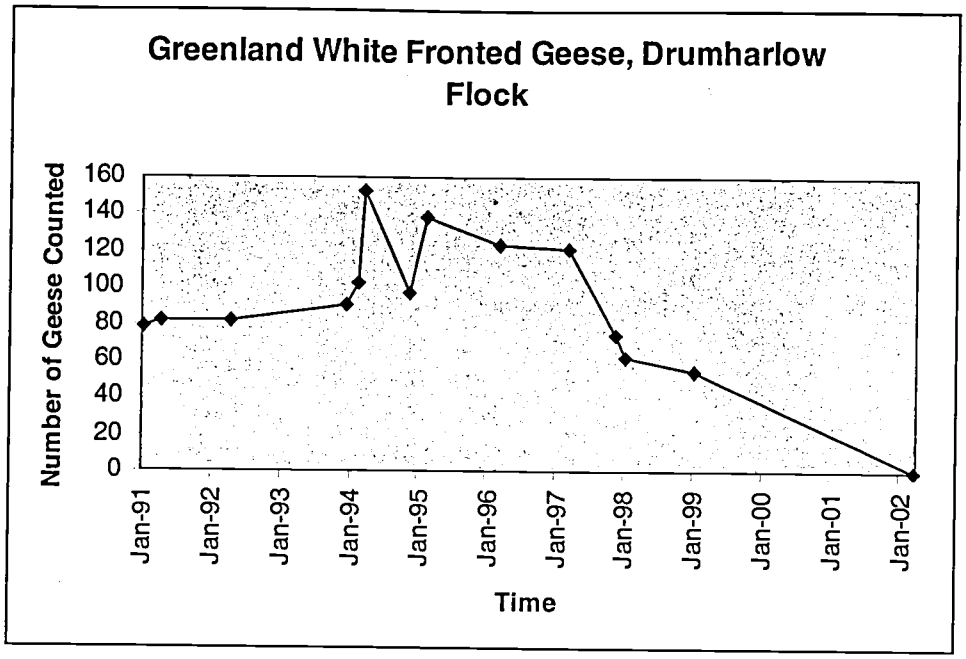
6.1.5 Reasons for the International Decline

The international decline of overwintering Greenland White-fronted Geese may be attributed to several combining factors including, but not limited to:

- An increase in the numbers of Canada geese breeding in traditional Greenland White-fronted Goose sites.
- Global warming, resulting in desertion of traditional feeding sites in favour of more northerly feeding areas.
- Improved weather conditions in Iceland in autumn and spring so the geese extend the time spent there. Since hunting is not banned in Iceland, it is assumed that a larger number are culled than have been in the past.
- Other factors may contribute to reduced numbers, such as a loss of suitable feeding habitat in overwintering areas and/or increased disturbance.

6.1.6 Recommendations

Counting the Upper Shannon flocks presents difficult logistical issues for staff and volunteers. However, it is clear that more accurate and frequent counting is required to determine flock sizes more accurately. There is a need for research into flock movements and feeding patterns in the Upper Shannon to determine whether disturbance, habitat loss or other preventable issues are resulting in flock declines.



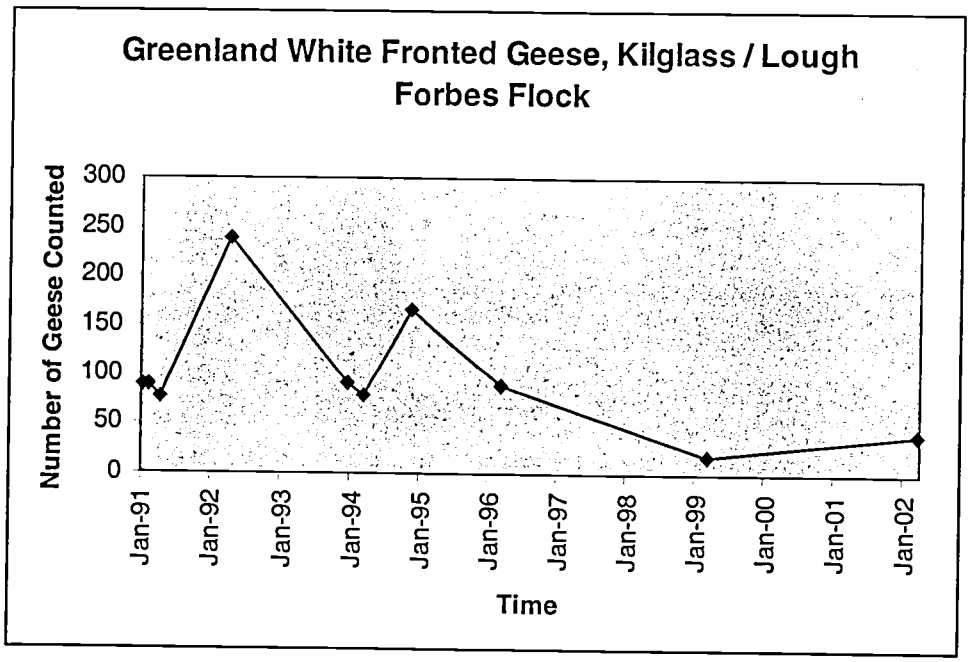


Figure 6.1a&b show the fluctuation in numbers of geese counted from each flock since 1990; (a) Drumharlow flock, (b) Kilglass/Lough Forbes flock. The graphs also indicate a decline that has been evident since the mid-1990s. Where two data entries were available for a single month, the higher number was used. No flock estimates were included with graph data.

6.0 Areas of Importance to Birds

The Upper Shannon Floodplain is an important area for wildfowl, particularly overwintering migratory species. This includes Greenland White-fronted Geese (*Anser albifrons flavirostris*) an Annex I species in the EU Birds Directive. A map showing feeding areas of this species within the present survey area was compiled based on information from Dúchas staff (Appendix 5).

Information on other species was taken from published I-WeBS counts. The Irish Wetland Bird Survey (I-WeBS) is a joint scheme between BirdWatch Ireland, Dúchas The Heritage Service and The Wildfowl and Wetlands Trust (WWT). Counts of 'waterbirds' are carried out on a monthly basis between September and March, with the month of January prioritised for counting to take place.

6.1 Greenland White-fronted Goose: Anser albifrons flavirostris

Protection: Annex I species in Birds Directive

6.1.1 Status in Ireland

The Greenland White-fronted Goose is a winter migrant. The Irish population was estimated at c. 14,600 in 1994 (Fox *et al.,* 1994) but has declined to c.11,400 in 2001-02 (A. Walsh, *pers. comm.*). In 1997-98 there were seven Internationally Important sites for this species in the Republic. Following the 1998-99, I-WeBS counts, this was reduced to six (Colhoun 2000; 2001). Numbers fluctuate each year but the international Greenland White-fronted Goose population is regarded as declining at present and what was a gradual decline from 1994-95, markedly accelerated from 1999 onwards (A. Walsh *pers. comm.*). The winter mean (1988-89) at the Wexford Wildfowl Reserve was 10,064 but the flock has been stable or in decline since. During recent, 2001-2002, counts only 7,400 were present (A. Walsh *pers.comm.*).

6.1.2 Distribution in Ireland

The main concentration of overwintering birds in Ireland is at Wexford, but otherwise their overall distribution is north-western, mirroring the climatic template for the formation of blanket bog habitat. This was the traditional wintering habitat for the species prior to human induced changes to the landscape (Fox *et al.*, 1994).

6.1.3 Distribution in Upper Shannon

Flock 21 at Drumharlow Lough: Counties Leitrim and Roscommon. This flock feeds at Drumharlow and small numbers of birds, which are assumed to have originated from this flock, have been occasionally observed at the northern end of Lough Allen - Kilgarriff area (B. O'Connor and D. Norris, *pers. comm.*). During the most recent combined aerial and ground counts, carried out by Dúchas on 1st and 21st March 2002, the Drumharlow Flock was not found at any site along Drumharlow, the Shannon or Lough Allen (A. Walsh, *pers.comm.*). Table 6.1 shows the number of geese counted at sites around Drumharlow from 1990 to present. Despite the limited dataset, a declining trend is apparent since the mid-1990s (Figure 6.1a).

Flock 22 at Loughs Kilglass and Forbes: Counties Leitrim, Longford and Roscommon. Lough Forbes is a cSAC and there is protection for many of the known feeding sites of this flock (Appendix 5). This flock numbered 240 in 1994 (Fox *et al.* 1994). The flock subsequently split into a number of feeding groups so lower counts during the 1990s could reflect the less thorough coverage of bird counters, or a real decline. The most recent counts by Dúchas staff in March 2002 included combined aerial and ground observations (A. Walsh *pers.comm.*). Only 41 birds were counted on 1st March and 28 on March 21st. These were encountered at a site approximately 1km south of Annaveagh Bridge on the Rinn River. This is a location outside the present project area (Grid Ref. approx. N 10 88) but it is included in the Rinn River NHA designation. No geese were noted from other sites on Lough Forbes or Kilglass (A. Walsh *pers.comm.*). A fluctuating, but declining, trend is apparent from flock counts, since at least the mid-1990s or possibly earlier (Figure 6.1b).

Feeding areas for the geese in the study area are illustrated in Appendix 5 with nature conservation designations also indicated for comparative purposes. These are priority areas for protection, which have been used by geese in the past and could be used in the future if flocks recover.

6.1.4 Conservation status in Upper Shannon

The Drumharlow flock was of National Importance from 1992-93 to 1996-97. Since then, the number and frequency of counts has declined but what counts have taken place suggest that the site is no longer Nationally Important (D. Norriss *pers.comm.*). The feeding and roosting sites of the Drumharlow flock no longer qualify for SPA status. The Kilglass/Lough Forbes flock was described as Nationally Important in 1994 (Fox *et al.* 1994) but widespread and difficult to count. The decline in this flock means that feeding and roosting sites for this flock no longer qualify for SPA status (D. Norriss *pers.comm.*).

The Drumharlow flock could not be located in Spring 2002 and the Kilglass/Lough Forbes flock was seriously diminished in size. There has been an estimated overall 85% reduction in the number of birds overwintering in the two flocks in the Upper Shannon. Exact reasons for the decline of Flocks 21 and 22 on the Upper Shannon catchment are unknown. A gradual decline in overall Irish population counts was noted from 1994/1995. However, large declines in the Upper Shannon flocks relative to other Irish flocks run counter to previously observed patterns and have no ready explanation.

Table 6.1: Number of geese counted from each of the Upper Shannon flocks from 1990 to present, information from Dúchas files and A. Walsh *pers. comm.*

	Drumharlow Flock 21		*Kilglass/Lough Forbes Flock 22*	
Year	**Month**	**Number**	**Month**	**Number**
1990-91	- January - April	- 78 - 82	December January February April	240+ 89 111 78
1991-92	April	82	April	240
1992-93	December March	(100 estimate) (100 estimate)	December March	(240 estimate) (240 estimate)
1993-94	December February March	90 102 152	December - March	92+ - 80 (240 estimate)
1994-95	November February -	97 138 -	November - March	167 (240 estimate) - (240 estimate)
1995-96	November - March	147 - 123+	- December March	- (240 estimate) 63/89 (240 est)
1996-97	- March -	- 121+ -	December - April	(240 estimate) - (240 estimate)
1997-98	November - January -	74 - 62 -	- December - April	- (240 estimate) - (240 estimate)
1998-99	December January March -	(74 estimate) 54 (74 estimate) -	December - March April	(240 estimate) - 19 (240 estimate)
2001-02	March	0	March	41/28

6.2 Areas of Importance for Other Bird Species

The Upper Shannon region is an area of some importance for wetland birds. The following list identifies specific sites and subsites that are covered by I-WeBS.

Table 6.2 I-WeBS site: **Annaghmore Lakes.** This includes many small lakes in the area between Strokestown and Elphin, and north east to Rooskey. The following subsites are included in results for the Annaghmore Lakes I-WeBS site.

SUBSITE	Grid Ref.
Annaghmore Lough	M900835
Ardakillin Lough	M880782
Clooncullaan Lough	M885850
Fin Lough	M899782
Floods North West of Ardakillin Lough	M872790
Illanowen Loughs	M885852
Lough Acrann	M870813
Lough Brackan	M922909
Lough Cunny	M900887
Lough Duff	M888812
Lough Feeny	M879847
Lough Gal	M873828
Lough Lea	M919812
Lough Nablasbarnagh	M903823
Lough O'Moran	M882868
Lough Patrick	M860830
Lough Saggart	M888812
Loughanammer	M869850
Mosshill House Lough (Black Lough)	M958867
River and Loughs South of Cloonsreane Lough	M904806
Turlough East of Lough Nablasbarnagh	M913828
Turlough North of Moneyboy.	M880815
Lough Killynagh	M922909
Turlough South East of Caldragh	M922845

Nationally important numbers of the following species were counted at Annaghmore Lakes in 1999 (Colhoun 2001). Data from 2000-2001 are not yet available.

- **Teal** *(Anas creca)*, 993 birds were counted here in January 1999 (National Threshold: 500)
- **Pintail** *(Anas acuta)*, 20 birds were counted here in January 1999 (National threshold: 20)
- **Shoveler** *(Anas clypeata)*, 152 were counted in January 1999 (National threshold: 40)
- **Lapwing** *(Vanellus vanellus)*, 2081 were counted in January 1999 (National threshold: 2000)

6.3 Other bird species of interest

Whooper swan: *Cygnus cygnus*
This is a common winter visitor. It was recently placed on the Amber List of species of medium conservation concern (Newton *et al.* 1999) and is listed in Annex I of the Birds Directive. I-WeBS counts of this species along the Upper Shannon do not normally exceed National or International thresholds. However, in February 2002, 97 were counted close to Drumharlow Lough (Grid Ref. G914 003) during the present project. The National threshold is 100 (Colhoun 2001). Whooper swans have also been recorded in Mahanagh bay, Lough Allen (30/11/97), at Gortinty Lough and along the Rinn River to Lough Rinn (D. Cotton *pers. comm.*).

Bewick swan: *Cygnus columbanius*
This is a common winter visitor to Ireland's lakes and marshes and can be found in mixed flocks grazing on fields and sloblands. Breeding in northern Russia and Siberia, they arrive in Ireland in late autumn/ early winter and leave by March or April (Dempsey and O'Clery 1995). A large flock (50/60) of Bewick swans were recorded at Oakport Lough (B. O'Connor *pers. comm.*). This is higher than the National threshold of 20 (Colhoun 2001). Bewick swans are on the Amber list and are of European conservation concern (Newton *et al.* 1999).

Golden plover: *Pluvialis apricaria*
This species has been noted in high numbers at Annaghmore Lough NHA (1626). Approximately 300 individuals were counted there in the 1980's (Dúchas files). Although this is a large number it is well below the national threshold of 1500 (Colhoun 2001). The golden plover is listed in Annex I of the EU Birds Directive.

Garden warbler: *Sylvia borin*
This uncommon breeding species (Dempsey and O'Clery 1995) is found in some midland and northern counties. It has been recorded breeding in Inisfale Island, Lough Allen (24/5/92 D. Cotton *pers.comm.*).

Hen harrier: *Circus cyaneus*
The hen harrier is a scarce breeding species with small numbers present in the midlands, eastern, south-western, western and northern regions (Dempsey and O'Clery 1995). Hen harriers have been observed in a young forestry plantation in Derrynamanagh, County Roscommon (B. O'Connor *pers. comm.*). A young male was observed hunting along the river close to Carrick-on-Shannon at Cloonmaan in February 2002 (by the present survey team). The hen harrier is on the Red List of species of high conservation concern owing to a decline in breeding pairs (Newton *et al.* 1999).

Marsh harrier: *Circus aeruginosus*
The Marsh harrier is a scarce but regular spring and autumn passage migrant from Europe (Dempsey and O'Clery 1995). This species was recorded at Grange Lough on three occasions in 2001 (B. O'Connor *pers. comm.*).

7.0 Species of interest within the Upper Shannon Area

Information for rare species was compiled based on the following information:

- Rare Lichen and Bryophyte reports (by Stewart)
- NHA Site files
- Rare species records
- Personal communication
- Published reports

7.1 Plants

7.1.1 Vascular Plants

***Bromus racemosus:* Smooth brome**
Protection: None
Status in Ireland: Listed in the Red Data Book, very rare (Webb *et al.* 1996). Apparently declining in Republic of Ireland (Curtis and McGough 1988).
Distribution in Ireland: In water meadows, hay fields, arable and waste land (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Two records from 1901, one at Drumshanbo and another which is probably outside the boundary of the present survey at Arigna. Current distribution is unknown.

***Carex acuta*: Slender tufted sedge**
Protection: None
Status in Ireland: Rather rare (Webb *et al.* 1996)
Distribution in Ireland: Along rivers and lake margins, mainly in the Northern half (Webb *et al.* 1996). .
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: New county record at the bank of the River Shannon at Drumsna (D. Cotton *pers. comm.*).

***Carex elongata*: Elongated sedge**
Protection: None
Status in Ireland: Rare but not threatened (Red Data Book Threat Number 3), (Curtis and McGough 1988).
Distribution in Ireland: Found in Cavan, Leitrim, Roscommon, Longford and Monaghan (Curtis and McGough 1988 and recent Dúchas Record for Lough Forbes). Habitats include wet meadows, lake shores, ditch margins and swamp woodlands.
Conservation status in Upper Shannon: Rare but not threatened.
Distribution in Upper Shannon: Found at Corrigeenroe, Lough Key in 1980 (Dúchas File) and along the shore of Lough Forbes in 2000 (Browne Dunne Roche 2000).

Carex pallescens: **Pale sedge**
Protection: None
Status in Ireland: Local in areas of North and West, rare elsewhere (Webb *et al.* 1996).
Distribution in Ireland: In damp grassland, moorland and open woods, North and West (Webb *et al.* 1996).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Recorded from Lough Boderg shoreline in 1993 (Heery 1994).

Epipactis palustris: **Marsh helleborine**
Protection: None in the Republic of Ireland, Northern Ireland Scheduled Species.
Status in Ireland: Relatively frequent in suitable habitats in the Republic but rare in Northern Ireland where it has been recorded from 4 counties (Curtis and McGough 1988). Declining according to Webb *et al.* (1996).
Distribution in Ireland: It occurs on marshes, fens, lake shores and wet sandy pastures (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Found at Annaghmore Lough (1626) NHA.

Eriophorum latifolium: **Common cotton grass**
Protection: None
Status in Ireland: Widespread but rather rare (Webb *et al.* 1996).
Distribution in Ireland: Found on fens, marshes and flushes on bogs. It is distributed widely throughout the country (Webb *et al.* 1996).
Conservation status in Upper Shannon: Unknown
Distribution in Upper Shannon: Found at Annaghmore Lough (1626) NHA.

Juncus compressus: **Round-fruited rush**
Protection: None
Status in Ireland: Listed in the Red Data Book, rare but apparently increasing (Curtis and McGough 1988).
Distribution in Ireland: Found in Counties Meath, Longford and Roscommon on alluvial meadows (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Was recorded in 1986 below the lock at Termonbarry.

Lathraea squamaria: **Toothwort**
Protection: None
Status in Ireland: Rare (Webb *et al.* 1996).
Distribution in Ireland: Widespread on roots of various trees and shrubs (Webb *et al.* 1996) in woodland habitats.
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Recorded from DerrygrastenWood (Dúchas, NHA File).

Lathyrus palustris: **Marsh pea**
Protection: None in the Republic of Ireland, Northern Ireland Scheduled Species.
Status in Ireland: This species was formerly protected in the Republic but is not considered threatened. It is, however, described by Webb *et al.* (1996) as rare.
Distribution in Ireland: Mainly in the centre of the country in marshes and wet meadows. It is typically found in callows (Webb *et al.* 1996, Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Found near Lanesborough (across the Shannon from the power station) by Goodwillie (*pers.comm.*). It has not been recorded further north but callows vegetation north of Lanesborough has been poorly surveyed so it may be present.

Luronium natans: **Floating water plantain**
Protection: None
Status in Ireland: Rare, recently described as a native species (Rich *et al.* 1995).
Distribution in Ireland: Scattered along the west coast and midlands. Found in acid ponds and along canals (Stace 2001).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: In 1871 it was found at Inchmurrin Island (a.k.a. Rabbit Island), this record was recently confirmed (Rich *et al.* 1995).

Ophrys apifera: **Bee orchid**
Protection: None in the Republic, Northern Ireland Scheduled Species.
Status in Ireland: Local in the Republic but rare in the North where it occurs at 11 known sites (Curtis and McGough 1988).
Distribution in Ireland: Found on sand dunes pasture, dry banks and limestone soils it occurs locally on suitable soils (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Found at the Annaghmore Lough (1626) NHA.

Ophrys insectifera: **Fly orchid**
Protection: None
Status in Ireland: Rare (Webb *et al.* 1996).
Distribution in Ireland: Found in fens and limestone pavement in the centre and west of the country (Webb *et al.* 1996).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Present at Annaghmore Lough (1626) NHA, County Roscommon.

Orobanche hederae: **Ivy broomrape**
Protection: Not protected in Republic of Ireland, Northern Ireland Scheduled Species.
Status in Ireland: Red data list species due to its rarity in Northern Ireland.
Distribution in Ireland: Occasional in the southern half of the country becoming scarcer in northern parts (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Aughry Wood, Dromod (D. Cotton *pers. comm.*).

Populus nigra: **Black poplar**
Protection: Not protected.
Status in Ireland: Considered by Hobson (1993) as likely to be a native Irish species. The Irish population, if native, is of global significance (Hobson 1993).
Distribution in Ireland: Distribution closely follows the flood plains and lakes of the Shannon with other records distributed throughout easterly midlands counties. Not found in the north or extreme south.
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Situated on the winter storm zone of the shores of Lough Allen (Grid Reference given in Hobson 1993, G 986 155, is not an accurate location), exact location unknown, possibly on the eastern shore.

Prunus padus: **Bird cherry**
Protection: None
Status in Ireland: Listed in the Red Data Book. Possibly declining from the Republic of Ireland but it is likely to be more widespread than records suggest (Curtis and McGough 1988).
Distribution in Ireland: Found throughout the country but more frequently in the north-west, in woodlands and damp, rocky places (Webb *et al.* 1996).
Conservation status in Upper Shannon: Frequent, threatened by a reduction in woodland cover.
Distribution in Upper Shannon: Frequent in the Castle Forbes demesne (Browne Dunne Roche 2000). Also found in the 1970s at Lough Drumharlow in County Roscommon.

Ranunculus lingua: **Greater spearwort**
Protection: None
Status in Ireland: Frequent in the centre of Ireland but rare elsewhere (Webb *et al.* 1996)
Distribution in Ireland: Mainly central, in marshes, fens, canals and reed-beds (Webb *et al.* 1996).
Conservation status in Upper Shannon: Rare in Leitrim (D. Cotton *pers. comm.*).
Distribution in Upper Shannon: Found at Holly Island, Lough Allen (D. Cotton *pers. comm.*).

Scandix pecten-veneris: **Shepherd's needle**
Protection: None
Status in Ireland: Listed in the Red Data Book as Extinct (Curtis and McGough 1988).
Distribution in Ireland: Currently unknown from any Irish county, formerly present on tilled fields in all counties (Curtis and McGough 1988).
Conservation status in Upper Shannon: Extinct.
Distribution in Upper Shannon: Not believed to be present in the survey area, formerly found by Praeger at Killashee in 1896.

***Stellaria palustris*: Marsh stitchwort**
Protection: None
Status in Ireland: Rare (Webb *et al.* 1996).
Distribution in Ireland: Mainly in the centre of the country (Webb *et al.* 1996).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Recorded at Lough Bofin around Rabbit/Otter Islands (Heery 1994).

***Teucrium scordium*: Water germander**
Protection: None.
Status in Ireland: Frequent on some lakeshores on the Shannon but rare elsewhere (Webb *et al.* 1996).
Distribution in Ireland: Almost confined to Shannon Lakes (in particular Loughs Ree and Derg).
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Recorded from a stony lakeshore of Lough Boderg (Heery 1994).

***Thalictrum flavum*: Common meadow rue**
Protection: None.
Status in Ireland: Frequent in some places, particularly the centre of the country (Webb *et al.* 1996), rare elsewhere.
Distribution in Ireland: Mainly in the centre and around Lough Neagh (Webb *et al.* 1996). Found in fens and marshy fields.
Conservation status in Upper Shannon: Unknown.
Distribution in Upper Shannon: Found at Cloonglasny Beg, Garymona (M 988 895) (D. Cotton *pers. comm.*).

***Viola persicifolia:* Fen violet**
Protection: Not protected in Republic of Ireland, Northern Ireland Scheduled Species.
Status in Ireland: IUCN category Rare (Curtis and McGough 1988).
Distribution in Ireland: Has been recorded from 7 counties, its stronghold is the north Clare, south east Galway turlough area. Also found at Lough Erne and along the Shannon. It is found in damp grassland which is subject to periodic inundation (Curtis and McGough 1988).
Conservation status in Upper Shannon: Unknown
Distribution in Upper Shannon: Recorded by Praeger in 1900 from the area around Rooskey. Present distribution is unknown.

7.1.2 Bryophytes

Bryum uliginosum recorded at Annaghmore Lough near Strokestown, Co. Roscommon (Grid Ref. 9 8) by W.V. Rubens *et al.* in 1968.

Bryum caespiticium recorded near Boyle (Grid Ref. 8 0) by J.S. Thomson in 1940 although its exact position is unrecorded so may have been outside the survey area.

Cephalozia loitlesbergeri was recorded at Derreenargan Bog, Co. Roscommon, (Grid Ref. 9 0) on two occasions by A.L.K. King in 1966 and 1967.

Campylopus pyriformis recorded at Ballykenny Bog, Co. Longford, (Grid Ref. 090 790) by C. Douglas and Grogan in 1986.

Colura calyptrifolia recorded at Cloonart Bridge, Co. Longford, (Grid Ref. 0 8) by J.W. Fitzgerald in 1965. Another record for the same species was made in County Leitrim by J.W. Fitzgerald, also in 1965 (Grid Ref. 9 2). However, its exact position is unknown and may be outside the present project boundary.

Pedinophyllum interruptum recorded at an unnamed location, (Grid Ref. 9 2) by J.W. Fitzgerald in 1969. Whether this is inside the present project boundary is unknown.

Plagiomnium cuspidatum recorded at Castle Forbes, west of Lough Forbes, Co. Longford, (Grid Ref. 0 8) by W.V. Rubens *et al.* in 1968.

Riccia fluitans recorded at Smutternagh, Lough Key, Co. Roscommon (Grid Ref. 8 0) by D.L. Kelly in 1980. The same species was also recorded at the River Shannon, below Carrick-on-Shannon (Grid Ref. 9 9) by R.L. Praeger in 1899.

7.2 Lichens

Cladonia parastica recorded at Castle Forbes (Grid Ref. 0 8) by J. Doyle in 1925.

7.3 Invertebrates

***Margaritifera margaritifera*: Freshwater pearl mussel**

Protection

Annex II species on EU Habitats Directive. It is one of two European species of pearl mussel that are now on the International Union for the Conservation of Nature and Natural Resources (I.U.C.N.) Red Data List. Under Irish law, the freshwater pearl mussel is covered by Statutory Instrument No. 112 1990 which states that it is illegal to interfere with pearl mussel and also outlaws pearl fishing.

Status in Ireland

Recent work shows that the species is still widespread in Ireland but populations may be in decline. A study of 32 populations, for example, found that only eight had young mussels (Moorkens 1999).

Distribution in Ireland

The pearl mussel is found in clean, well oxygenated rivers over non-calcareous rock. It requires little calcium, few nutrients, clean gravel and sand. Its Irish stronghold is the south west of the country (Moorkens 1999).

Status in Upper Shannon
Unknown.
Distribution in Upper Shannon
Freshwater pearl mussel (*Margaritifera margaritifera*) was recorded in the waters of Kilgarriff Bay (north Lough Allen) by Ingenierbüro Ott GmbH during an Environmental Impact Assessment for a proposed housing and marina project in the area (2001). This record requires verification, as it would be a first for County Leitrim (*pers. comm.* D. Cotton). The present project area was not, however, listed with known records by Moorkens (1999).

Austropotamobius pallipes: **White Clawed Crayfish**
Protection
Annex II species of the Habitats Directive
Status in Ireland
This is the only crayfish species found in Ireland. It is classified as vulnerable and rare in the IUCN Red List of threatened animals. Ireland is thought to hold some of the best European stocks of the species, under least threat from external factors (Reynolds 1998).
Distribution in Ireland
Widely distributed around the country inhabiting rivers, lakes and streams (Lucey and McGarrigle 1987). Distribution generally corresponds to freshwater habitats over Carboniferous strata with most records from Carboniferous Limestone. Crayfish also require unpolluted water. Also, Ireland's largest lakes (over 2000ha) contain crayfish only near mouths of inflowing rivers (Reynolds 1982).
Conservation status in Upper Shannon
Unknown.
Distribution in Upper Shannon
Lucey and McGarrigle (1987) indicate that crayfish are found in freshwater habitats with the following natural chemistry characteristics: pH 7.2 to 8.4, alkalinity 34-356mgl^{-1} and hardness 47-402mgl^{-1}. Lucey and McGarrigle recorded crayfish at Dowra bridge, County Leitrim. This is the only published record within the limits of the present survey area, but it is not situated on limestone. There are several published records for crayfish on smaller rivers outside the survey area in Roscommon and Leitrim. Also just outside the survey area there are Dúchas records for crayfish in Lough Ree, Lanesborough.
Potential suitability of Upper Shannon for crayfish
Records of water chemistry in **Lough Allen** sampled in October 1973 and April 1974 indicate a pH 6.9-7.3, alkalinity 20-24 mgl^{-1} and hardness 35-45mgl^{-1} (Flanagan and Toner 1975). The recorded natural water chemistry of Lough Allen could therefore be considered marginally unsuitable for crayfish. **Lough Boderg** on the other hand, pH 7.7-8.0, alkalinity 50-120mgl^{-1} and hardness 70-145mgl^{-1} (Flanagan and Toner 1975), is more suitable for crayfish. **Lough Bofin** has similar water chemistry, pH 7.9-8.0, alkalinity 60-105mgl^{-1} and hardness 80-130mgl^{-1} which is also suitable for fresh water crayfish (Flanagan and Toner 1975). Water quality within much of the Upper Shannon is generally moderate to good. The Boyle River, for example, has satisfactory water quality and runs over limestone for much of its length. This river should be ideal for supporting crayfish populations. Other areas which may support crayfish populations are the

following: River Shannon south from Leitrim, small lakes and rivers between Strokestown, Elphin and Rooskey. Loughs Boderg, Bofin and Forbes may have the correct water chemistry characteristics but crayfish do not favour large lakes.

Euphydryas aurina: **Marsh fritillary**

Protection

Annex II species on EU Habitats Directive

Status in Ireland

Under pressure from drainage and intensive sheep grazing (Asher *et al.* 2001)

Distribution in Ireland

Strongholds in counties Fermanagh, Sligo, Donegal and the west Shannon region. Also good populations on northern sand dunes and on limestone in the Burren (Asher *et al.* 2001).

Status in Upper Shannon

Unknown.

Distribution in Upper Shannon

Colonies may exist on cutaway bogs and along linear features such as road verges (Asher *et al.* 2001) but there are no recorded populations within the project area (Dublin Naturalists' Field Club 2000).

7.4 Vertebrates (for information on birds see Section 6)

Lutra lutra: **Otter**

Protection

Annex II species on EU Habitats Directive.

Status in Ireland

Common

Distribution in Ireland

The otter is found throughout Ireland and has avoided the population declines that have occurred in many other countries (Hayden and Harrington 2000).

Status in Upper Shannon

Likely to be frequent.

Distribution in Upper Shannon

Otters may be found at a variety of aquatic habitats throughout the survey area. Spraints have been recorded on islands in Lough Allen as well as at Kilgarriff in North Lough Allen (*pers. comm.* J. Matthews).

8.0 Zonation and Sites of Interest

The study area was classified into three zones:

A Areas of high conservation interest where development is likely to have adverse impacts.

B Areas of interest where proposals for any new developments should be adequately assessed.

C Areas that have been developed, where permissions have been granted for development or for other reasons are of low conservation interest which developments would be assessed mainly on the basis of their impacts on adjacent areas.

Zonation is demarcated on a series of maps of the project area (Appendix 6). It is envisaged that such a zonation will aid assessment of the impact of proposed developments on habitats and conservation interests. Since little detailed survey work could be carried out during the timeframe of this project zone boundaries are not definite. It is possible that, following detailed survey work, sites may be reassigned to different, more suitable, zones or boundaries may be readjusted. Sites not included in the following Zone A or B lists are allocated to Zone C since they are considered to have low conservation interest. However, Zone C areas may, in future studies, be found to support species or habitats of conservation interest.

Zone A sites are listed first, then Zone B sites. For both Zones the entire project area is divided into the Sections listed below.

Section 1: Lough Allen
Section 2: Drumshanbo to Carrick-on-Shannon
Section 3: Lough Key to Drumharlow
Section 4: Carrick-on-Shannon to Lough Bofin
Section 5: Lough Bofin to Termonbarry
Section 6: Termonbarry to Lanesborough
Section 7: Area between Strokestown, Elphin and Rooskey

The sites are also graded hierarchically into national, regional or local importance (adapted from An Foras Forbatha, in Lockhart *et al.* 1993):

- Sites of **national importance** are ones which are important in an Irish context but equally good examples *may* be found elsewhere in the country. NHA sites, for example, are assigned to Zone A.
- Sites of **regional importance** good examples of habitats that reflect the vegetation of the region, or occur relatively seldom in the region. These are assigned to Zones A or B, depending on the species complement and/or rarity.
- Sites of **local importance** have some items of interest and are better than the areas not listed. These sites are usually listed in Zone B.

Photographs illustrating features of these areas are shown in Appendix 8. No descriptions are given of NHAs since these areas were not surveyed and more detailed information is available in Dúchas files. Detailed information on species composition and flooding of the site is based on field work carried out in February or March 2002, unless otherwise specified.

8.1 ZONE A

Areas of high conservation interest where development is likely to have adverse impacts.

8.1.1 Lough Allen

Location: Owengar Wood NHA 1419	**Conservation rating: Regional Importance**
Grid reference: G 925 238	**County Leitrim**
Appendix 6 Map: Leitrim 018	**Appendix 8: Photo none**

Location: Lough Allen South End and Parts NHA 427	**Conservation rating: Regional Importance**
Grid reference: Various	**County Leitrim**
Appendix 6 Map: Leitrim 018, 020	**Appendix 8: Photo none**

Location: Mahanagh Lough	**Conservation rating: Regional Importance**
Grid reference: G 964 255	**County Leitrim**
Appendix 6 Map: Leitrim 018	**Appendix 8: Photo 1**

Description: Mahanagh Lough is a small narrow lake located 1km north of Lough Allen and approximately 2.5km south west of the village of Dowra. The lake is surrounded by well developed reedbeds (*Phragmites australis* and *Typha latifolia*) which grade into wet grassland dominated by rushes (*Juncus effusus*), scrub and alder-ash-willow woodland.

At Kiltyfeenaghty Glebe, on low-lying land south of the lake, wet alder-ash-willow woodland was recorded. Species noted were birch (*Betula pubescens*), willow (*Salix* sp.), lichens, yellow flag (*Iris pseudacorus*), bramble (*Rubus fruticosus*), sedges (*Carex* spp.), lesser celandine (*Ranunculus ficaria*), wavy bittercress (*Cardamine flexuosa*), common polypody (*Polypodium vulgare*).

Recommendation: Possible extension to Lough Allen South End and Parts NHA 427.

Location: Rossmore to Kilgarriff	Conservation rating: Regional Importance
Grid reference: Various	County Leitrim
Appendix 6 Map: Leitrim 018	Appendix 8: Photos 2-4

Description: Part of this area is included in the Lough Allen, South End and Parts NHA, 427. Among the habitats present are broadleaf woodland, willow scrub, wet grassland, reedbeds, lakes. At Rossmore/Kilgarriff there are unconfirmed records for white-clawed crayfish (*Austropotamobius pallipes*) and for pearl mussel at Kilgarriff lake (*Margaritifera margaritifera*). There is a conifer plantation on Deadman's Point peninsula which is excluded from Zone A.

Recommendations: The following areas along the northern shore of Lough Allen are recommended for further survey with a view to inclusion in the Lough Allen South End and Parts NHA, 427:

- Rossmore Inlet (G 964 240)
- Rossbeg Glebe (G 965 232)
- Kilgarriff Lake (G 980 240)
- Derrynahona (a known Greenland White-fronted Geese site, see Appendix 5) (G 987 235).

Surveys are required to confirm presence / absence of white-clawed crayfish and pearl mussel at Rossmore and Kilgarriff Lake.

Location: Inisfale Island	Conservation rating: Regional Importance
Grid reference: G 965 135	County Roscommon
Appendix 6 Map: Roscommon 002	Appendix 8: Photo none

Description: A long, narrow peninsula in the south of Lough Allen that supports extensive woodland with a mature broadleaf canopy. Mountallen, close to Inisfale, is a known Greenland White-fronted Goose feeding site and it is included in Zone A.

Recommendation: This area is difficult to access from land. It is recommended for further survey, with a view to inclusion in the NHA (Lough Allen South End and Parts, 427).

Location: Holly Island	**Conservation rating: Regional Importance**
Grid reference: G 962 126	**County Leitrim**
Appendix 6 Map: Leitrim 023 and Roscommon 002	**Appendix 8: Photo 5 taken from Holly Island to Shannon exit.**

See also Zone B.

Recommendation: Sheltered bays to the north of Holly Island peninsula have well developed wet alder-willow woodland and, pending further survey work, recommended for inclusion within the NHA (Lough Allen South End and Parts, 427). The rest of Holly Island has been assigned to Zone B.

Location: Bodorragha	**Conservation rating: Regional Importance**
Grid reference: G 950 120	**County Roscommon**
Appendix 6 Map: Roscommon 004	**Appendix 8: Photo 6 and 7**

Description: An extensive cutover raised bog that is outside, but adjacent to, the survey boundary. The bog is surrounded by birch scrub and there is a conifer plantation on the south eastern edge of the bog.

The bog vegetation is dominated by ling heather (*Calluna vulgaris*) and hare's tail bog cotton (*Eriophorum vaginatum*). The lichen *Cladonia impexa* is abundant. *Sphagna* are numerous, particularly *Sphagnum capillifolium, S. papillosum* and *S. magellanicum*, with *S. cuspidatum* and *S. imbricatum* occasionally recorded. Bog cotton (*Eriophorum angustifolium*), carnation sedge (*Carex panicea*), cross leaved heath (*Erica tetralix*), deergrass (*Scirpus cespitosus*), bog asphodel (*Narthecium ossifragum*), bog rosemary (*Andromeda polyfolia*) were noted. The mosses *Racomitrium lanuginosum* and *Hypnum jutlandicum*, and the lichen *Cladonia uncialis* were also recorded. To the south, the vegetation becomes dominated by purple moor grass (*Molinia caerulea*) and birch scrub, this is the location of a small lake.

There has been some turf-cutting using a Difco machine along the bog edge but the bog still retains much of its wetness and there are occasional pools. The peat appears somewhat compacted however, and the hummock and hollow structure typical of raised bogs is not well-developed.

This bog is relatively extensive and is relatively intact despite some turf-cutting, drainage and forestry plantation along the boundary. Lodgepole pine saplings are found on the bog close to the forestry plantation. There is some restoration potential if turf cutting ceases and drains are blocked.

8.1.2 Drumshanbo to Carrick-on-Shannon

Location: Drumhierney Wood NHA	Conservation rating: Regional Importance
Grid Reference: G 951 055	County Leitrim
Appendix 6 Map: Leitrim 027	Appendix 8: Photo 8

Recommendation: The conservation value of the entire woodland could be improved if the undesignated area was included in the Native Woodland Scheme (Forest Service 2001), in which case the boundaries of the NHA could be extended.

Corryolus (Map Leitrim 031, Grid Ref: 930 005) is included in Drumharlow NHA (see Section 8.1.3).

8.1.3 Lough Key to Drumharlow

Location: Lough Key NHAs and Islands	Conservation rating: National Importance
Grid Reference: G 84 05	County Roscommon
Appendix 6 Map: Roscommon 003, 006	Appendix 8: Photo 9 Corrigeenroe Marsh, 10/11 Drum Bridge, 12 Tawnytaskin, 13 Hogs Island, 14 Erris Bay, 15 Tinnarinnow, 16 Islands in L.Key (Castle, Green and Orchard)

Description: A number of parts of the shoreline (Corrigeenroe Marsh 596, Drum Bridge 1631, Drummans Island 1633, Tawnytaskin Wood) and an island (Hogs Island 1638) are designated NHAs. Other islands on the lake (Ash, Bingham, Bullock, Castle, Church, Green, Hermit, Lahan's, Orchard, Sally, Stag, and Trinity) also appear to have good broadleaf woodland habitat. Erris Bay is an extensive wetland area of rushes and reeds with copses of birch and willow. Tinarinnow Peninsula is broadleaf woodland dominated by ash and oak. Birch and alder are present along the lake shore. Drumcormick Peninsula on the north eastern shore of Lough Key, is dominated by broadleaf woodland of ash and oak with birch in the understorey. There is also wet woodland fringing the lake.

Recommendations: The islands, Tinarinnow Peninsula and Drumcormick Peninsula are assigned to Zone A and should be subject to further survey with a view to NHA designation. Erris Bay on the southern shore may also be of high conservation value and requires further survey work to verify this.

Location: Fin Lough NHA	**Conservation rating: Regional Importance**
Grid Reference: G 865 040	**County Roscommon**
Appendix 6 Map: Roscommon 006	**Appendix 8: Photo 17**

Location: Drumharlow lake (Lough Eidin) NHA	**Conservation rating: National Importance**
Grid Reference: G 91 01	**Counties Roscommon/Leitrim**
Appendix 6 Map: Roscommon 006, 007	**Appendix 8: Photos 18-20 Drumharlow various, 21 Cloongownagh (whooper swans) S of N4, 22 Cloongownagh N of N4, 23 Cleaheen Bog, 24 Corryolus.**

Recommendations:

- A forestry plantation at Dereenannagh, north of Drumharlow Lake, is reported to have hen harriers but this is not inside the NHA (B.O'Connor *pers.comm.*). Further survey work should be carried out to determine whether this forestry should be included since it is difficult to designate areas for highly mobile species such as hen harriers.
- A small number of mute swans and 97 whooper swans were recorded in flooded fields on the south side of the N4. This area at Cloongownagh townland, is recommended for further boundary survey and inclusion in Drumharlow NHA.
- Greenland White-fronted Geese have been observed feeding at areas in Dergraw and Carrigeen Townlands, outside the NHA boundary. These should be included within the designation boundary.

8.1.4 Carrick-on-Shannon to Lough Bofin

Location: Lough Bofin/Boderg NHA 1642	**Conservation rating: National Importance**
Grid Reference: N 02 90	**County Roscommon/Leitrim**
Appendix 6 Map: Leitrim 035	**Appendix 8: Photo 25 Drumman Beg Lough**

Recommendations:

- Extend boundaries of designated area to include Greenland White-fronted Geese feeding sites (Appendix 5).
- Boundaries should also be extended to include all known areas of flooding (Appendix 4), for example, the area around Carrandoe Bridge on the southern shore of Lough Boderg, at Annagh Townland on the western shore and flooding south of Lough Tap.

Location: Cordrehid/Cortober	**Conservation rating: Regional Importance**
Grid Reference: M 940 985	**County Roscommon**
Appendix 6 Map: Roscommon 011	**Appendix 8: Photo none**

Description: Wet grassland on the flood plain of the Killukin River close to its inflow with the Shannon. A hen harrier was sighted here in February 2002. There is extensive flooding of rushy fields with scattered willows.

Recommendations: This area should be not zoned for development by the local authority but is probably too small to warrant NHA designation.

Location: Drumkeeran to Rinnacurreen	**Conservation rating: Regional Importance**
Grid Reference: M 950 980	**County Leitrim**
Appendix 6 Map: Leitrim 031	**Appendix 8: Photo 26**

Description: A low lying area, 2km south of Carrick-on-Shannon, on the eastern bank of the river at Lough Corry. During survey work, water levels were very high and roads were flooded. The vegetation is willow scrub and wet grassland with reeds (*Phragmites australis*) and soft rush (*Juncus effusus*). The wet woodland of principally alder (*Alnus glutinosa*) and birch (*Betula pubescens*) becomes more extensive towards Rinnacurreen.

Recommendations: Any proposed developments at the Shannon floodplain should be subject to stringent ecological assessment.

Location: Attitory, Ballynacleigh, Poulnacappal, Cornacoroo	**Conservation rating: Regional Importance**
Grid Reference: M 950 990, M 955 980, M 960 970, M 955 965	**County Leitrim**
Appendix 6 Map: Leitrim 031	**Appendix 8: Photo 27 Cornacoroo**

Description: A low lying area southeast of Carrick-on-Shannon on the eastern bank of the Shannon. Extensive flooding of wet grassland and wet woodland is typical. There is high potential for development along the Shannon, for marinas or housing and infilling was recorded at Cornacoroo.

Recommendations: Any proposed developments at the Shannon floodplain should be subject to stringent ecological assessment.

8.1.5 Lough Bofin to Termonbarry

Location: Clooneen Bog NHA 445	**Conservation rating: National Importance**
Grid reference: N 070 840	**County Longford**
Appendix 6 Map: Longford 004, 008	**Appendix 8: Photo none**

Location: Rinn River NHA 691	**Conservation rating: National Importance**
Grid reference: N 085 835	**Counties Longford and Leitrim**
Appendix 6 Map: Longford 008	**Appendix 8: Photo 28**

Location: Lough Forbes SAC 1818	**Conservation rating: National Importance**
Grid reference: N 080 815	**Counties Longford and Roscommon**
Appendix 6 Map: Longford 008	**Appendix 8: Photo none**

8.1.6 Termonbarry to Lanesborough

Location: Ballinphuill	**Conservation rating: Regional Importance**
Grid Reference: N 040 770	**County Roscommon**
Appendix 6 Map: Roscommon 030	**Appendix 8: Photo 29**

Description: Extensive flooding by the Feorish River of wet grassland and scrub, just west of Termonbarry, on the west shore of the Shannon. On the far bank of the river is industrial cutaway. This is not an intensively managed habitat and is good for waterfowl.

Recommendation: This area should be surveyed in detail to determine whether, and to what extent, callows grassland is present. If high quality callows vegetation is present, it may be appropriate to designate a new NHA combining this area and Highstreet, on the other side of the Shannon.

Location: Highstreet	Conservation rating: Regional Importance
Grid Reference: N 040 760	County Longford
Appendix 6 Map: Longford 012, 13	Appendix 8: Photo 30, Photo 56 view of Lodgetown channel

Description: Located 2km west of Cloondara, on the east bank of the Shannon. Extensive flooding of wet rushy fields, possibly callows. Species recorded were creeping bent (*Agrostis stolonifera),* meadow buttercup *(Ranunculus acris),* lesser spearwort (*R. flammula),* lady's smock *(Cardamine pratensis),* soft rush *(Juncus effusus),* forget-me-not *(Myosotis sp.),* meadow sweet *(Filipendula ulmaria),* marsh marigold *(Caltha palustris),* marsh pennywort *(Hydrocotyle vulgaris),* common sorrel *(Rumex acetosa),* marsh bedstraw *(Galium palustre)* and dandelion *(Taraxacum sp.).* Scattered bushes of grey willow *(Salix cinerea)* also occur. This area may be of importance for wildfowl: curlew (*Numenius arquata*), mute swan (*Cygnus olor*), tufted duck (*Aythya fuligula*) and great crested grebe (*Podiceps cristatus*) were noted.

Recommendation: This area should be surveyed in detail to determine presence and extent of callows grassland with a view to NHA designation (possibly with Ballinphuill above).

Location: Kilnacarrow	Conservation rating: Regional Importance
Grid Reference: N 015 720	County Longford
Appendix 6 Map: Longford 012	Appendix 8: Photo 31 and 32

Description: Located 3km north of Lanesborough, on the eastern bank of the Shannon. Some fields here are not flooded but have debris of dead *Phragmites* stems from recent flooding events. Close to the river, fields are still flooded and are dominated by rushes. Certain areas in this location have abundant moss cover and may be sedge meadows but the water level was too high to investigate this.

Recommendation: Further survey required to determine conservation interest.

Location: Cloontuskert to Ballyleague	Conservation rating: Regional Importance
Grid Reference: N 01 72 to 01 70	County Roscommon
Appendix 6 Map: Roscommon 037	Appendix 8: Photo 33 at Cloonmustra/Cloontuskert

Located north of Lanesborough, on the west bank of the Shannon. There is industrial cutaway bog, the edge of which is dominated by gorse and birch scrub. There is extensive flooding of the River Shannon. The Shannon floodplain, at a site close to Lanesborough village, were surveyed by Goodwillie (*pers.comm.*) who found a mosaic of vegetation types, including wet peaty-grassland, marsh and dry grassland.

Among the species listed by Goodwillie were: Yorkshire fog (*Holcus lanatus),* creeping bent (*Agrostis stolonifera*), sweet vernal grass (*Anthoxanthum odoratum*), hairy sedge (*Carex hirta*), brown sedge (*C.disticha*), oval sedge (*C.ovalis*), soft rush (*Juncus effusus*), sharp-flowered rush *(J.acutiflorus*), yellow flag (*Iris pseudacorus*), tufted hairgrass (*Deschampsia cespitosa*), marsh ragwort (*Senecio aquaticus*), autumn hawkbit (*Leontodon autumnalis*), tufted hairgrass (*Deschampsia cespitosa*), marsh valerian (*Valeriana officinalis*), skullcap (*Scutellaria galericulata*), devilsbit (*Succisa pratensis*), meadow thistle (*Cirsium dissectum*), carnation sedge (*Carex panicea*), common sedge (*C.nigra*), star sedge (*C.echinata*), marsh cinquefoil (*Potentilla palustris*), marsh stitchwort *(Stellaria palustris*), velvet bent (*Agrostis canina*), gypsywort (*Lycopus europaeus*), yellow loosestrife (*Lysimachia vulgaris*), marsh pea (*Lathyrus palustris*), fen bedstraw (*Galium uliginosum*), ragged robin (*Lychnis flos-cuculi*), sneezewort (*Achillea ptarmica*), yellow flag (*Iris pseudacorus*), silverweed (*Potentilla anserina*), amphibious bistort (*Persicaria amphibia*), creeping buttercup (*Ranunculus repens*), lesser spearwort (*R.flammula*), marsh bedstraw (*Galium palustre*), marsh marigold (*Caltha palustris*), forget-me-not (*Myosotis scorpioides*), meadowsweet (*Filipendula ulmaria*), rough-stalked meadowgrass (*Poa trivialis*), marsh ragwort (*Senecio aquaticus*), reed fescue (*Festuca arundinacea*), tufted hairgrass (*Deschampsia cespitosa*), marsh stitchwort (*Stellaria palustris*).

Goodwillie noted that the flora of the site is rich and typical of the Shannon callows, The vegetation types correspond quite closely with those described by Heery (1993) for the Shannon callows generally. Parts of the site which are augmented by a large cutover peatland are of considerable ecological interest. The Red Data Book species marsh pea (*Lathyrus palustris*) was recorded by Goodwillie. Also among the least common species found was duckweed (*Spirodela polyrhiza*) which grows in the ditch north of the site. This has a local centre of distribution around Lough Ree but is quite rare lower down the Shannon.

Recommendation: Further survey work, along the Shannon floodplain north from Lanesborough should be carried out to determine the extent of callows vegetation and its conservation importance with a view to NHA designation.

8.1.7 Area between Strokestown, Elphin and Rooskey

Location: Kilglass & Grange Loughs NHA 608	**Conservation rating: National Importance**
Grid Reference: M 98 85	**County Roscommon**
Appendix 6 Map: Roscommon 023	**Appendix 8: Photo 34 Kilglass, 35 Mountain River, 36 Clooneen**

Recommendations:

- Extend boundaries of designated area to include Greenland White-fronted Geese feeding sites (Appendix 5).
- Boundaries should also be extended to include known areas of flooding (Appendix 4) such as Mountain River, Gillstown, Corgowan and Clooneen.

Location: Ardakillan Lake NHA 1617	**Conservation rating: National Importance**
Grid reference: M 880 783	**County Roscommon**
Appendix 6 Map: Roscommon 029	**Appendix 8: Photo none**

Location: Annaghmore Lough NHA 1626	**Conservation rating: National Importance**
Grid reference: M 900 837, M 902 825	**County Roscommon**
Appendix 6 Map: Roscommon 023	**Appendix 8: Photo none**

Description: This NHA comprises two lakes, Annaghmore Lough and Lough Nablasbarnagh. The NHA boundary also includes an area described in the I-WeBs report as a turlough (Colhoun 2001).

Location: Lough Nablahy Complex	**Conservation rating: National Importance**
Grid reference: M 95 88	**Counties Roscommon**
Appendix 6 Map: Roscommon 017, 023	**Appendix 8: 37 Finlough River, 38 Lough Nablahy, 39 Lough Nahincha**

Description: Small lakes, some with reedbeds, surrounded by wet grassland and scrub or wet alder-ash-willow woodland. Particularly good examples of habitat zonation may be found at Lough Nablahy or Lough Nahincha south. Relevés from wet woodland were taken from the Carrigeenduff Lake, Dooneen Lough, Clooncraff Lough and Lough Elia by Dúchas staff in the 1980s.

Main rivers in the area are Finlough and the Clooncraff. The Finlough River flows directly into Grange Lake (NHA). Lough Brackan is included in I-WeBs counts of the Annaghmore Lakes site.

Lake names: Bellavahan Lough (M 944 861), Black Lough (near Lough O'Donra) (M 959 868), Black Lough (north of Clooncraff Lough) (M 965 911), Carrigeenduff Lake (M 945 907), Cloonahee Lough (M 935 894), Clooncraff Lough (960 900), Dooneen Lough (M 955 907), Drimmon Lough (M 933 873), Grange Lough (M 940 858), Loughanduff (M 945 900), Lough Brackan (M 922 909), Lough Elia (M 972 890), Lough Incha (M 947 891), Lough Laure (M 920 900), Lough Nablahy (M 955 885), Lough Nahincha (north) (M 940 905), Lough Nahincha (south) (M 933 883), Lough Namweelia (M 940 888), Lough O'Donra (M 955 873), Rathmore (M 945 868), Rodeen Lough (M 925 915), Toomore Lough (M 955 915).

Recommendations: Further survey work is required to determine conservation interest and habitat types more precisely. Depending on the result, this complex may warrant NHA designation.

Location: Clooncullaan Lough Complex	**Conservation rating: National Importance**
Grid reference: M 88 85	**County Roscommon**
Appendix 6 Map: Roscommon 022, 023	**Appendix 8: Photo none**

Description: Small lakes surrounded by wet grassland and willow scrub. Killynagh is a very small lake surrounded by thin strips of reeds that grade into rushy fields. There is coniferous forestry at the lake edge. Loughan Duff is a small lake surrounded by cutaway raised bog. A river connects this lake to Lough Feeny. Loughan Duff is one of the Illaunowen Loughs, where there is extensive wetland vegetation and scrub woodland. There may be *Schoenus* fen here. Illanowen Loughs, Clooncullaan, Lough Feeny, Lough O'Moran, Loughanammer and Killynagh Lough are included in the I-WeBs Annaghmore Loughs site where nationally important numbers of several bird species have been counted (see Section 6).

Cutaway bog at Lough Feeny is dominated by bracken (*Pteridium aquilinum*). The bog is wetter closer to the lake where the dominant vegetation cover on the peat is purple moor grass (*Molinia caerulea*) with some bog myrtle (*Myrica gale*) and ling heather (*Calluna vulgaris*).

Lake names: Ballyoughter Lough (M 870 864), Clooncullaan Loughs (M 885 855), Drinaun Lough (M 895 845), Killeen Lough (M 870 856), Illanowen Loughs (M 882 852), Killynagh Lough (M 865 841), Loughanammer (M 870 848), Lough Aneag (M 903 853), Loughan Duff (M 882 848), Lough Ean (M 864 838), Lough Feeny (M 878 848), Lough O'Donnellan (M 863 850), Lough O'Moran (M 880 866), Lough Nahincha (small) (M 865 855), Simons Lough (M 869 865).

Recommendations: Further survey work is required to determine whether fen vegetation is present at any of the lakes in this complex. Depending on the results of further survey work, this complex may warrant NHA designation.

Location: Lough Conny More Complex	**Conservation rating: National Importance**
Grid references: M 86 82	**County Roscommon**
Appendix 6 Map: Roscommon 022, 023	**Appendix 8: Photo 40 Lough Lea**

Description: A series of small lakes with interconnected feeder streams and floodplains. Many of these small lakes flood extensively during winter forming a network of wetland habitats. Habitats include wet grassland dominated by *Juncus* spp., reedbeds and willow scrub. Some of these lakes are included in the I-WeBs Annaghmore Lakes site where nationally important numbers of some wildfowl species have been counted. Two of these areas are small turloughs (Colhoun 2001). Lough Conny More may be a marl lake. Fen vegetation with *Schoenus* may be present at Lough Aneeg.

Lake names: Cloonakilly Beg (M 881 815), Cloonsreane Lough (M 901 809), Lough Acrann (M 869 814), Loughanduff (M 858 824), Lough Aneeg (M 878 835), Lough Caudagh (M 874 805), Lough Connybeg (M 871 826), Lough Conny More (M 865 823), Lough Duff (M 890 810), Lough Flasky (M 900 805), Lough Gal (M 875 829), Lough Nafulla (M 849 823), Lough Lea (M 920 813), Lough Patricks (M 860 830), Lough Rogers (M 860 820), Lough Saggart (M 888 809), (Floods NW of Ardakillan Lough (Sroove Townland) (M 870 795) not on Appendix 6 maps).

Recommendations: Further survey of habitats is required to determine conservation interest. Additional detail about the hydrology of this region would aid conservation management. Depending on the results of further survey work this complex may warrant NHA designation.

Location: Fin Lough, Cloonfree Lough	**Conservation rating: National Importance**
Grid reference: M 897 784, M 906 7986	**County Roscommon**
Appendix 6 Map: Roscommon 029	**Appendix 8: Photo none**

Lakes surrounded by reedbeds and occasional willow scrub. Some of the surrounding fields are dominated by rushes. The south eastern shore of Fin Lough has *Schoenus* fen vegetation. There is extensive flooding around Cloonfree Lough.

Recommendations: Further survey work is recommended, with a view to designation as a new NHA.

8.2 ZONE B

Areas of interest where proposals for any new developments should be adequately assessed.

8.2.1 Lough Allen

Location: Lough Allen shore	**Conservation rating: Local Importance**
Grid reference: Various	**Counties Leitrim and Roscommon**
Appendix 6 Map: Leitrim 018, 020, Roscommon 002	**Appendix 8: Photo 41 Cartronbeg, 42 Corry Strand**

Description: Alder (*Alnus glutinosa*) fringes the lakeshore. Examples of narrow strips of ash-alder-willow woodland may be found at Cartronbeg townland (G 955 175) and Corry Strand (G 948 240).

Location: Mahanagh Lower	**Conservation rating: Local Importance**
Grid reference: G 965 248	**County Leitrim**
Appendix 6 Map: Leitrim 018	**Appendix 8: Photo none**

Description: On a rise to the south of Mahanagh Lough, there are fields with numerous rocky boulders and heath vegetation. Species recorded were ling heather (*Calluna vulgaris*), bog myrtle (*Myrica gale*), bilberry (*Vaccinium myrtillus*), purple moor grass (*Molinia caerulea*), birch (*Betula pubescens*), holly (*Ilex aquifolium*) and lichens (*Cladonia* spp). Other parts of this townland are assigned to Zone A.

Location: Diffagher River	**Conservation rating: Local Importance**
Grid reference: G 935 240	**County Leitrim**
Appendix 6 Map: Leitrim 018	**Appendix 8: Photo none**

Description: The Diffagher River enters Lough Allen from the north, approximately 2km east of the village of Drumkeeran. This may be an occasional feeding site for Greenland White-fronted Geese (J. Matthews *pers.comm.*).

Location: Derrinvoney Upper	**Conservation rating: Local Importance**
Grid reference: G 943 249	**County Leitrim**
Appendix 6 Map: Leitrim 018	**Appendix 8: Photo none**

Description: Small strip of alder wood in a river valley along the R200 Drumkeeran to Dowra road, approximately 3km east of Drumkeeran.

Location: Drummanfaughnan	Conservation rating: Local Importance
Grid reference: G 925 222	County Leitrim
Appendix 6 Map: Leitrim 018	Appendix 8: Photo none

Description: Small broadleaf woodland on a ridge beside the R280 just south of Drumkeeran. The woodland has abundant ash (*Fraxinus excelsior*) with some exotics and birch (*Betula pubescens*). Understorey species include alder (*Alnus glutinosa*) and hazel (*Corylus avellana*), with bramble (*Rubus fruticosus*) and furze (*Ulex europaeus*) common in the shrub and field layers.

Location: Derragallion Bog	Conservation rating: Local Importance
Grid reference: G 945 135	County Roscommon
Appendix 6 Map: Roscommon 002	Appendix 8: Photo 43

Description: This is an extensive area of cutaway bog just to the west of the project boundary, north of Mount Allen Bridge. The bog consists of a central raised mound of peat surrounded by a series of smaller mounds and flushed, waterlogged depressions left after turf cutting. The depressions are very wet and are dominated by large hummocks of *Sphagna* with purple moor grass (*Molinia caerulea*) and bog cottons (*Eriophorum* spp). Bog myrtle (*Myrica gale*) and cranberry (*Vaccinium oxycoccus*) are abundant. Cross leaved heath (*Erica tetralix*) and ling heather (*Calluna vulgaris)* are occasional. Other species recorded were bog rosemary (*Andromeda polyfolia*), bog asphodel (*Narthecium ossifragum*), bog cotton (*Eriophorum angustifolium, E. vaginatum*), milkwort (*Polygala serpyllifolia*), tormentil (*Potentilla erecta*) and mosses *Sphagnum palustre, S. papillosum, S. magellanicum, S. capillifolium, S. auriculatum, S. cuspidatum, Aulacomnium palustre* and *Polytrichum commune.*

The central raised peat mound has been burned recently and 75% vegetation cover remains. Even though the peat has been compacted it has retained some wetness. On the central mound purple moor grass (*Molinia caerulea*) is dominant. Ling heather (*Calluna vulgaris*) is abundant but not conspicuous. Bog asphodel (*Narthecium ossifragum*) and bog myrtle (*Myrica gale*) are also common. Hummocks of *Sphagnum* remain. Other species recorded were cross leaved heath (*Erica tetralix*), carnation sedge (*Carex panicea*).

The bog is surrounded by encroaching birch scrub. Despite draining and turf cutting, it is fairly extensive. There is potential for some recovery of the vegetation, as many species typical of a raised bog are still present, though the hydrology and function of the bog are totally compromised. The area may develop into flush and birch scrub communities.

Location: Holly Island	Conservation rating: Local Importance
Grid reference: G 963 125	County Leitrim
Appendix 6 Map: Leitrim 023	Appendix 8: Photo none

Also see Zone A above.

Description: A small peninsula at the south end of Lough Allen, north east of Bellantra Bridge. Some of the peninsula was planted with conifers that have been clear felled recently. A small road provides access for anglers. Most of the vegetation is wet grassland dominated by rushes (*Juncus* spp) with occasional furze (*Ulex europaeus*), willow (*Salix cinerea*) and alder (*Alnus glutinosa*). Reeds (*Phragmites australis*) are present in wet flooded areas. There are numerous drainage channels throughout the site. Lichens are abundant on hedgerow bushes. Snipe (*Gallinago gallinago*) was recorded.

Location: Drumshanbo Lough	Conservation rating: Local Importance
Grid reference: G 965 111	County Leitrim
Appendix 6 Map: Leitrim 023	Appendix 8: Photo none

Description: Shoreline with wet grassland or willow scrub are assigned to Zone B.

8.2.2 Drumshanbo to Carrick-on-Shannon

Location: Blackrock	Conservation rating: Local Importance
Grid reference: G 965 107	County Leitrim
Appendix 6 Map: Leitrim 023	Appendix 8: Photo none

Description: A mixed broadleaved woodland on the southern shore of Lough Allen. The main canopy trees are beech (*Fagus sylvatica*) and ash (*Fraxinus excelsior*). The understorey contains alder (*Alnus glutinosa*) and cypress (*Cupressus* sp.). Cherry laurel (*Prunus laurocerasus*) is the main component of the shrub layer. Some parts of the woodland are grazed. There is an abundance of dead wood here.

Location: Acres Lake	Conservation rating: Local Importance
Grid Reference: G 967 100	County Leitrim
Appendix 6 Map: Leitrim 023	Appendix 8: Photo 44

Description: A small lake approximately 1km south of Drumshanbo and Lough Allen and 3km east of the River Shannon. A short canal (1km) connects it with Lough Allen at Carricknabrack, while a longer canal (5km) connects the lake to the River Shannon at Battlebridge. A conifer plantation surrounds the lake to the south and west and there is a

small marina on its eastern shore that is accessed by the R207, Leitrim to Drumshanbo road.

The lake is fringed by common reed (*Phragmites australis)* and bulrush (*Typha latifolia*) but the reedbeds are not extensive. There is a zonation of vegetation from reedbeds to wet grassland. There is wet grassland dominated by purple moor grass (*Molinia caerulea)* on the eastern shore and fields dominated by soft rush (*Juncus effusus*) along other shores. Six whooper swans and two mute swans were recorded in February 2002.

This area is considered to have high education value and the first Irish record for the freshwater snail *Viviparous viviparous* was from here (D. Cotton *pers. comm.*).

Location: Dromore / Dereenasoo Bog Complex	**Conservation rating: Regional Importance**
Grid Reference: G 936 090	**County Roscommon**
Appendix 6 Map: Roscommon 004	**Appendix 8: Photo 45 Dromore Bog, 46 Dereenasoo Bog**

Description: An extensive cutaway bog complex divided by a third class road. The complex extends to the Feorish River (to the west) and is divided into two distinct peat masses connected by a small area of damaged bog. Dereenasoo bog is north of the road, Dromore to the south.

Dromore bog is relatively small and is bordered by birch woodland to the south west and coniferous forestry to the south. It is still reasonably wet, with good vegetation cover. Heather (*Calluna vulgaris*), bog cotton (*Eriophorum* sp.) and purple moor grass (*Molinia caerulea*) provide most vegetation cover, although certain areas are solely dominated by purple moor grass (*Molinia caerulea*). There are some hummocks and hollows but these are not very pronounced.

Species recorded were; bog rosemary (*Andromeda polyfolia*), bog asphodel (*Narthecium ossifragum*), purple moor grass (*Molinia caerulea*), bog cotton (*Eriophorum vaginatum, E. angustifolium*), lichen (*Cladonia impexa, C. uncialis*), cross-leaved heath (*Erica tetralix*), ling heather (*Calluna vulgaris*), bog myrtle (*Myrica gale*), carnation sedge (*Carex panicea*), deergrass (*Scirpus cespitosus*), white beaked sedge (*Rhynchospora alba*) and mosses *Hypnum jutlandicum, Racomitrium lanuginosum, Sphagnum capillifolium, S. auriculatum, S. papillosum.* Bulrush (*Typha latifolia*) is present within the drains along the road and bog myrtle (*Myrica gale*) is found in the cutaway depressions.

Dereenasoo Bog is more extensive. Close to the road it is quite damaged and has a patchy vegetation cover, but it is still relatively wet. Species recorded in this damaged area include bog asphodel (*Narthecium ossifragum),* cross-leaved heath (*Erica tetralix),* carnation sedge (*Carex panicea),* bog myrtle (*Myrica gale)* and ling heather (*Calluna*

vulgaris). Bog rosemary (*Andromeda polyfolia)* and the lichen *Cladonia impexa* were occasional. *Sphagna* were virtually absent, with only small patches of *Sphagnum capillifolium* and *S. papillosum.*

Further into the main peat area, the bog is in better condition. *Sphagna* are abundant and there are well developed hummocks, hollows and lawns. Ericoids, bog cottons and *Sphagna* provide the dominant plant cover. Ling heather (*Calluna vulgaris),* cross-leaved heath *(Erica tetralix),* bog rosemary *(Andromeda polyfolia), Sphagnum papillosum, S. capillifolium, S. cuspidatum, S. magellanicum,* bog cottons *(Eriophorum vaginatum, E. angustifolium),* lichens *(Cladonia impexa. C. uncialis)* and the mosses *Racomitrium lanuginosum* and *Hypnum jutlandicum* were recorded.

Due to size and species complement, the Dereenasoo / Dromore complex is of Regional Importance. Extensive areas of cutaway raised bog are of conservation interest.

Location: Carrick-on-Shannon, boardwalk	**Conservation rating: Local Importance**
Grid Reference: M 939 993	**County Leitrim**
Appendix 6 Map: Leitrim 031	**Appendix 8: Photo none**

Description: A sheltered bay at Carrick-on-Shannon, south of the N4 has developed vegetation with common reed (*Phragmites australis*), alder (*Alnus glutinosa*) and willow (*Salix* spp.) woodland. The wetland is bordered by amenity grassland along the roadside which has abundant horsetails (*Equisetum* sp). The boardwalk is damaged and unsafe to use, so could not be examined further.

8.2.3 Lough Key to Drumharlow

Location: Lough Key	**Conservation rating: Regional Importance**
Grid Reference: G 84 05	**County Roscommon**
Appendix 6 Map: Roscommon 003, 006	**Appendix 8: Photo 47 SE shore**

Also see Zone A above

Description: The lake shoreline (apart from NHAs and Erris Bay which are zoned A) and the Forest Park are included in Zone B. Lough Key Forest Park is located on the southern shore and is a large woodland with conifer plantations, and some broadleaves, mainly beech (*Fagus sylvatica*) and ash (*Fraxinus excelsior*). Laurel (*Prunus laurocerasus*) is extensive. The lake is fringed by occasional reed beds and broadleaf woodland (oak and ash), for example, at Rock of Doon.

Location: Poteen Hill Bog	Conservation rating: Local Importance
Grid Reference: G 865 055	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo 48 North, 49 South

Description: A raised bog surrounded by conifer plantation. The bog is cut in places (active hand cutting) but still retains a large amount of the peat mass. It is a nature reserve. There has been some encroachment of birch and rhododendron onto the bog margins, where the peat has dried out. A kestrel (*Falco tinnunculus)* was sighted here. The site is bisected by a bog road.

There is extensive birch scrub along the bog edge and along the forestry. There are no bog pools. The hummock and hollow structure is not well developed. The lichen, *Cladonia impexa,* is abundant. Bog cottons (*Eriophorum vaginatum, E. angustifolium),* ling heather (*Calluna vulgaris),* cross-leaved heath (*Erica tetralix),* deer grass *(Scirpus cespitosus),* lichen *(Cladonia uncialis),* bog asphodel *(Narthecium ossifragum),* bog moss *(Sphagnum capillifolium)* and carnation sedge *(Carex panicea)* were recorded on the north side of the road. South of the road the bog is slightly wetter, with a similar species complement to the other half. However, white beaked sedge (*Rhynchospora alba)* and *Sphagnum cuspidatum* were also recorded.

Location: Black Lake	Conservation rating: Local Importance
Grid Reference: G 865 045	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo 50

Description: Small circular lake completely surrounded by coniferous plantation in Rockingham Demesne. The lake shows zonation from emergent aquatics such as horsetails (*Equisetum* sp.) to a fringe of large sedges (*Carex paniculata*) with bulrush (*Typha latifolia*) and reeds (*Phragmites australis*) and finally to a small area of wet woodland with birch (*Betula pubescens*), willow (*Salix* sp.) and alder (*Alnus glutinosa*) around the lake.

The woodland contains the following in the field layer: bluebell (*Hyacinthoides non-scriptus)* (very abundant), opposite-leaved golden saxifrage *(Chrysosplenium oppositifolium),* herb bennet *(Geum urbanum),* lord's and ladies *(Arum maculatum),* bramble *(Rubus fruticosus),* cleavers *(Galium aparine),* sorrel *(Rumex acetosa),* nettle *(Urtica dioica),* ground ivy *(Gleochoma hederacea*) and bryophytes *(Rhytididelphus triquetrus, Plagiomnium undulatum, Thamnobryum alopercurum, Plagiochila adianthoides).* Rhododendron is abundant.

Location: Laundry, Dereen and Black Loughs	Conservation rating: Local Importance
Grid References: G 880 041, 875 045, 875 040	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo 51 Laundry Lough

Description: Three small lakes located within a conifer plantation south of the Boyle River between Oakport Lake and Lough Key. The lakes and their shorelines are assigned to Zone B on account of their fringes of wetland vegetation. Small pockets of birch scrub and beech woodland are present.

Location: Ballyardan to Lough Keel	Conservation rating: Local Importance
Grid Reference: G 865 035	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo none

Description: Part of Rockingham Demesne; hazel scrub growing over limestone boulders. There is a forestry plantation along the road, but one area has some ash woodland. The ash woodland may be of some conservation importance.

Location: Lough Keel	Conservation rating: Local Importance
Grid Reference: G 855 033	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo none

Dsecription: Lough Keel is a small circular lake with a small fringe of reedbeds grading into rushy fields. The lake is surrounded by mixed woodland to the west, consisting of young ash, beech and conifers. Holly (*Ilex aquifolium*) forms an occasional understorey. Laurel (*Prunus laurocerasus*) and dogwood (*Cornus sanguinea*) are present. The eastern shore of the lake is improved pasture. To the north of the lake are wet fields dominated by rushes with succession to birch woodland.

Location: Ballyardan	Conservation rating: Local Importance
Grid Reference: G 871 027	County Roscommon
Appendix 6 Map: Roscommon 006	Appendix 8: Photo none

Description: A small, narrow area of broadleaf woodland with ash (*Fraxinus excelsior*), hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*). Beech (*Fagus sylvatica*) is also present. Situated along the R285 road from Boyle to Keadew.

Location: Ardconra, Farranagalliagh	**Conservation rating: Local Importance**
Grid Reference: G 875 017	**County Roscommon**
Appendix 6 Map: Roscommon 006	**Appendix 8: Photo 52 Farranagalliagh**

Description: On the north side of the N4 Dublin to Sligo road, 5km west of Carrick-on-Shannon there are two flooded depressions in a field with a fringe of hawthorn. These may be turloughs. The surrounding high ground supports improved pasture.

Recommendations: Require further survey work to determine status.

Location: Oakport Lake	**Conservation rating: Local Importance**
Grid Reference: G 885 035	**County Roscommon**
Appendix 6 Map: Roscommon 006	**Appendix 8: Photo none**

Description: A small lake to the west of Cootehall, with occasional reedbeds and wet woodland of willow and alder. Bewick swans have been reported from here (B. O'Connor *pers.comm.*). The area is not within the Drumharlow NHA but is an important buffer zone for the lake.

8.2.4 Carrick-on-Shannon to Lough Bofin

Location: The Doon	**Conservation rating: Local Importance**
Grid Reference: M 981 969	**County Roscommon**
Appendix 6 Map: Roscommon 012	**Appendix 8: Photo none**

Description: A low hill with improved pasture on the steep ground. Lower, rush dominated, flooded fields within the Shannon floodplain are included in Zone B.

Location: Charlestown	**Conservation rating: Local Importance**
Grid reference: M 983 983	**County Roscommon**
Appendix 6 Map: Roscommon 012	**Appendix 8: Photo 53**

Description: A large demesne that has been planted with conifers is not included in Zone B (although its conservation value could be increased with planting of native broadleaf species). A strip of wet broadleaf woodland is present along the banks of the Shannon, this is included in Zone B. A relevé was taken here as part of a wet woodland survey by Dúchas staff.

Location: Lackagh	**Conservation rating: Local Importance**
Grid reference: M 995 960	**County Roscommon**
Appendix 6 Map: Roscommon 012	**Appendix 8: Photo none**

Description: Birch woodland that has probably developed on cutaway bog. The site is small, only a few hectares in size.

Location: Ballagh Lough	**Conservation rating: Local Importance**
Grid Reference: M 955 945	**County Roscommon**
Appendix 6 Map: Roscommon 011	**Appendix 8: Photo none**

Description: A small lake with extensive reed beds. The surrounding fields are a mixture of rushes and improved grassland. Most fields are flooded. A flock of lapwings were recorded. The fields south of the lake are flooded and a flock of whooper swans are present. These fields grade into an extensive area of wet grassland with soft rush (*Juncus effusus*) and purple moor grass (*Molinia caerulea*), which may once have been a raised bog that is now completely cutaway.

Location: Dangan	**Conservation rating: Local Importance**
Grid reference: M 980 950	**County Roscommon**
Appendix 6 Map: Roscommon 012	**Appendix 8: Photo none**

Description: A narrow strip of wet woodland of birch and ash and flooded fields

Location: Clogher Bridge, Lowfield and Cartron Loughs	**Conservation rating: Local Importance**
Grid reference: M 985 939, M 992 946, M 992 952	**County Roscommon**
Appendix 6 Map: Roscommon 012	**Appendix 8: Photo 54 (flooded forestry), 55 Cartron Lough.**

Description: At Clogher Bridge there is considerable flooding along a small river that flows into Lowfield Lough. The surrounding, low lying, wet grassland is dominated by rushes. Lowfield lake is a small circular lake surrounded by reedbeds and rushy fields. There is some broadleaf woodland along the eastern shore. Cartron Lake is small with occasional stands of reeds. It is bounded by rushy fields, most of which are flooded. There is extensive flooding between the two lakes. A conifer plantation between the two lakes is partly flooded.

Location: Gortinty Lough	Conservation rating: Regional Importance
Grid reference: N 015 959	County Leitrim
Appendix 6 Map: Leitrim 032	Appendix 8: Photo none

Description: Lake bordered by N4 and improved fields. There are some reedbeds along the southern and western shores. The lake supports populations of cormorants (*Phalacrocorax carbo*) and great crested grebes (*Podiceps cristatus*). In February 2002 a pair of tufted ducks (*Aythya fuligula*) and juvenile whooper swans (*Cygnus cygnus*) were noted. Very high levels of bat activity were observed during the summer of 2000. The following species were recorded foraging over, and along the edge of, the lake: soprano and common pipistrelles (*Pipistrellus pygmaeus* and *P. pipistrellus*), Daubentons' bats (*Myotis daubentoni*) and Leislers' bats (*Nyctalus leisleri*).

Location: Tully Lough	Conservation rating: Local Importance
Grid reference: M 985 920	County Roscommon
Appendix 6 Map: Roscommon 017	Appendix 8: Photo none

Description: A small lake with a fringe of reeds. There is a cutaway bog close to the lake that is grazed by cattle. Birch scrub has developed around the edges of the cutaway. Most of the lake is bordered by wet rushy fields. The feeder stream from the south west has well developed reed beds and willow scrub.

8.2.5 Lough Bofin to Termonbarry

Location: Kilbarry/Newtown Bog	Conservation rating: Local Importance
Grid reference: N 060 815	County Roscommon
Appendix 6 Map: Roscommon 024	Appendix 8: Photo none

Description: Extensive cutaway bog, 3km north of Termonbarry, on the western shore of Lough Forbes. The bog is heather dominated (*Calluna vulgaris*), with abundant lichens (*Cladonia impexa*) and bog cotton (*Eriophorum vaginatum*). Hydrology has been compromised through drainage and cutting.

Location: Cornollen	**Conservation rating: Local Importance**
Grid reference: N 082 765	**County Longford**
Appendix 6 Map: Longford 013	**Appendix 8: Photo none**

Description: Birch dominated woodland outside the boundary of Lough Forbes SAC. Approximately 2.5km south of Lough Forbes, at the confluence of the Camlin and Fallan rivers. Surveyed in 2000 for Dúchas (Browne Dunne Roche 2000).

Location: Cloondara	**Conservation rating: Local Importance**
Grid reference: N 060 760	**County Longford**
Appendix 6 Map: Longford 013	**Appendix 8: Photo none**

Description: Along the N5 between the Camlin and Fallan Rivers and at the Royal canal there is extensive flooding of fields. There are some reedbeds on the Camlin River but they are not well-developed.

8.2.6 Termonbarry to Lanesborough

Location: Derrycashel	**Conservation rating: Local Importance**
Grid Reference: N 030 765	**County Roscommon**
Appendix 6 Map: Roscommon 030	**Appendix 8: Photo 57**

Description: Located 2km west of Termonbarry, on the west bank of the Shannon, this is industrial cutaway bog that still has some relatively intact bog left. The main species are common ling (*Calluna vulgaris),* bog myrtle *(Myrica gale),* purple moor grass *(Molinia caerulea)* and bog cotton *(Eriophorum vaginatum).* Birch woodland and gorse scrub are found at the edge of the bog as well as invading rhododendron. Surrounding pasture fields are badly poached by cattle. There is extensive flooding by the Shannon.

Location: Knappogue	**Conservation rating: Local Importance**
Grid Reference: N 035 748	**County Longford**
Appendix 6 Map: Longford 13	**Appendix 8: Photo 58**

Description: Located 2km south west of Cloondara, on the east bank of the Shannon. This may be good area for waterfowl: coot (*Fulica atra*), mute swan (*Cygnus olor*) and grebe (*Podiceps cristatus*) were recorded.

Location: Cloonkeel Bog	Conservation rating: Local Importance
Grid Reference: N 040 730	County Longford
Appendix 6 Map: Longford 12	Appendix 8: Photo none

Description: Located 4km south west of Cloondara there is a small raised bog that appears reasonably intact but since it could not be accessed, it is difficult to assess its conservation importance. The bog may have been opened for industrial cutting. Species recorded on the bog were ling heather (*Calluna vulgaris)* and bog myrtle (*Myrica gale*). The vegetation becomes dominated by purple moor grass (*Molinia caerulea*) towards the river. Most of the bog habitat lies outside the survey boundary.

8.2.7 Area between Strokestown, Elphin and Rooskey

Location: Rockville	Conservation rating: Local Importance
Grid reference: M 945 912	Counties Roscommon
Appendix 6 Map: Roscommon 017	Appendix 8: Photo none

Description: Mixed woodland with beech (*Fagus* sylvatica), ash (*Fraxinus* excelsior) and conifers. There is a high cover of cherry laurel (*Prunus laurocerasus*). Conservation interest of the area could be improved with active woodland management and control of exotics.

Location: Kiltrustan	Conservation rating: Local Importance
Grid reference: M 939 835	Counties Roscommon
Appendix 6 Map: Roscommon 023	Appendix 8: Photo 59

Description: Dry broadleaf woodland on a north facing slope, 3km north of Strokestown. Canopy appears to be dominated by ash (*Fraxinus excelsior)*, with birch (*Betula pubescens)* and willow (*Salix* sp.) understorey.

Location: Cloonradoon	Conservation rating: Local Importance
Grid reference: M 946 815	County Roscommon
Appendix 6 Map: Roscommon 023	Appendix 8: Photo none

Description: Extensive birch woodland in a valley, north east of Strokestown. This may have developed on cutaway bog.

Location: Strokestown House	**Conservation rating: Local Importance**
Grid reference: M 934 807	**County Roscommon**
Appendix 6 Map: Roscommon 023	**Appendix 8: Photo none**

Description: There is mixed broadleaf/conifer woodland to the east of the house. The main canopy formers are beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*) and oak (*Quercus* sp.)with occasional Scots pine (*Pinus sylvestris*). Laurel (*Prunus laurocerasus*) is abundant. Conservation interest may be improved by availing of the Native Woodland Scheme.

9.0 Planning and Development within the Upper Shannon Area

Information was provided by the planning departments of Leitrim, Roscommon and Longford County Councils, with the assistance of Heritage Officers from each local authority. However, the format and level of detail varied between County Councils so the results are presented in tables (Longford and Roscommon) and maps (Roscommon and Leitrim) (see Appendix 7). The majority of planning applications and permissions throughout the survey area have been for one-off housing. Other applications include groups of houses (≥3), townhouses and apartments, extensions to existing buildings, marinas, retail developments and slatted sheds. Increased numbers of applications within the Upper Shannon Region have been associated with the implementation of the Rural Renewal Scheme. Upgrading of the N4 including the Carrick-on-Shannon by-pass is an ongoing major road development within the study area.

9.1 Rural Renewal Scheme

The Rural Renewal Scheme is aimed at regenerating parts of the Upper Shannon region and was first introduced in 1998. The scheme is administered by the Revenue Commissioners. Within the present project area, the residential scheme applies to Counties Leitrim, Longford and parts of Roscommon. Relevant areas in Roscommon within the present survey area qualifying for the scheme are: Termonbarry, Rooskey, Kilglass North, Kilglass South, Strokestown, Annaghmore, Tulsk, Lough Allen, Boyle Rural, Oakport, Rockingham and Elphin.

The scheme ensures that tax relief is available to owner-occupiers or landlords for the construction, refurbishment and conversion of residential property.

9.1.1 Leitrim

The current information provided for County Leitrim planning applications merely lists the number of applications and their locations but does not specify the nature of the proposed developments. Considerable development is taking place at Carrick-on-Shannon, Leitrim Village and Drumshanbo (Appendix 7).

9.1.2 Longford

Longford County Council provided information on the number of planning permissions granted since 01/01/01 on a townland basis (Appendix 7). Details were not provided on the exact nature of permissions granted. The Planning Officer stated that approximately 99% of the planning permissions granted have been for one-off housing and the remainder were granted for extensions to existing houses, and agricultural developments (A. Moore *pers. comm.*).

9.1.3 Roscommon

In Roscommon, the vast majority of applications for planning permission have been for one-off housing (Appendix 7). The Roscommon Planning Officer, following consultation with the Planning Department, provided a general map which indicates the roads on which most single house developments have been taking place. The maps can be seen in Appendix 7. Many roads in the Strokestown, small lake area, have housing developments

taking place. The primary growth centre for County Roscommon is the town of Roscommon which is excluded from the Rural Renewal Scheme, while most northern parts of the county are included.

9.2 Marinas and boating facilities

Carrick-on-Shannon is a major centre for the Shannon cruising industry.

With increasing boat traffic along the Upper Shannon there has been a corresponding increase in the number of marinas and associated boating facilities.

Development of marinas and jetties can cause habitat fragmentation along river banks and lake shores. Scrub removal, infilling and excavation are potentially damaging operations to sensitive habitats and species. Reynolds (1998) notes that spoil deposition may, in certain circumstances, increase the potential habitat for crayfish. Many of the older marinas along the Upper Shannon lack up-to-date sewage treatment and diesel facilities.

Several applications for marina development were noted by the authors during field work in February 2002. From the information provided by Roscommon County Council, only one application for a marina retention (at Cootehall) was listed for October 2001 to March 2002, inclusive. In County Leitrim there were two applications for marina developments on the Lough Allen shoreline, and two for floating jetties, all within a similar timeframe. The number of applications for these developments in County Longford is unknown.

9.3 Implications of Development

Development leads to habitat loss and fragmentation. Species movement and populations may be impacted upon. In many cases this is not necessarily detrimental to overall wildlife and conservation interests, where it occurs in Zone C, but Zones A and B are more sensitive (Appendix 6).

Water quality may be compromised by an increase in pollutants and/or nutrients to the ecosystem. This impact may be minimised through adequate control systems such as suitable sewage treatment.

9.4 Recommendations for Planning Authorities

Since many marina and lake/river shore developments take place outside nature conservation designated areas, these planning applications are not automatically forwarded to Dúchas. There is potential for habitat loss, particularly by the accumulation of many small piecemeal developments which, individually, may not be subject to thorough ecological assessment. The Shannon and its lake systems have been classified, for the purposes of this project, as Zone A and B i.e. of conservation interest and sensitive to development. It is recommended that all proposed marina/jetty developments should be forwarded to Dúchas so that their impact can be assessed.

The enclosed zoning maps (Appendix 6) should be used as a guideline to assist in determining the potential impact of any proposed developments. Note that specific zoning boundaries may be adapted depending on the results of future, more detailed, ecological survey work.

10.0 Threats

10.1 Invasive species

10.1.1 Zebra Mussels

The following information has been sourced from the Marine Institute and NUI Galway websites (www.marine.ie/freshwater/zebra and www.nuigalway.ie/freshwater/zebra).

10.1.1.1 Origins
The zebra mussel (*Dreissena polymorpha*) is native to the drainage systems of the Black Sea, Caspian Sea and Aral sea. Almost 200 years ago it expanded its range to western Europe. The building of an extensive European canal system in the 1700's made this possible and by 1830 the species had become established throughout much of Europe and Britain. More recently the species became established within North America beginning in Lake St Clair, in 1985 or 1986. The zebra mussel was first recorded in Ireland in 1997.

10.1.1.2 General Biology
Like the marine mussels, adult *D. polymorpha* are epifaunal and are typically attached to solid substrates by means of hundreds of anchoring thread-like structures (byssal threads) with adhesive pads. The high reproductive output of zebra mussels and the occurrence of an extended planktonic life cycle phase, which facilitates dispersal, are very unusual among fresh water bivalves, though such life cycles are typical of many marine invertebrates.

Zebra mussel is the only bivalve of fresh water systems that causes fouling of boats hulls and the clogging of water pipes. Zebra mussels colonise hard substrata to depths of 30m or more and may attain maximum densities to 10m. The free-swimming stage tends to remain in the warmer surface waters and consequently densities of adult mussels may be greatest in this zone. Their numbers in shallower waters are lower because of fluctuating water levels, nevertheless they can move over short vertical distances where they often become established in small crevices and holes. They have a preference for regions where there is some current movement. Zebra mussels are able to remain on horizontal surfaces where there are current speeds of up to 2.5m/sec. Zebra mussels are tolerant of temperatures ranging between 12° and 20°C. If water temperatures are high enough to allow them to reproduce early in the year they can grow to 25mm within twelve months and can spawn when less than one year.

10.1.1.3 Dispersal
It is thought that the zebra mussel spread is greatest at the juvenile mussels and the tiny free-swimming larval stage. The principal mode of transport is via ships ballast water.

Mussels begin to reproduce when water temperatures exceed 12°C, which corresponds to the peak season for boating traffic, i.e. summer, which contributes to the likelihood that the free-swimming stage will be released over the full extent of the navigable waters. The main carriers are likely to be barges and private boats that do not regularly slip for annual

inspections. Such vessels may have several generations of zebra mussels on their hulls, including mature breeding mussels.

10.1.1.4 The zebra mussel in Ireland

The zebra mussel was first found in 1997 by researchers working with the ESB in Lough Derg (McCarthy *et al.* 1997 a & b). In October 1997 the zebra mussel had formed extensive and locally dense populations in Lough Derg and on boats as far north as Carrick-on-Shannon. It has been found in Lough Key and Lough Erne. In Shannon Harbour, the entrance to the Grand Canal, large numbers were found on the hulls of barges, including one in a dry dock.

Distribution maps compiled using the information available from the NUI, Galway survey results and surveys carried out by the Marine Institute (Fisheries Research Centre) and members of DANI (Department of Agriculture for Northern Ireland) working on the River Erne system highlight the rapid spread of the zebra mussel from 1997 to 1998 (Figures 10.1 and 10.2).

10.1.1.5 Potential zebra mussel habitats in the Upper Shannon

Most large lakes, especially those lying on limestone bedrock, have suitable hydrochemistry (calcium levels, pH etc) for zebra mussels. Variations in substrate type and exposure to wave action affect zebra mussel abundance. Small streams, turloughs and areas which are periodically exposed due to extremes of water level, are unlikely to be colonised. Densities of zebra mussels are lower in flowing waters than those in lakes. Lake outfalls are usually heavily populated.

10.1.1.6 Ecological Impacts

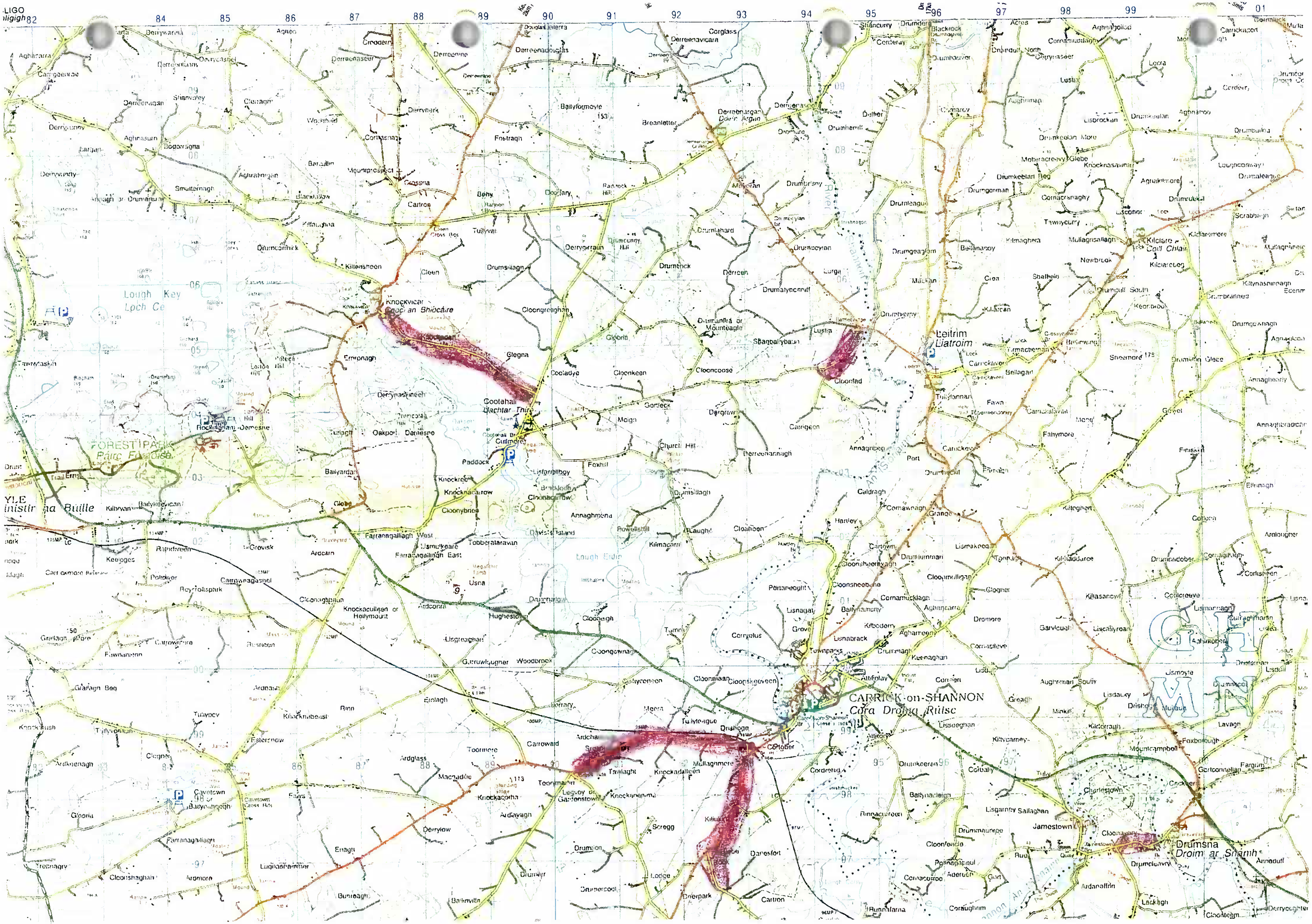
When zebra mussels occur in large numbers they can dramatically alter lake ecosystem causing a shift of energy flow from pelagic to benthic.

The effects of zebra mussels on the lake benthic communities involves changes in the abundance and vertical distribution of certain invertebrate taxa.

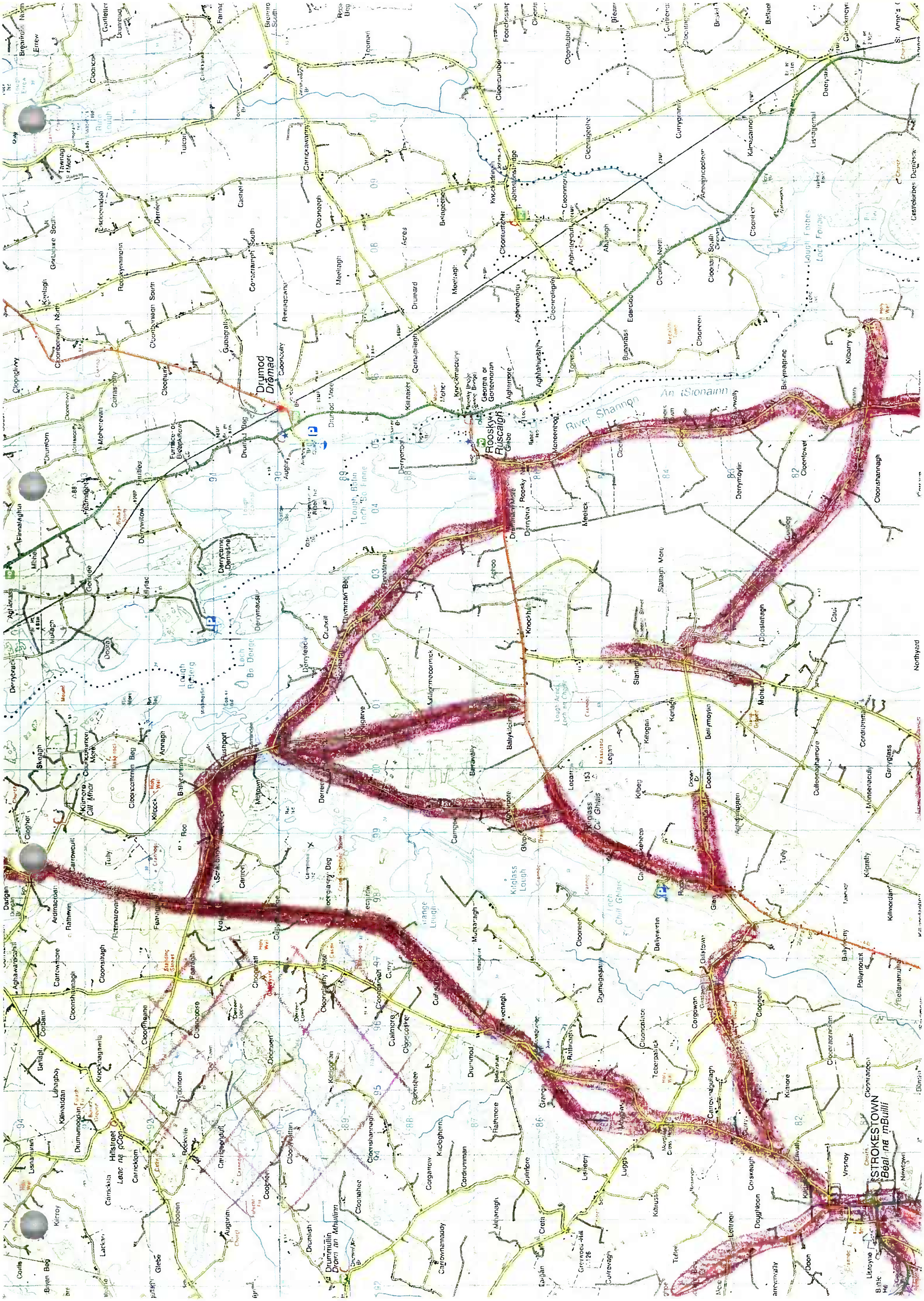
Zebra mussels can be expected to virtually eliminate the existing populations of swan mussels (*Anodonta* species) in lakes they colonise. This is achieved by heavy spat settlement on the shells of *Anodonta* living in soft sediment. This causes difficulties for the swan mussel in maintaining vertical position and increased competition for food.

10.1.1.7 Economic Impacts

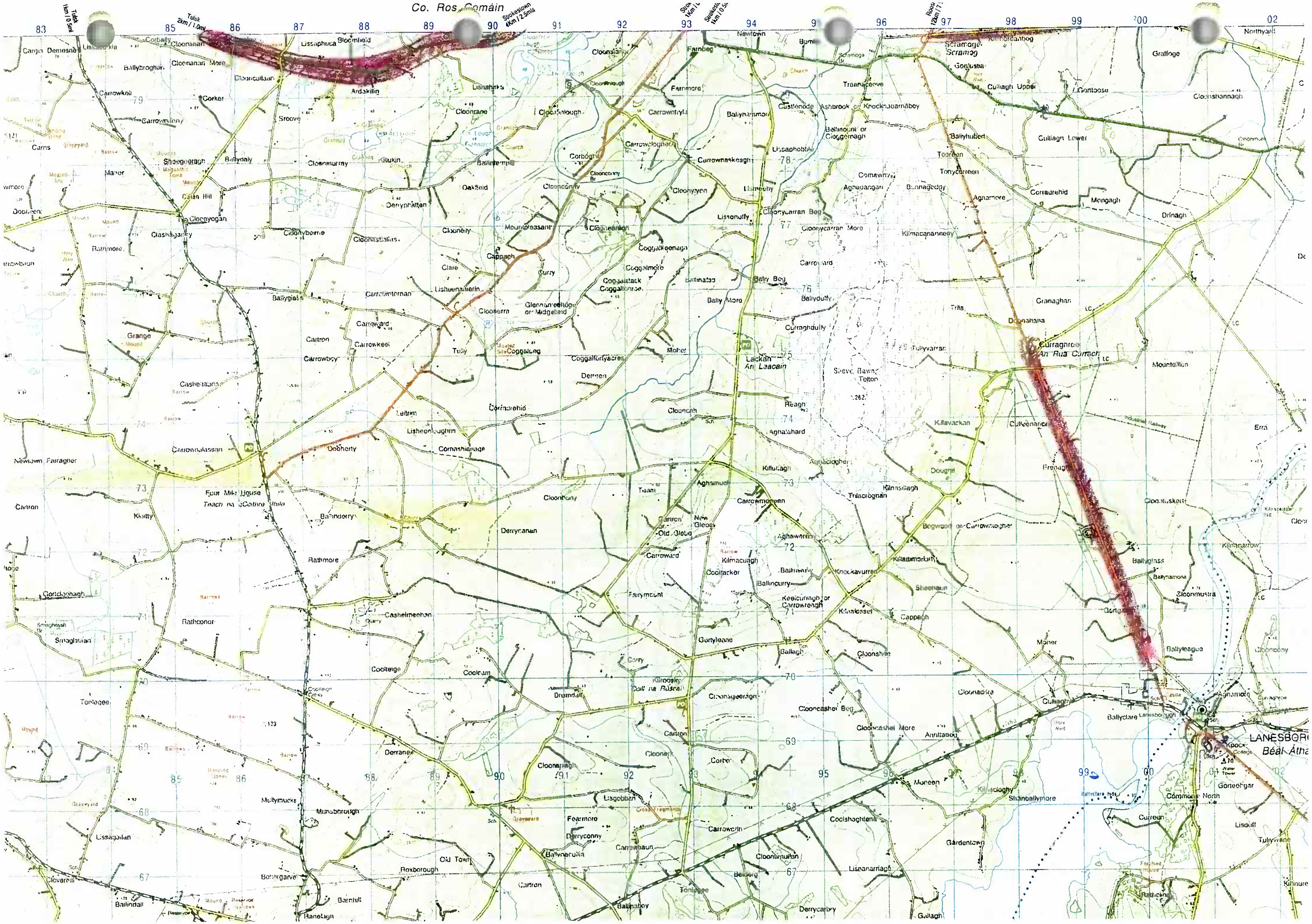
Zebra mussels are notorious fouling organisms and are capable of causing serious economic damage by obstructing pipes and by damaging submerged structures, industrial equipment and turbines. The extraordinarily high densities (up to more than 10,000m^2) on some structures give an indication of the rapidity with which a serious fouling problem can be caused by the zebra mussel. The hydroelectricity generating station at Ardnacrusha was among the first sites at which zebra mussel was noted in the Shannon.

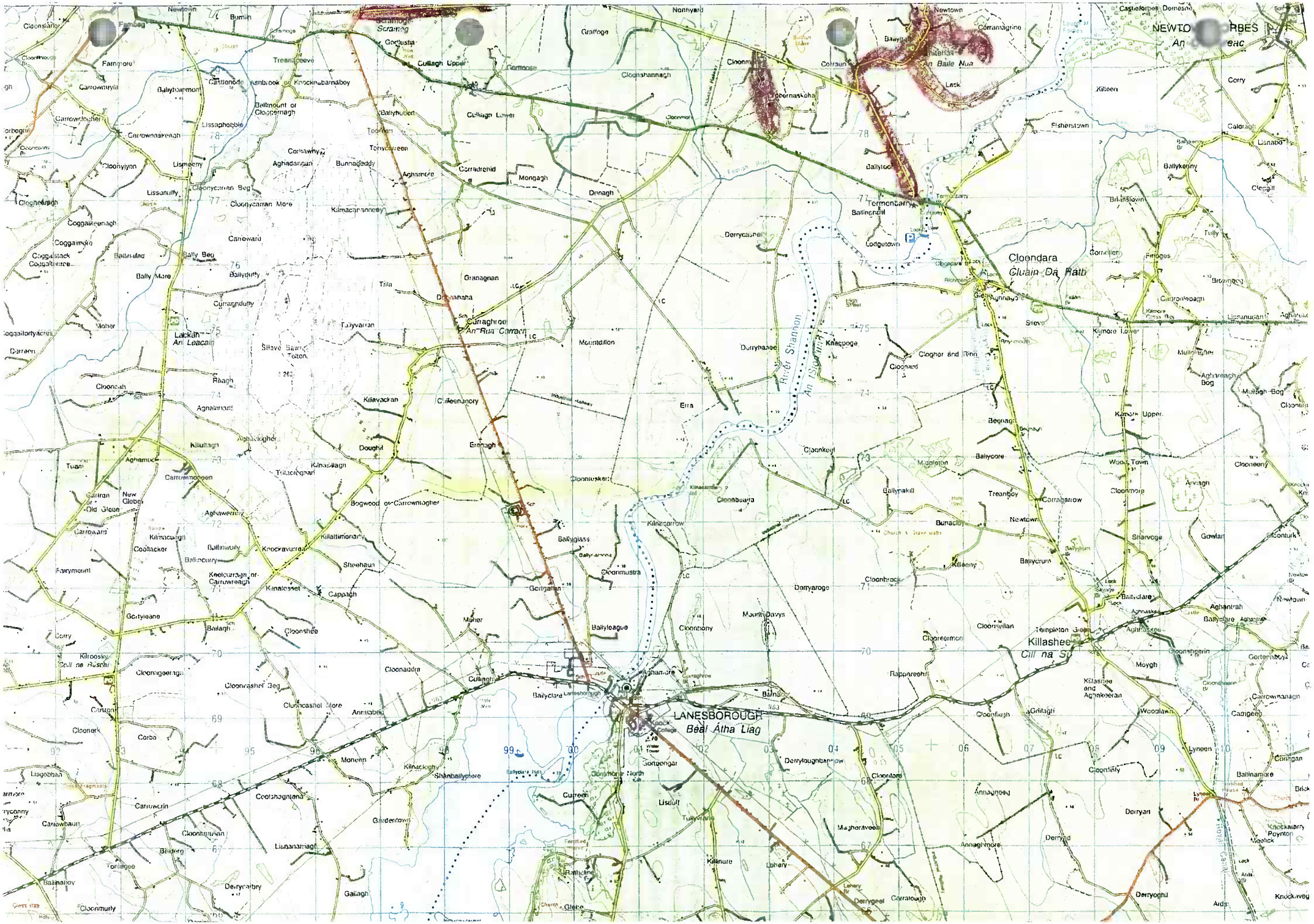


CARRICK-on-SHANNON
Cora Droma Rúisc
Leitrim
Liatroim
Drumsna
Droim ar Snámh
Lough Key
Loch Cé
FOREST PARK
Páirc Foraoise
Knockvicar
Cnoc an Bhiocáire
Cootehall
Uachtar Thíre
Lough Eidin
Jamestown
Charlestown



Drumod
Dromad
Roosky
Ruscaigh
River Shannon
An tSionainn
Lough Bofin
Loch Bó Finne
Lough Boderg
Kilglass Lough
Kilmore
Cill Mhór
Hillstreet
Leac na gCon
Drummullin
Drom an Mhuilinn
STROKESTOWN
Béal na mBuillí


Co. Ros Comáin
LANESBOROUGH
Béal Átha
Slieve Bawn
Tulsk
Strokestown
Four Mile House
Teach na gCeithre Míle
Curraghroe
An Rua Churrach
Lackan
An Leacain
Kilrooskey
Coill na Rúscaí
Newtown
Roxborough
Old Town
Ballyclare
Ardakillin
Rathmore
Mountdillon
Dooherty
Derrynanan
Northyard


Cloondara
Cluain Dá Rath
LANESBOROUGH
Béal Átha Liag
Killashee
Cill na Sí
River Shannon
An tSionainn
Scramoge
Scraing
Lackan
An Leacain
Curraghroe
An Rua Carrach
Farnmore
Carrowmurtyla
Ballyhaunmont
Castlenode
Ashbrook or Knockabarnaboy
Beltmount or Cloncernagh
Carrowclogher
Carrowmaskeragh
Lissaphobble
Cloonyiyon
Lismeeny
Cloghnagh
Lissanilty
Cloonycarran Beg
Cloonycarran More
Coggalkeenagh
Coggalmore
Coggalstack
Coggalfarrance
Ballinafad
Bally Beg
Bally More
Ballydrilty
Carroward
Currarghduffy
Moher
Coggallortyacres
Darren
Cloncah
Raagh
Agnalamart
Aghamuck
Tuam
Carrowmoneen
Garrian or Old Gleen
New Globe
Aghawemey
Carroward
Kilmacugh
Coolacker
Ballinwully
Knockavurrea
Fairymount
Ballincurry
Keelcurragh or Carrowreagh
Kinalessel
Cappagh
Gortyleane
Ballagh
Corry
Cloonshee
Kilroosky
Coill na Ruscai
Cloonageeragh
Cloonashee Beg
Cloonashee More
Carrigan
Cloonark
Corbo
Lisgobban
Carrowbaun
Carrowcrin
Cloonhaurian
Beldero
Tonlegee
Ballinaboy
Derrynaboy
Cloonmurty
Lisnanamagh
Gallagh
Gardentown
Coolshaughtona
Moneen
Kilnaclohy
Shanballymore
Cloonaddra
Annaghbeg
Ballyclare
Aghamore
Cullaghy
Ballyleague
Cloonbony
Gortgeragan
Cloonmustra
Shoohaun
Killaltimonary
Bogwood or Carrowtogher
Kilnasillagh
Trillereghan
Aghackogher
Doughd
Kilnavacklan
Chileenancry
Dromanaha
Granagnan
Trila
Tullyvarran
Mountdillon
Agharnore
Cullaghy Upper
Cullaghy Lower
Toorban
Tonycarreen
Aghadarragan
Bunnafeddy
Aghamore
Corradrehid
Mongagh
Dromagh
Kilmacnanneny
Derrycashel
Lodgetown
Termonbarry
Ballinphull
Ballytoo
Cloonmore
Cloonshannagh
Corraun
Lack
Killeen
Fisherstown
Ballykenny
Brinlistown
Tully
Cornalon
Finnoges
Carrowbeagh
Kilmore Lower
Kilmore Upper
Aghanreagh Bog
Murtagh Bog
Begnagh
Cloonkeel
Ballycore
Middleton
Ballynakill
Treanboy
Corraharrow
Newtown
Bunaclon
Killeeny
Ballycrum
Cloonbrack
Derryaroge
Mount Davys
Cloonmillan
Templeton Glebe
Cloontermon
Rappareehill
Killashee and Aghakeeran
Moygh
Woodlawn
Griltagh
Cloonfugh
Cloonsilly
Derryart
Annaghmore
Derryad
Derryogid
Knockaveg
Knockalbery
Poynton
Maolick
Ballinamore
Lyneen
Corrigan
Cadigeen
Carrowmanagh
Gortamboy
Aghantrah
Ballybare
Shanvoge
Gowlan
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Cloonmore
Woodtown
Clooneeny
Aghagh
Mullaghcher
Aghareagh
Corry
Killeen
Corraghy
Lisnabo
Calcragh
Clengall
Corraghgrine
Castleforbes Demesne
Newtown
Baingah
Whitehall
An Baile Nua
Cloonmore
Cloonshannagh
Corraun
Lack
Derrylougbanrow
Cloontore
Annagineog
Mugheravoola
Kilmore
Lohery
Derrycarrow
Corralough
Ards
Gortgeragan
Sortgeragan
Cloonmore North
Curreen
Lisduff
Tullyvrane
Ballyclare
Lanesborough
Aghamore
Cullaghy
Bana
Knock College
Water Tower
Fortified House
Church
Glebe
Ballyglass
Ballyarmagh
Kilnecarrow
Cloonbuaria
Cloonbuck
Cloonlusker
Erena
Erenagh
Dromanaha
Granagnan
Trila
Tullyvarran
Mountdillon
Curraghroe
Lackan
Silver Barns
Telton
Dunnyhaage
Knappoge
Cloghor and Rinn
Cloonard
Sieve
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Treanboy
Corraharrow
Newtown
Bunaclon
Killeeny
Ballycrum
Cloonbrack
Derryaroge
Mount Davys
Cloonmillan
Templeton Glebe
Cloontermon
Rappareehill
Killashee and Aghakeeran
Moygh
Woodlawn
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Lyneen
Corrigan
Cadigeen
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Gortamboy
Aghantrah
Ballybare
Shanvoge
Gowlan
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Cloonmore
Woodtown
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Aghagh
Mullaghcher
Aghareagh
Corry
Killeen
Corraghy
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Calcragh
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Cullaghy
Bana
Knock College
Water Tower
Fortified House
Church
Glebe
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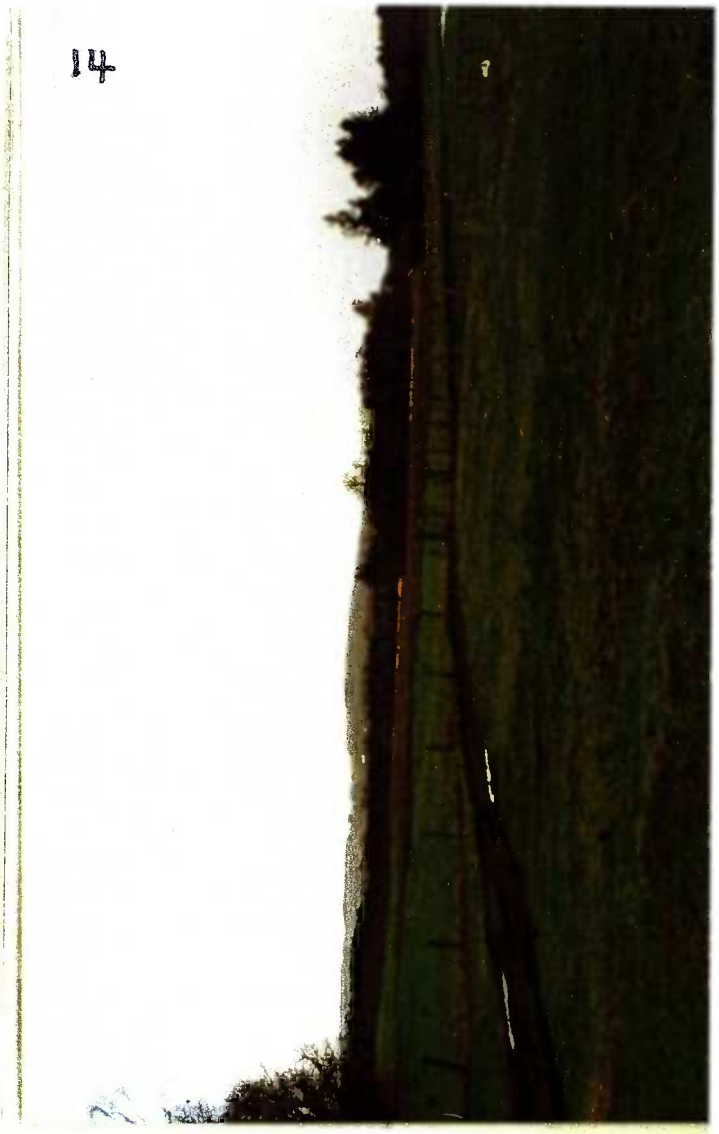

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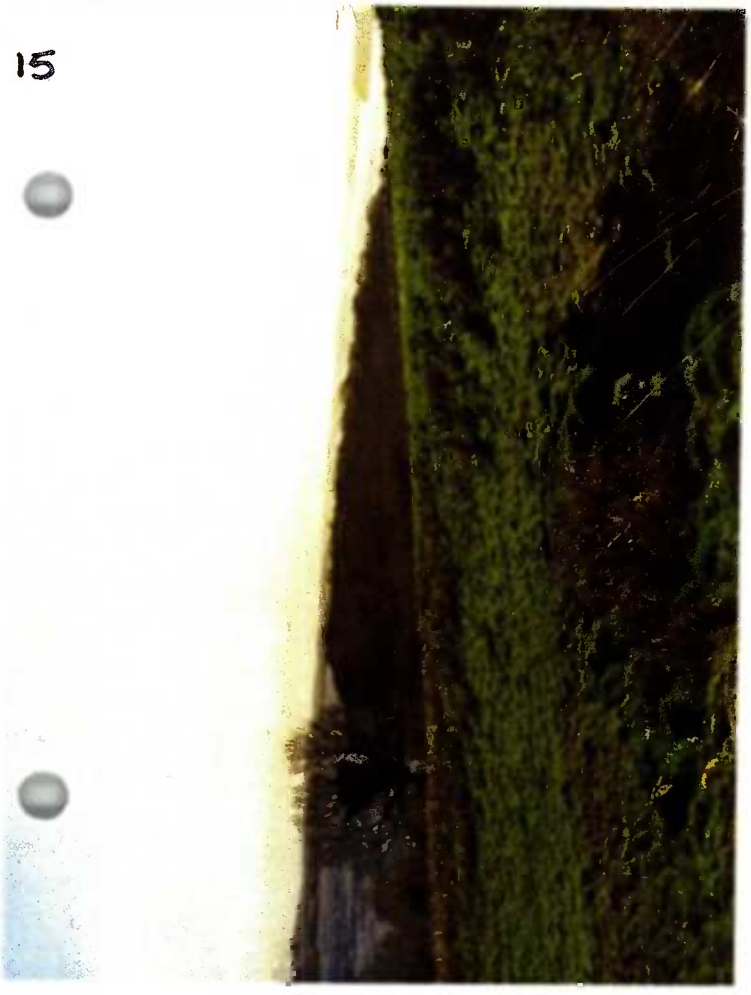

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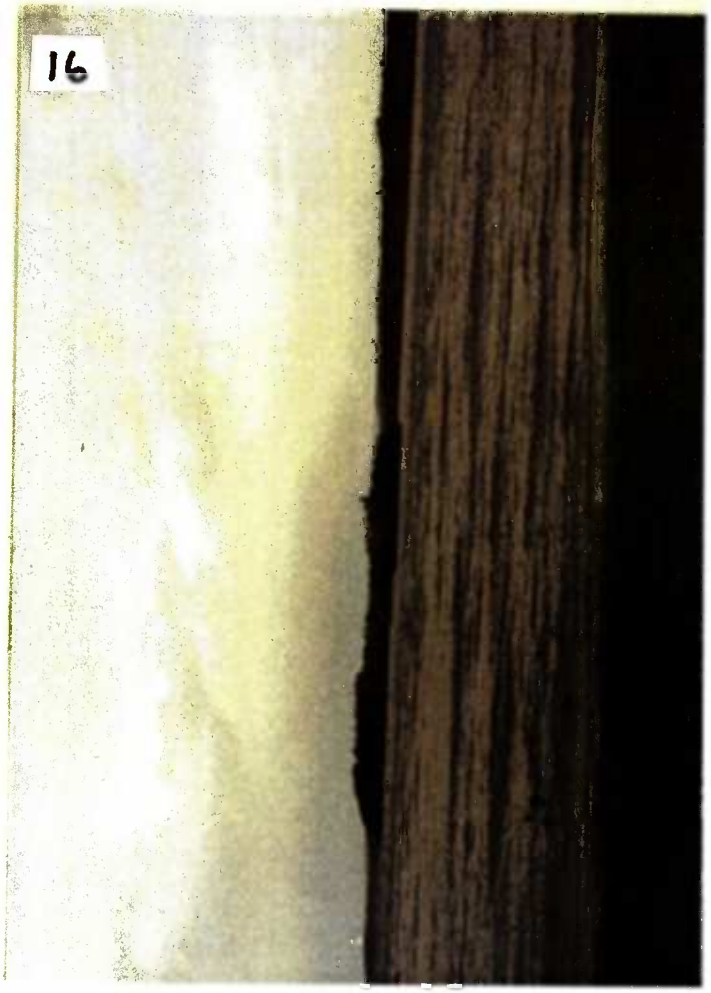

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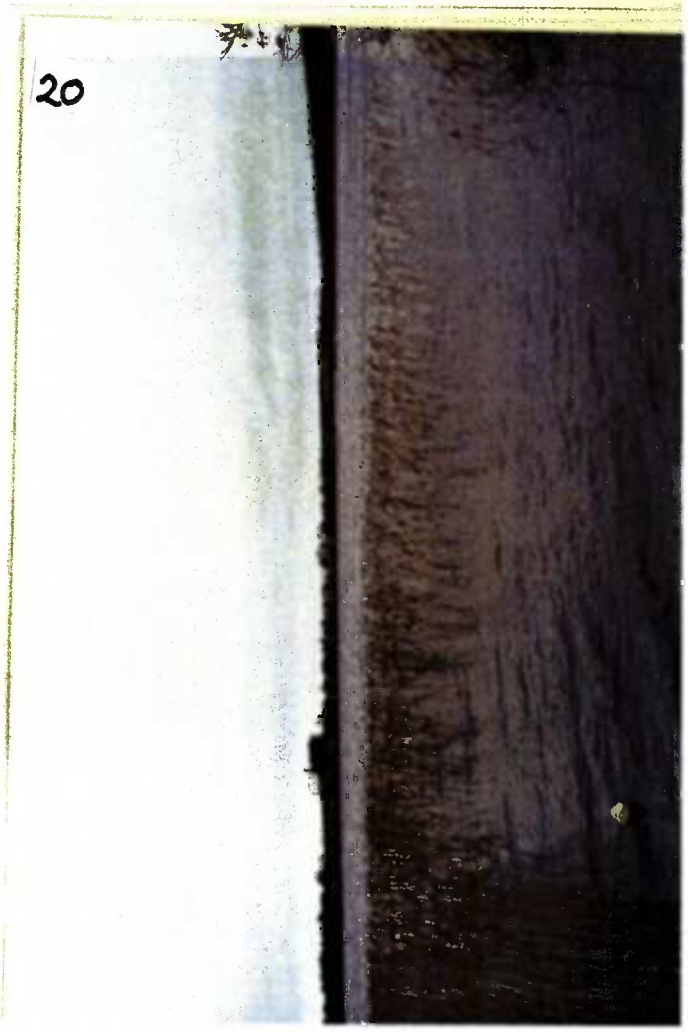


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Figure 10.1. Known zebra mussel distribution in 1997

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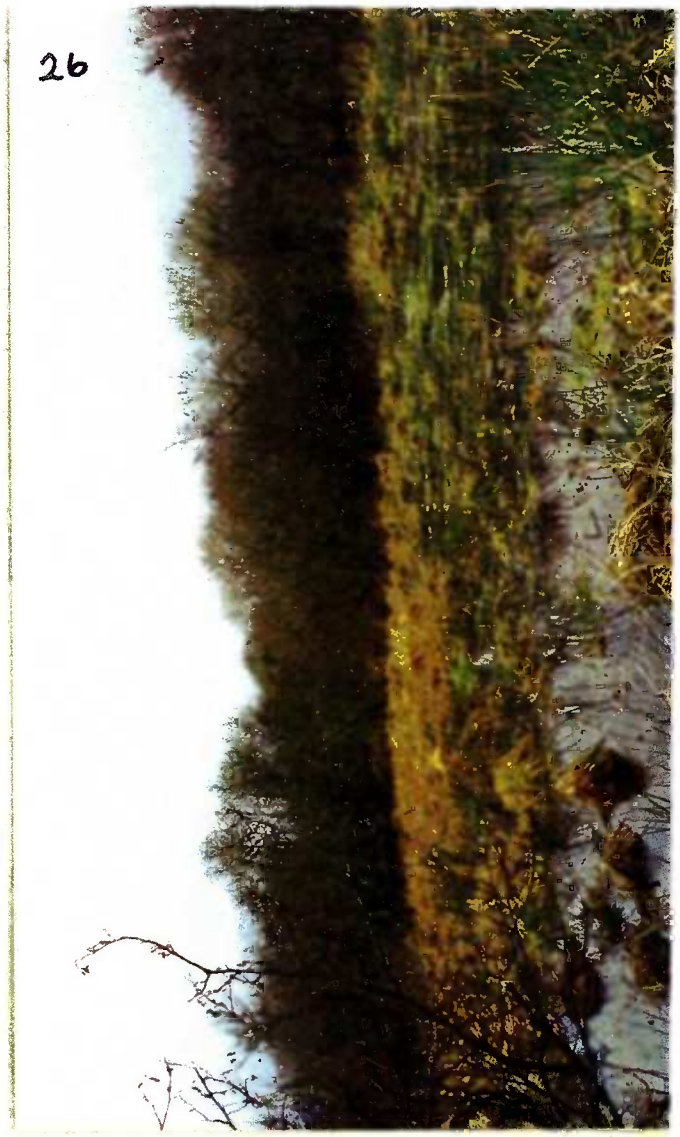

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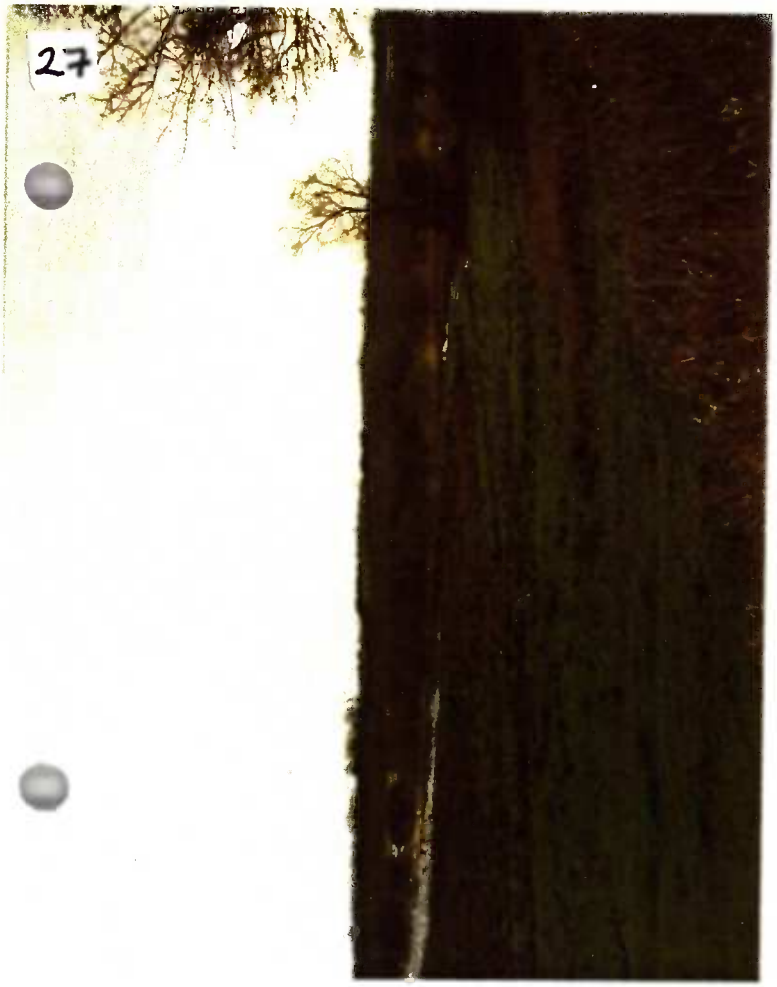

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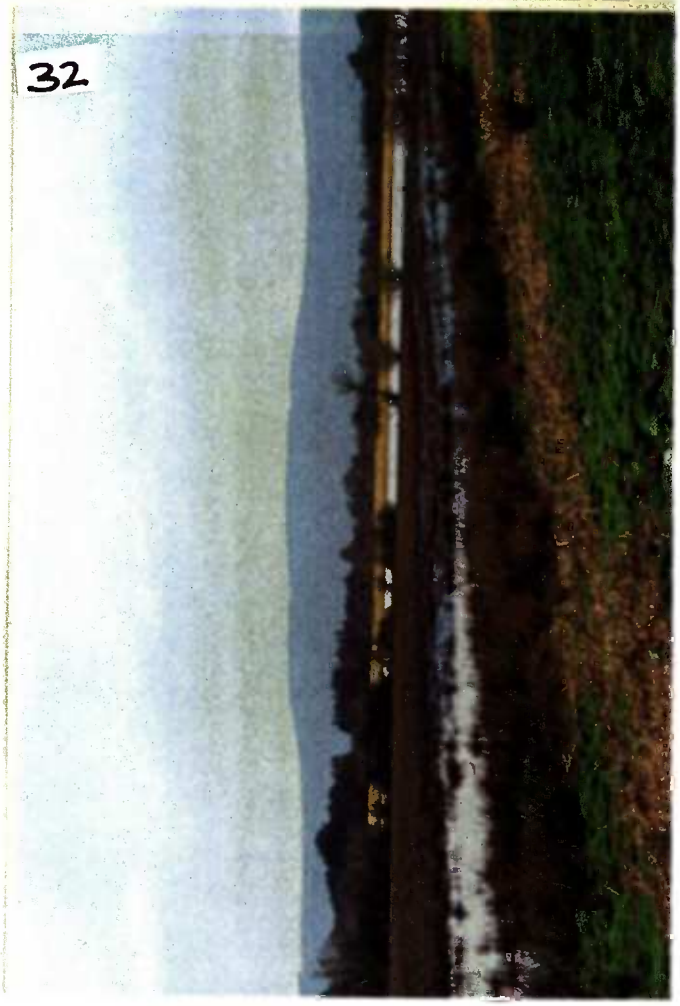
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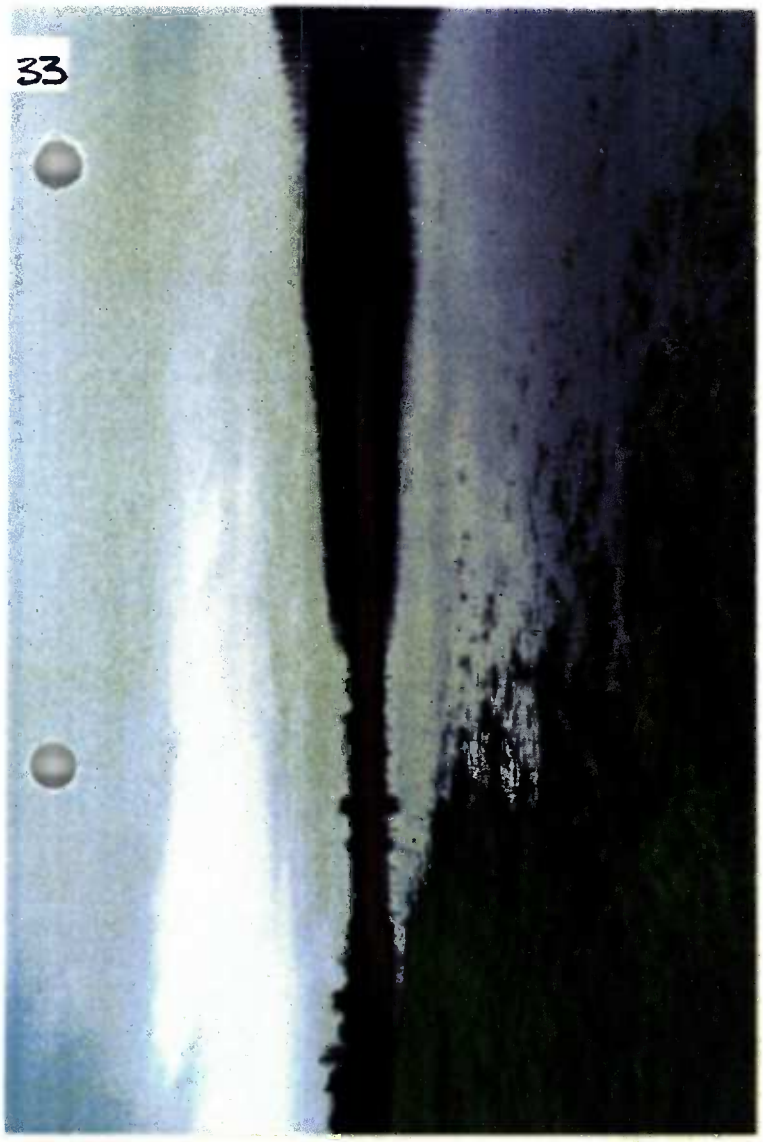
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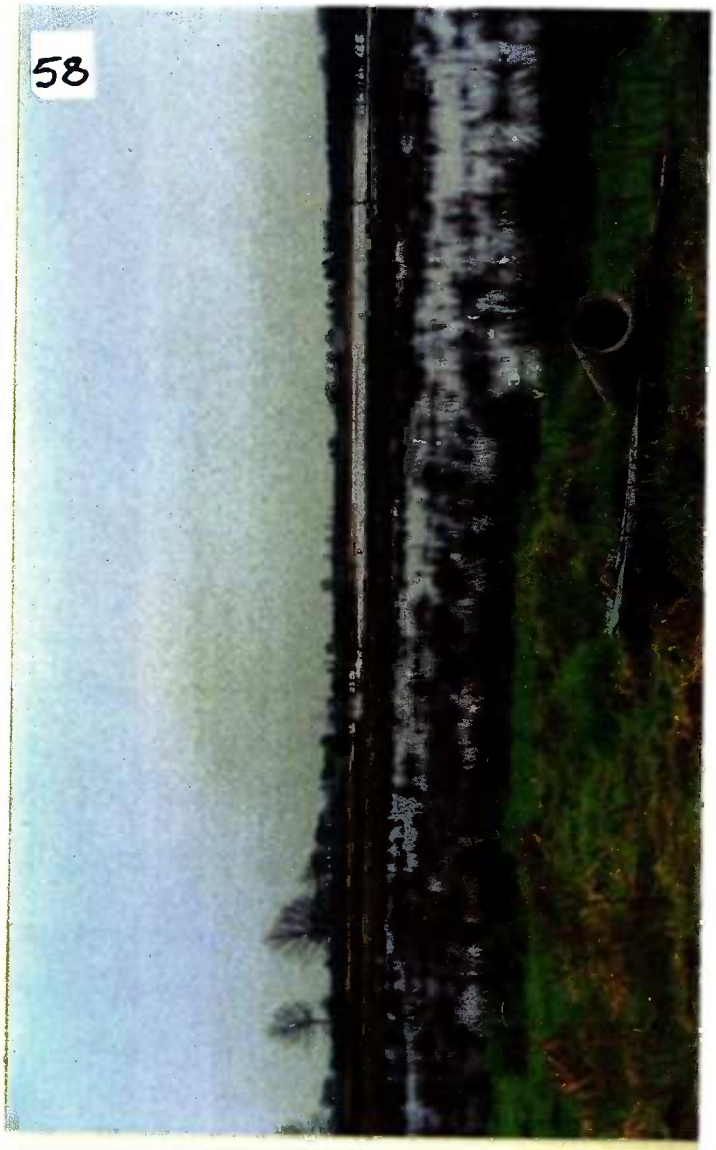

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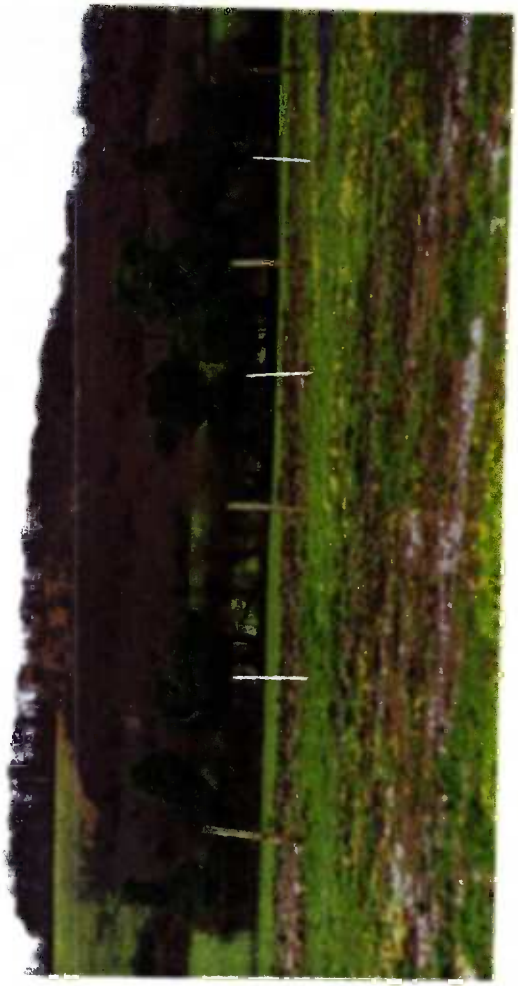
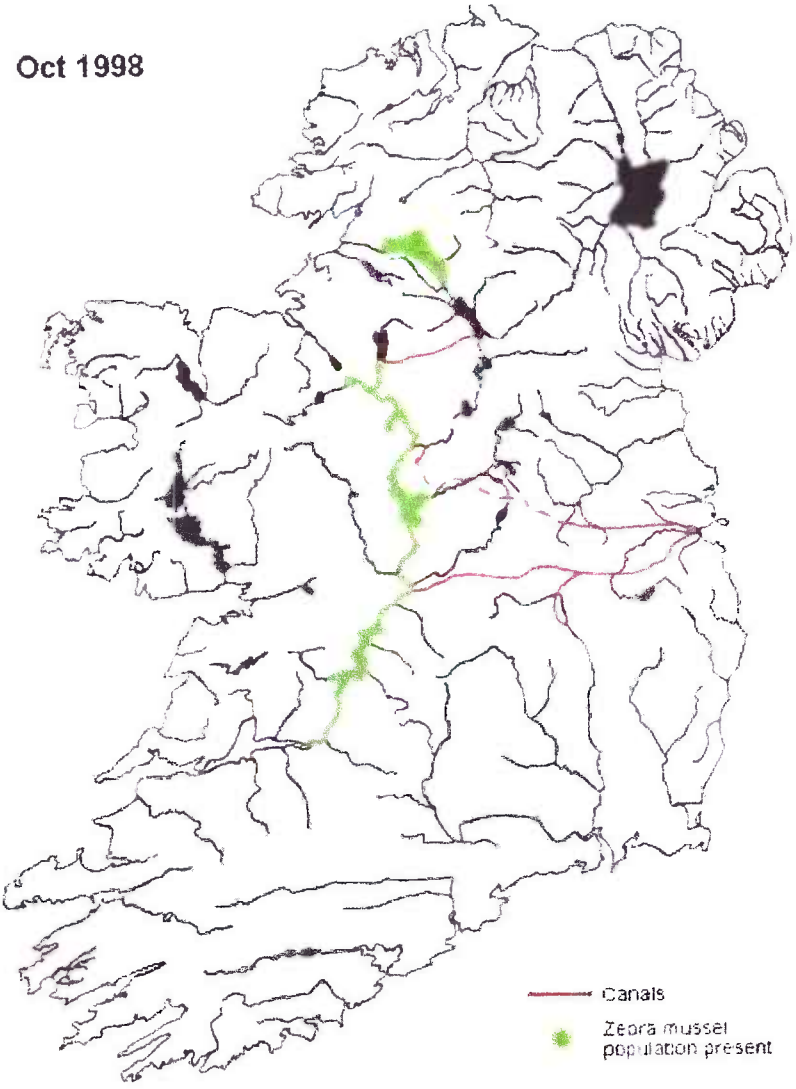


Figure 10.2. Known zebra mussel distribution in 1998.



10.1.2 Other Invasive species

Rhododendron is a threat to woodlands and cutaway bog, particularly around Castleforbes and Rockingham demesnes.

Ideally, rhododendron and non-native trees such as beech, sycamore and conifers should be removed from SAC/NHAs. This can only be achieved through co-operation with the landowners.

10.1.3 Development pressures

Development leads to habitat loss and fragmentation. Species movement and populations may be impacted upon. In many cases this is not necessarily detrimental to overall wildlife and conservation interests, where it occurs in Zone C, but Zones A and B are more sensitive (Appendix 6).

Water quality may be compromised by an increase in pollutants and/or nutrients to the ecosystem. This impact may be minimised through adequate control systems such as suitable sewage treatment.

10.1.4 Tourism

Development of tourism infrastructure such as houses, hotels and marinas have already been discussed (see Section 9).

The impact of increased boating traffic along the Shannon and its lakes by both the cruising and angling industries could potentially cause disturbance to sensitive species such as the Greenland White-fronted Goose.

Boat traffic may spread the zebra mussel. The Shannon Fisheries Board issues advice on hygiene measures for boat owners and users, to help combat the spread of zebra mussel. Introduction of alien fish species for angling can reduce populations of native species (e.g. introduced roach can quickly out compete perch within a system).

10.1.5 Agriculture

Agricultural practices have the potential to reduce water quality within the catchment. Intensification of agriculture results in higher nutrient inputs into the system, as well as loss of species and habitats through drainage and land reclamation. The impacts of agriculture on parts of the Shannon catchment are detailed in a report by Kirk McClure Morton (1999).

11.0 Recommendations

11.1 Conservation Areas

11.1.1 Existing conservations areas

Some of the best examples of habitat in the project area are already within the SAC/NHAs in the Upper Shannon region. The current designations also provide for many of the feeding sites for the Greenland White-fronted Goose, a protected species. **Greenland White-Fronted Goose feeding sites that are not within designated areas are recommended for inclusion into existing NHAs (Appendix 5).**

There is a case for extending the boundaries of some NHA to include other areas of good quality habitat and the winter flood levels where not already included (see Appendix 4 for flooding levels). **Extensions are recommended for the following NHAs** (see Section 8 for more details):

- Lough Allen South End and Parts 427 may be extended or new NHAs may be developed to include the area between (and including) Rossmore and Kilgarriff Lake) and Inisfale Island, flooded woodland at the Shannon outflow (Holly Island)
- Lough Key NHAs (596, 1631, 1633, 1638, 1651) may be extended or new NHAs developed to include Tinarinnow Peninsula, Drumcormick Peninsula, Erris Bay and the undesignated Islands on the lake.
- Drumharlow Lake 1643 may be extended to include flooding at Cloongownagh, hen harrier sites and Greenland White-fronted Geese feeding areas.
- Lough Bofin/Boderg 1642 should be extended to include winter flooding areas and Greenland White-fronted Geese feeding areas.
- Kilglass and Grange Loughs 608 should be extended to include winter flooding areas and Greenland White-fronted Geese feeding areas.

11.1.2 Potential new areas for designation

A number of areas are recommended for further survey to ascertain whether they warrant designation as NHAs (see Section 8 for more details):

- Ballinphuill (near Termonbarry) – possible callows and Highstreet (near Cloondara) – possible callows may be designated together if they warrant NHA status.
- Cloontuskert to Ballyleague – possible callows.
- Lough Nablahy complex – a complex of lakes, wet grassland and wet woodland vegetation.
- Clooncullaan Lough complex – a complex of lakes, wet grassland and wet woodland vegetation. Possible *Schoenus* fen requires confirmation and survey.
- Lough Conny More complex – a complex of lakes, wet grassland and wet woodland vegetation. Possible *Schoenus* fen and marl lake require confirmation and survey.

- Fin Lough and Cloonfree Lough – *Schoenus* fen, wet grassland and lake vegetation.

11.1.3 Other Zone A Sites

A number of sites listed in Zone A are not specifically recommended for NHA designation but are of sufficient conservation interest and importance to be listed in this Zone. Subsequent surveys may indicate that these habitats are of sufficient importance and size to warrant a conservation designation.

Within NHA and SAC woodlands a programme of invasive exotic removal, such as rhododendron, in cooperation with landowners, would be ideal.

11.1.4 A National Park

The Shannon is the largest river in the country and it still has an extensive floodplain, despite arterial drainage and land reclamation. The area supports high biodiversity and the idea of designating the River Shannon as an SAC or National Park was mooted by several consultees during the project. There is some merit to this suggestion since linking up all the current designated sites on the Shannon would improve their protection and help prevent fragmentation. Management of current areas of conservation along the Shannon cannot be seen in isolation from the rest of the river system.

11.2 Information gaps

11.2.1 Knowledge sharing

There are good relations between local Dúchas staff and their counterparts in other State organisations such as Waterways, County Councils, OPW, Fisheries etc. Improvement in communications and cooperation, in particular in exchange of information, would improve the management of conservation areas and aid staff in assessing the potential impacts of proposed developments.

11.2.2 Important species

Further survey and monitoring needs to be carried out on a range of species, particularly rare or threatened species. Detailed information is needed on populations sizes, distributions and trends. **Greenland White-fronted Geese (see Section 6 for detailed recommendations), white clawed crayfish and pearl mussel are the species of most conservation interest for which there are particular information deficits in the project area.**

Counting the Upper Shannon Greenland White-fronted Goose flocks presents difficult logistical issues for staff and volunteers. However, it is clear that **more accurate and frequent counting is required to determine flock sizes more accurately.** There is a need for research into flock movements and feeding patterns in the Upper Shannon to determine whether disturbance, habitat loss or other preventable issues are resulting in flock declines.

11.2.3 Other surveys

Detailed soil surveys should be completed for Longford and Roscommon where preliminary surveys were carried out. Only Leitrim has had a detailed soil survey.

Regular mapping of flooding levels for the entire area, including the small lakes of Strokestown/Elphin/Rooskey, will help to illustrate the exact limits of flooding.

These surveys, however, are outside of the remit of Dúchas (wildlife branch) and are the responsibility of other State organisations.

11.3 Staffing of the Upper Shannon

Currently, the responsibility of monitoring the Upper Shannon area is divided between three Dúchas regions: Northern Region (Moyne District) (2 conservation rangers), Northern Region (Church Hill District) (1 conservation ranger) and Mid-Western Region (Ballinasloe District) (1 conservation ranger). Staff cannot concentrate solely on the Shannon area because they have many other areas to monitor.

An additional conservation ranger position should be allocated to monitor the Upper Shannon, the principal aquatic resource in the country. This position would facilitate improved monitoring of conservation interests. It would also simplify liaison with planning and other authorities in the region.

11.4 Planning and Development Pressures

Dúchas needs a policy on the levels of amenity/leisure activity that can take place within designated areas to facilitate conservation management decisions. Formulation of such a policy is outside the remit of the present project.

The majority of the proposed developments within the project area are for single dwellings. There is the potential for continued deterioration in water quality if sewage systems are inadequate or poorly maintained.

Development should be excluded from Zone A, areas of high conservation interest, as indicated on the zoning maps (Appendix 6).

Future planning proposals should be cognisant of the flood plain boundaries as indicated on the map (Appendix 4). Ideally, the aim should be to retain the current floodplain and prevent further losses through drainage or development.

Existing marinas that do not have appropriate anti-pollution facilities should be upgraded immediately to prevent pollution of the watercourse from these sources. Applications for new marina developments should be subject to thorough, independent ecological assessment.

All requests for encroachment licences/ proposed marina or jetty developments should be sent to Dúchas for assessment.

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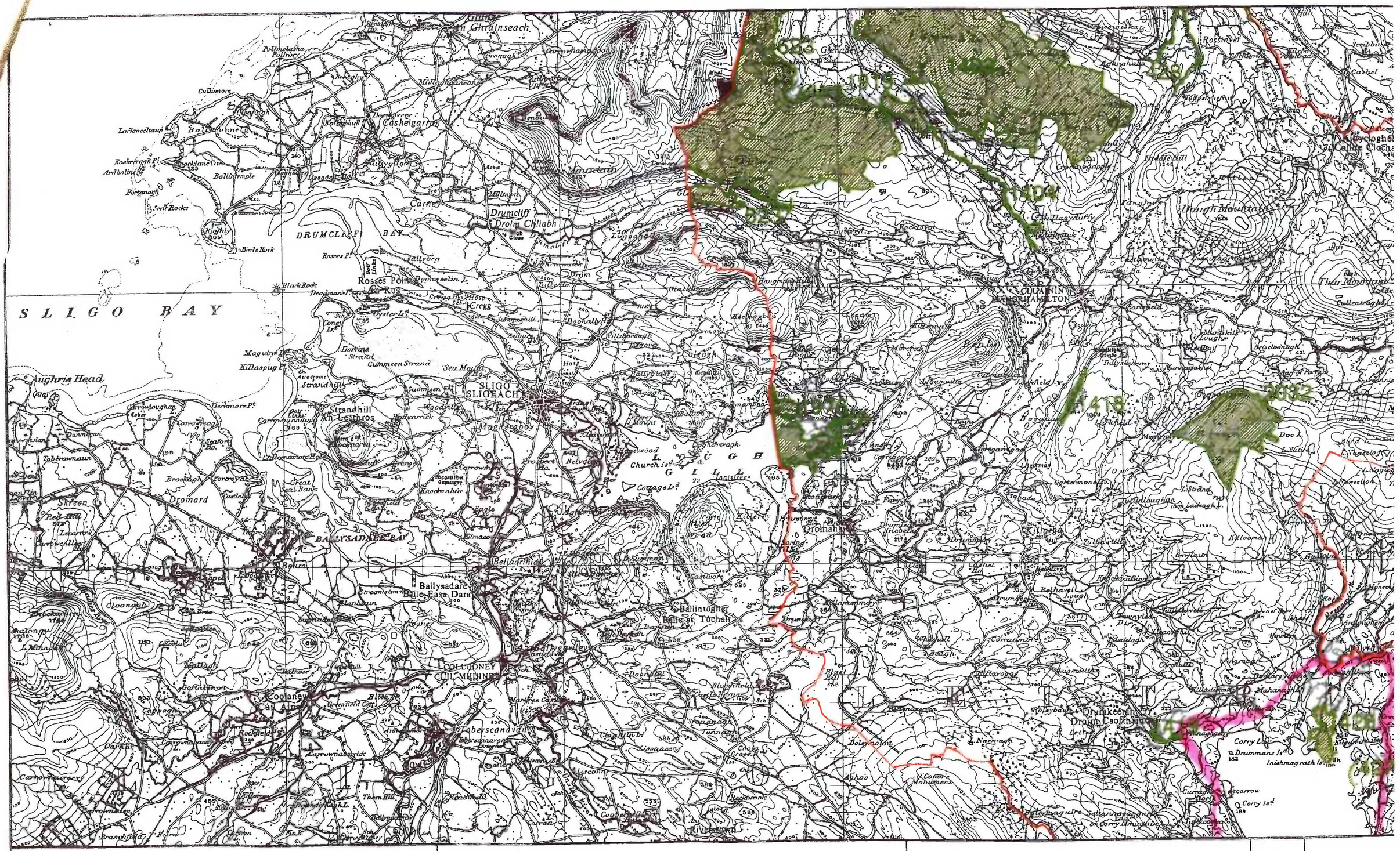
APPENDIX 1 LIST OF CONSERVATION AREAS

List of Conservation areas within the Upper Shannon Project Boundaries

Site Code	Site Name	Designation	County
422	Aghnamona Bog	NHA	Leitrim
426	Kilgarriff Marsh	NHA	Leitrim
427	Lough Allen South end and parts	NHA	Leitrim
1412	Drumhierney Wood	NHA	Leitrim
1419	Owengar Wood	NHA	Leitrim
1642	Lough Boderg and Lough Bofin	NHA	Leitrim
1643	Drumharlow Lough	NHA/SPA	Leitrim
422	Aghnamona Bog	NHA	Longford
442	Brown Bog	NHA	Longford
445	Clooneen Bog	NHA	Longford
691	Rinn River	NHA	Longford
1818	Lough Forbes Complex	NHA/SAC/SPA	Longford
596	Corrigeenroe Marsh	NHA	Roscommon
608	Kilglass and Grange Loughs	NHA	Roscommon
1626	Annaghmore Lough	NHA	Roscommon
1631	Drum Bridge (Lough Key)	NHA	Roscommon
1633	Drumman's Island (Lough key)	NHA	Roscommon
1636	Fin Lough	NHA	Roscommon
1638	Hog's Island (Lough Key)	NHA	Roscommon
1642	Lough Boderg and Lough Bofin	NHA	Roscommon
1643	Lough Drumharlow	NHA	Roscommon
1651	Tawnytaskin Wood (Lough Key)	NHA	Roscommon
1818	Lough Forbes Complex	NHA/SAC	Roscommon



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Féadtar athruithe a chur an na ceantair / Sites subject to revision
(ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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CO. LEITRIM

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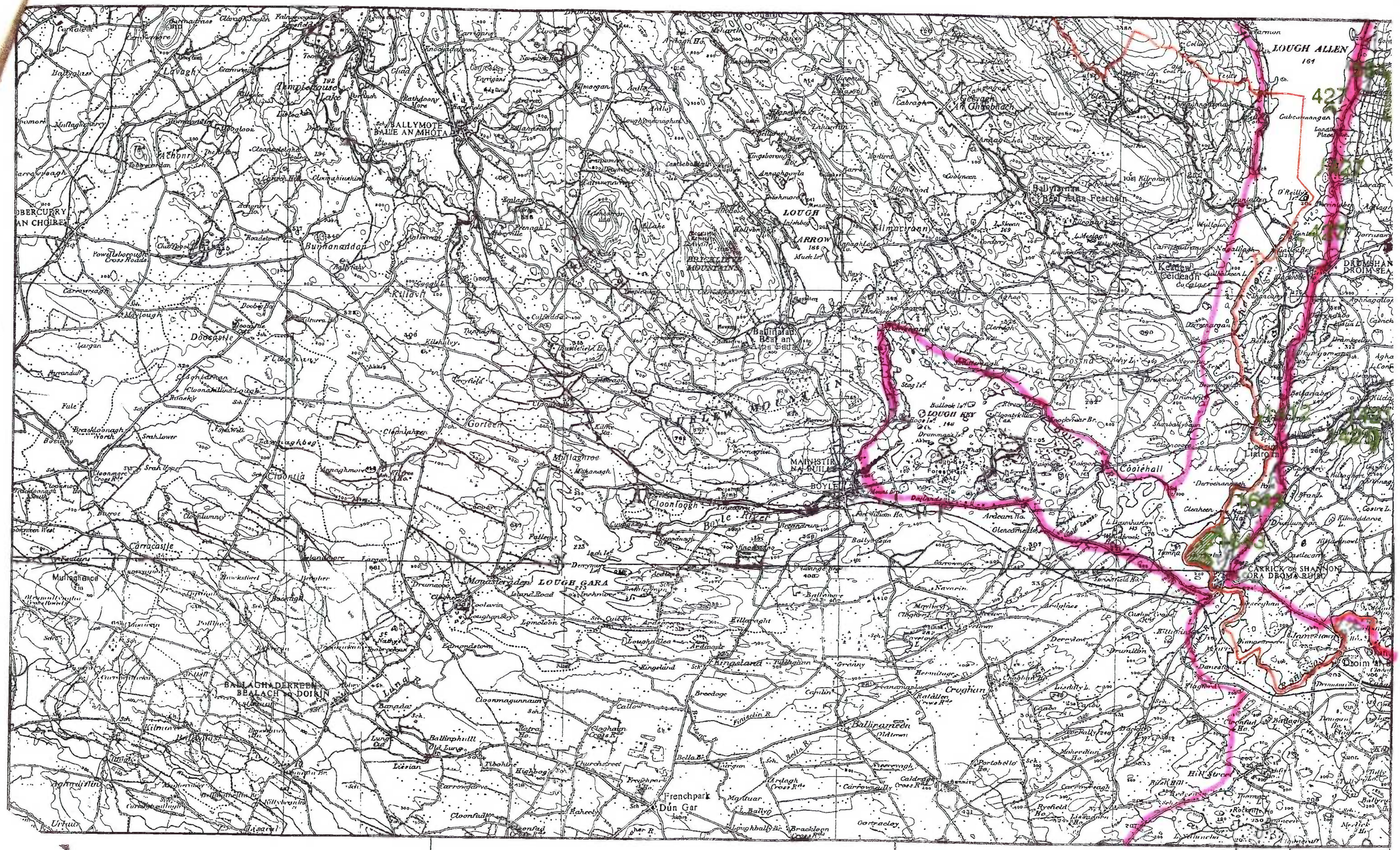

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CO. LIATROMA
CO. LEITRIM

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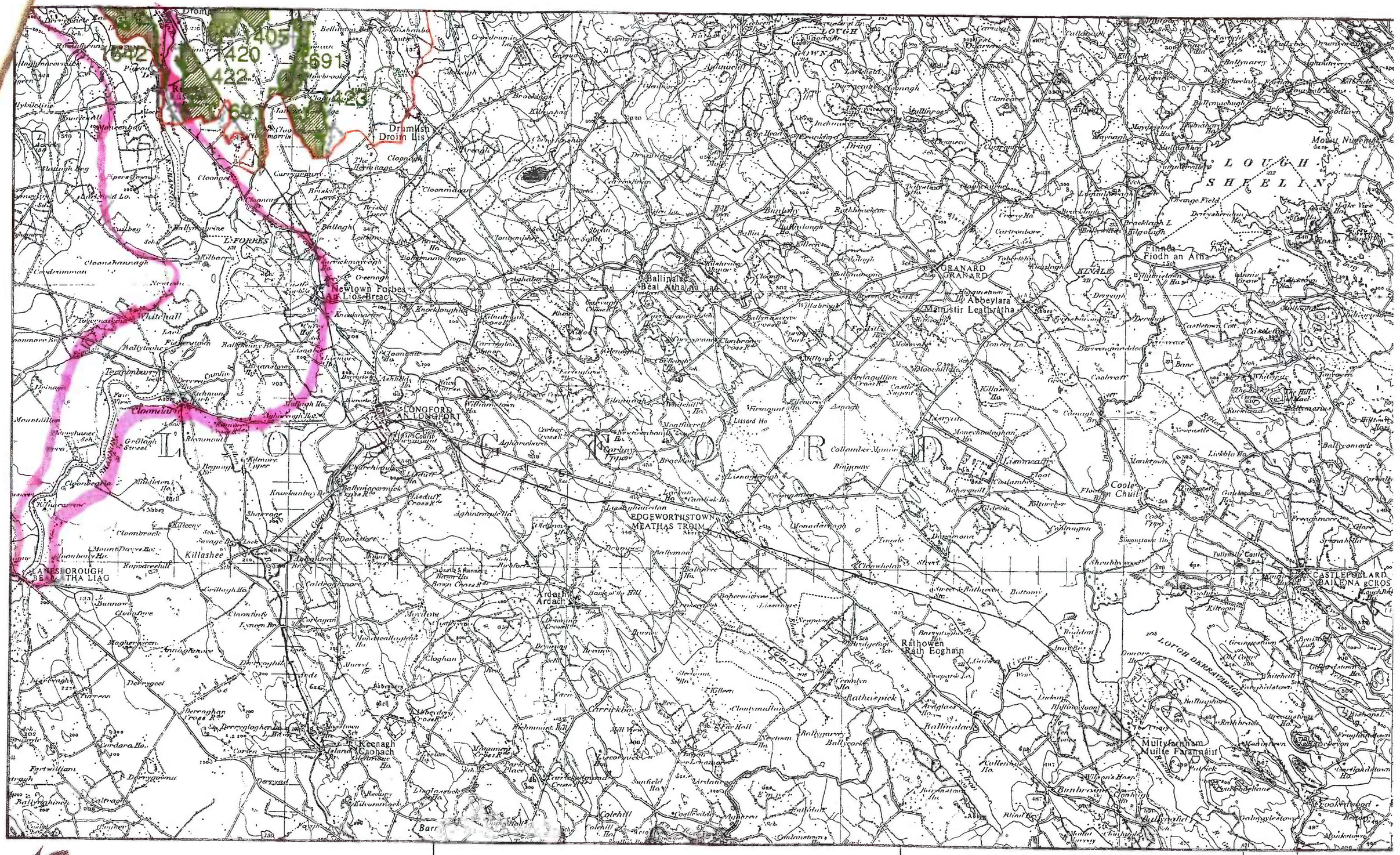

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NATURAL HERITAGE AREAS - PROPOSED

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CO. LIATROMA
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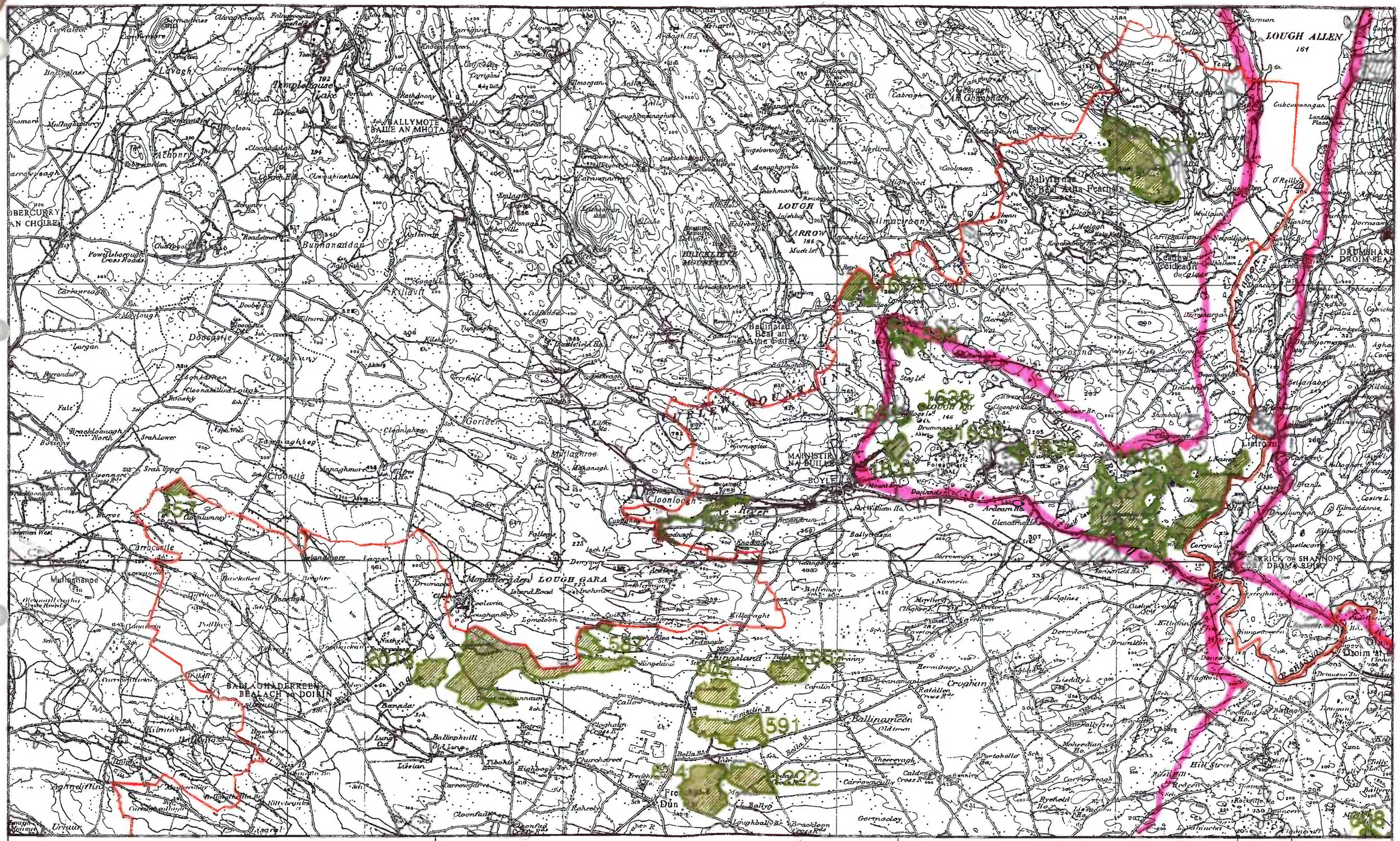

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CO. ROS COMÁIN
CO. ROSCOMMON

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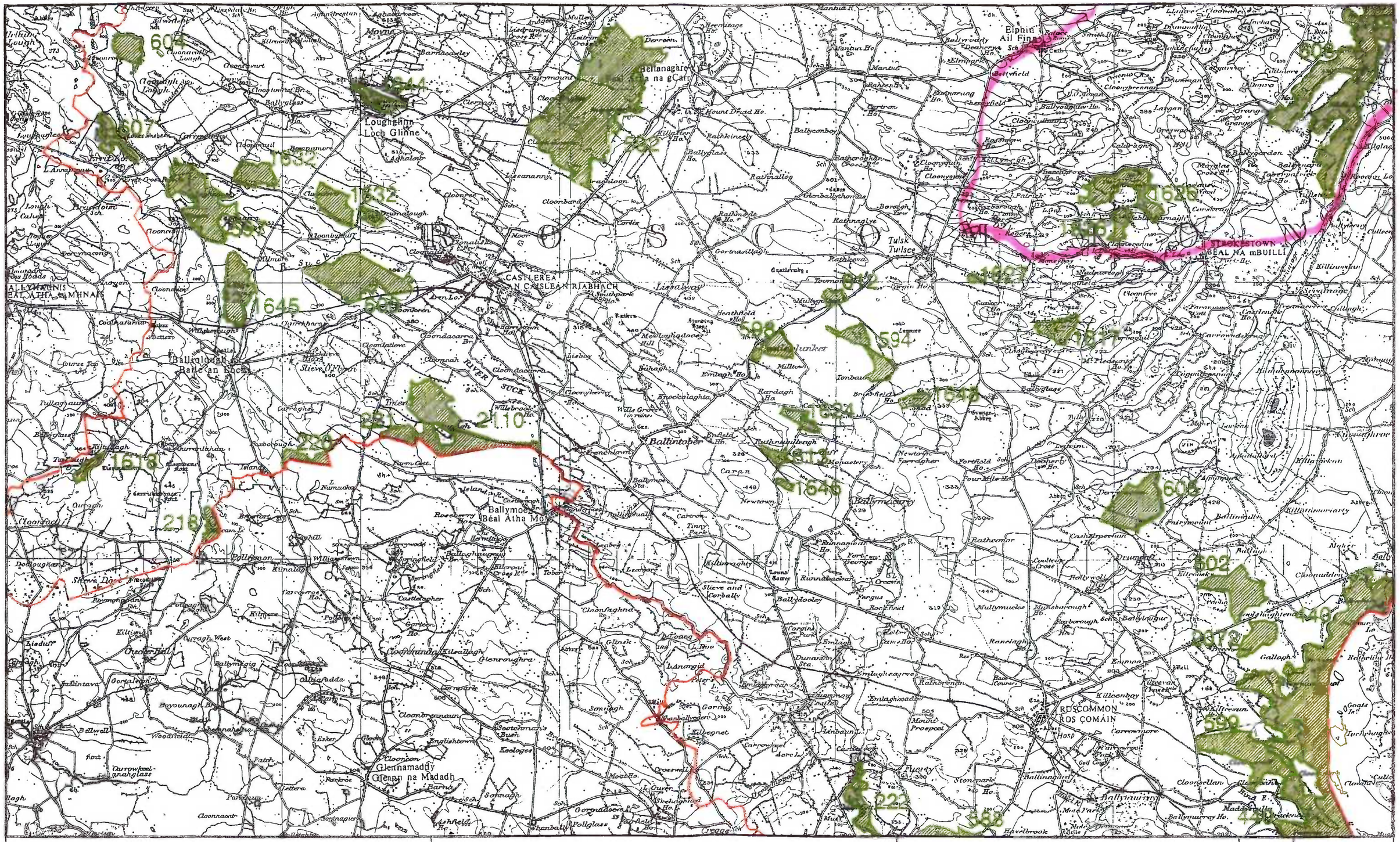

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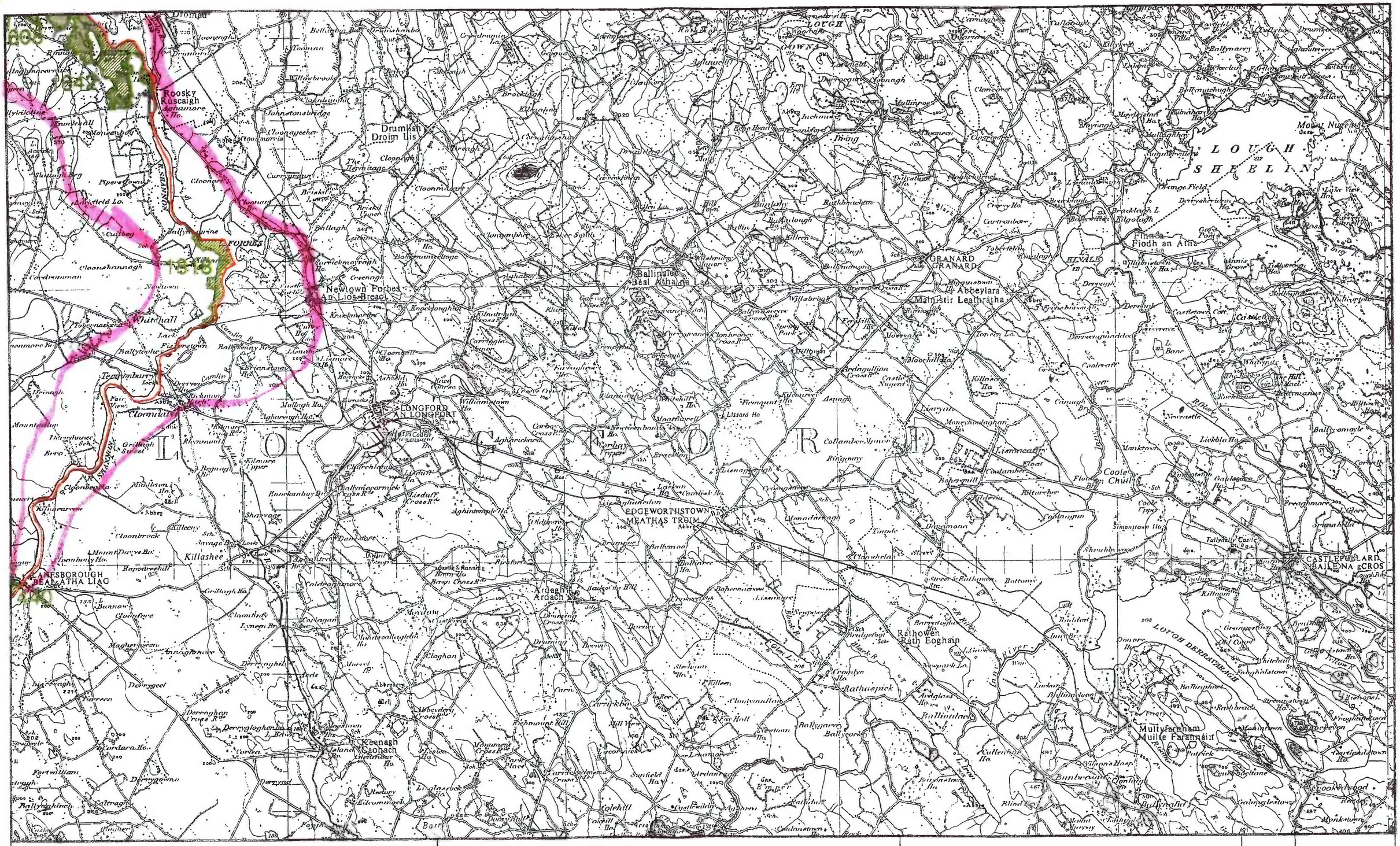

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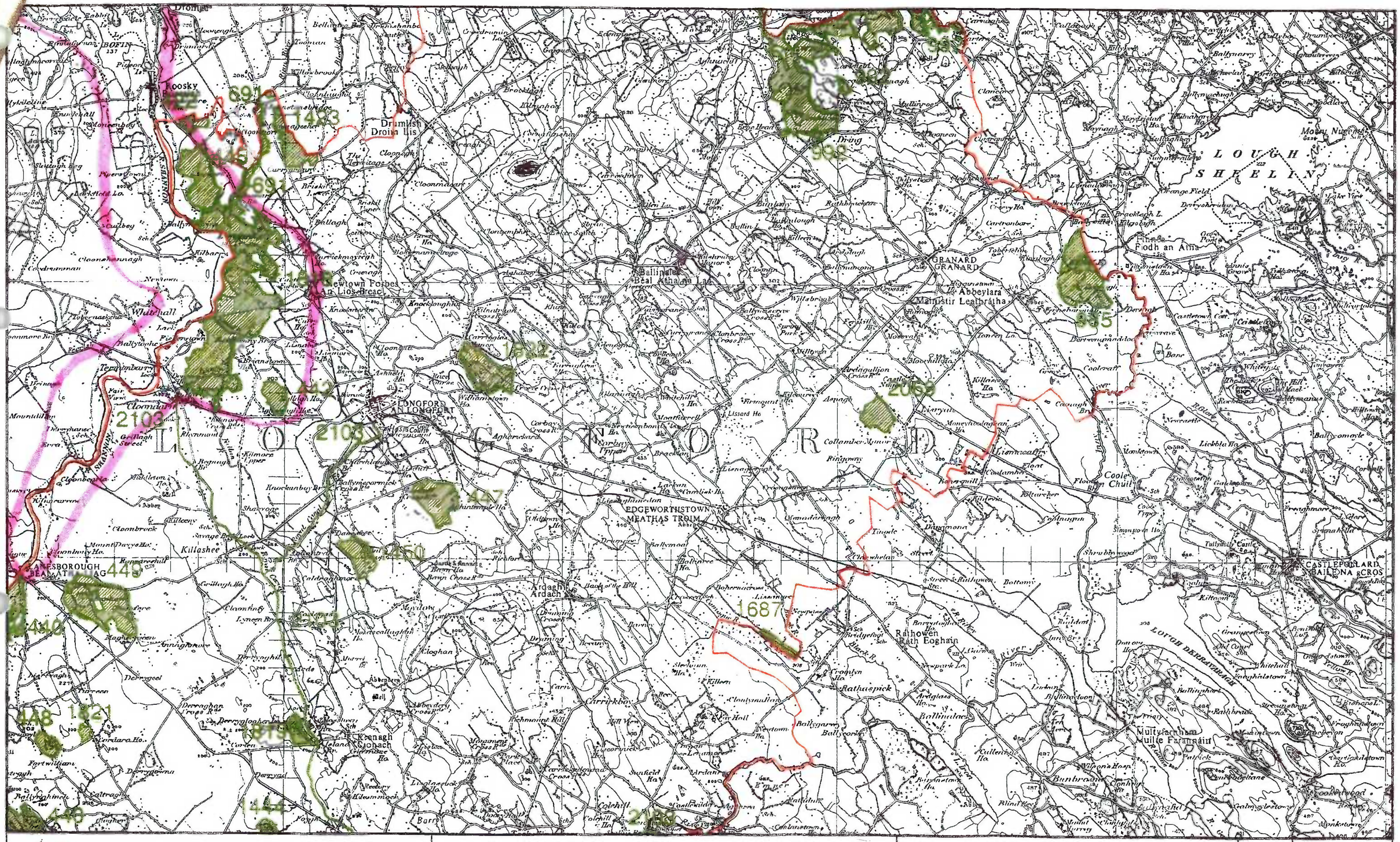

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NATURAL HERITAGE AREAS - PROPOSED

Féadtar athruithe a chur an na ceantair / Sites subject to revision
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CO. LONGFORD

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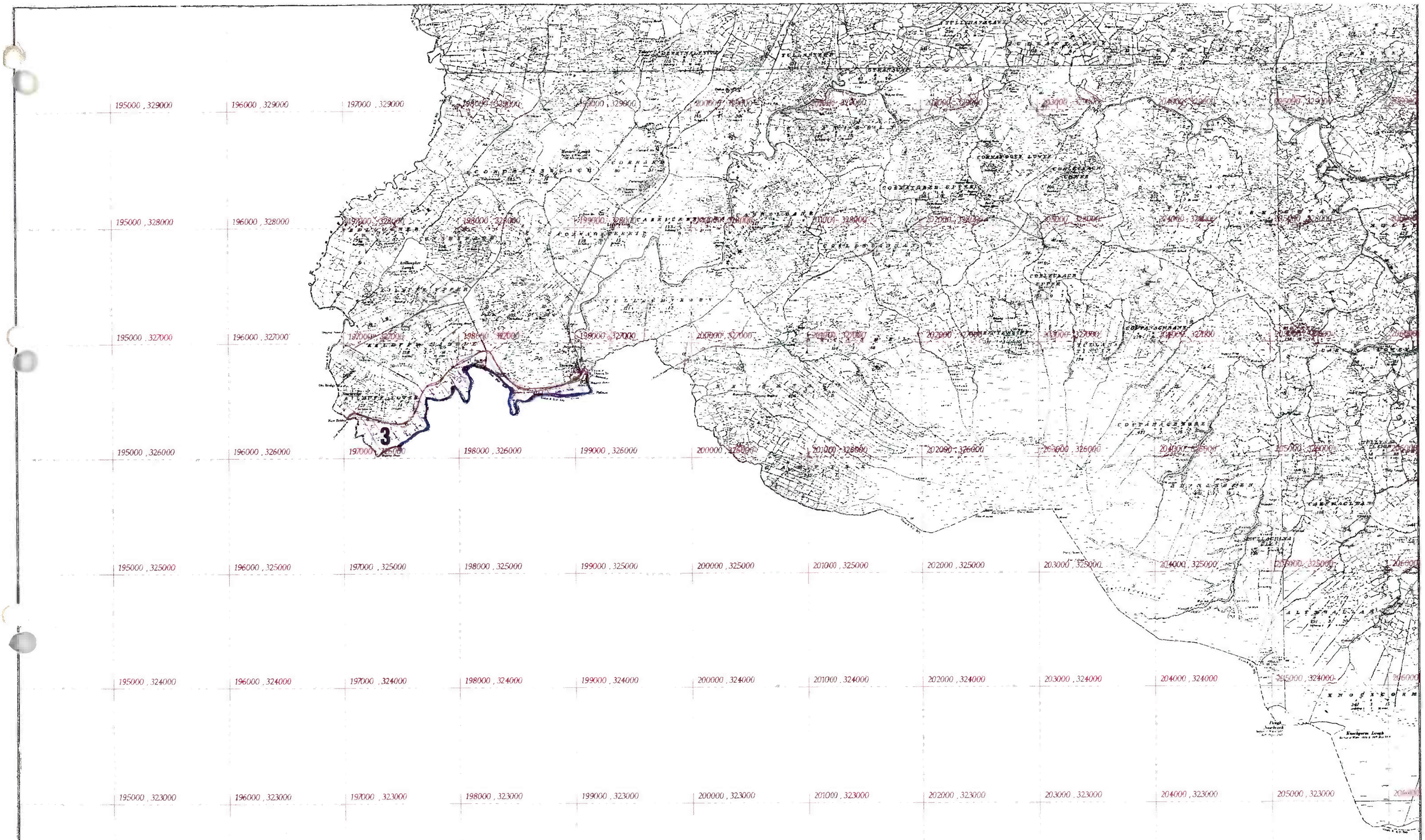

Dúchas The Heritage Service

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Sheet: 005-

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UPPER SHANNON SURVEY

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General Purpose 1:30,000 NPW Map

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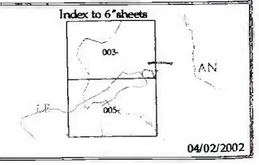


04/02/2002

APPENDIX 2 CONSULTATION

Name	Organisation
Bleasdale Andy	Dúchas, Regional Ecologist
Clabby Gerry	Heritage Officer Longford
Cotton Don	IT Sligo
Cross John	Dúchas Research
Crowley Miriam	Dúchas Ranger
Diamond Seán	Teagasc, Soil Survey Unit
Douglas Caitriona	Dúchas Research
Dunne Ray	Regional Manager, Waterways
Giffen Karen	Shannon Fisheries, Drumsna
Goodwillie Roger	Roger Goodwillie and Associates
Gormally Mike	NUI Galway, Applied Ecology Unit
Guest Bernie	Leitrim County Council
Heery Stephen	Ecologist
Kellerman Judit	Dúchas, Regional Ecologist
Kelly Daniel	Trinity College
MacGowan Fiona	KT Cullen
Matthews John	Dúchas Ranger
McCarthy Kieran	UCG
McKeon Nollaig	Roscommon Heritage Officer
Minchin Dan	Marine Organisms Investigations
Moles Sue	Dúchas Ranger
Moloney Dominic	Waterways Ireland
Moore Aoife	Planner, Longford County Council
Norriss David	Dúchas Research
O'Connor Brendan	Dúchas Ranger
O'Donnell Padraig	Dúchas, DCO
Ryan Jim	Dúchas Research
Walsh Alyn	Dúchas, Wexford Wildfowl Reserve
Wyse-Jackson Mike	Dúchas Research

APPENDIX 3 HABITAT MAPS

Habitats maps were compiled from aerial photography and validated by limited ground-truthing. Delineations between similar habitat types, such as wet and improved grassland or wet woodland and scrub, were not always clear cut. The habitats present in flooded areas (10) could not be ascertained. Wet grassland (2) may also include pockets of fen habitat.

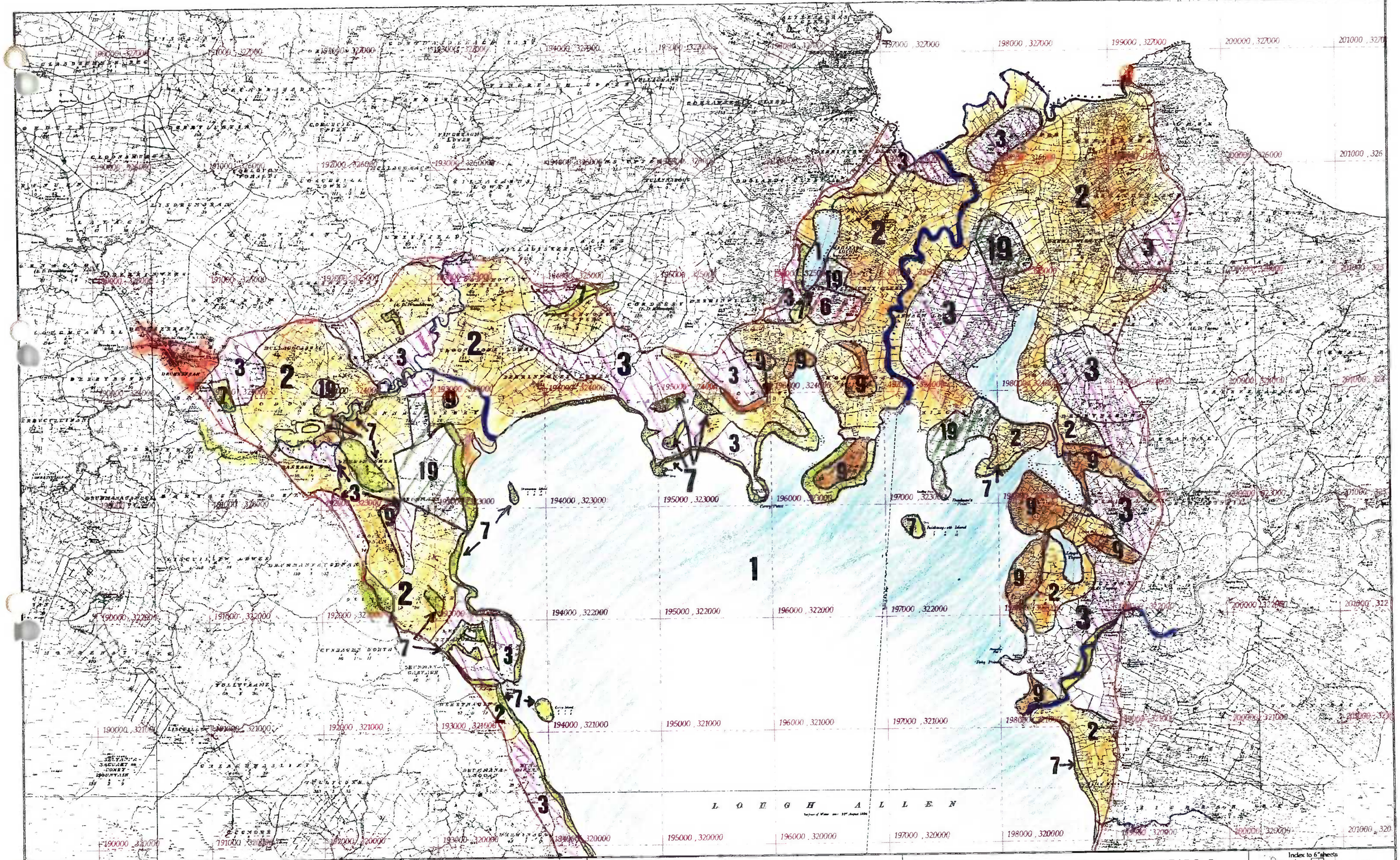
1. Lakes
2. Wet grassland
3. Improved grassland
4. Raised bog and cutaway bog
5. Industrial cutaway bog
6. Heath
7. Broadleaf semi-natural woodland (includes oak-ash woodland and wet woodland)
8. Mixed woodland
9. Scrub
10. Flooding

19. Conifer plantation

Rivers

Project boundary

Conurbation / Developments



Dúchas The Heritage Service

County: LEITRIM
Sheet: 018-

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This map is not acceptable as a source for digitising.
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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

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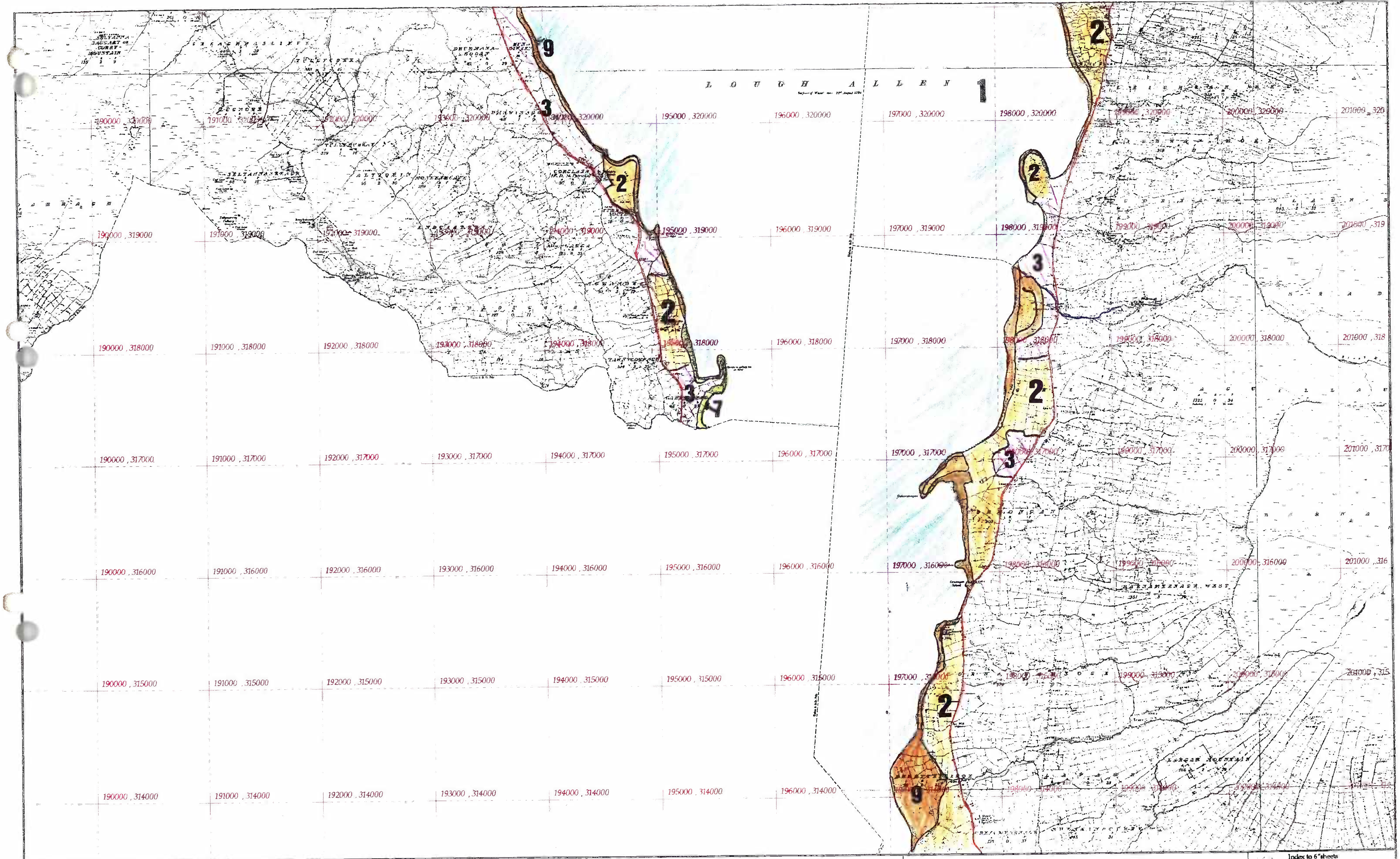

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General Purpose 1:30,000 NPW Map

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(Ní thaispeintar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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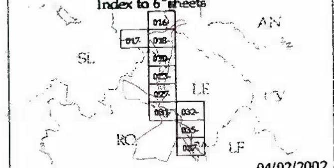

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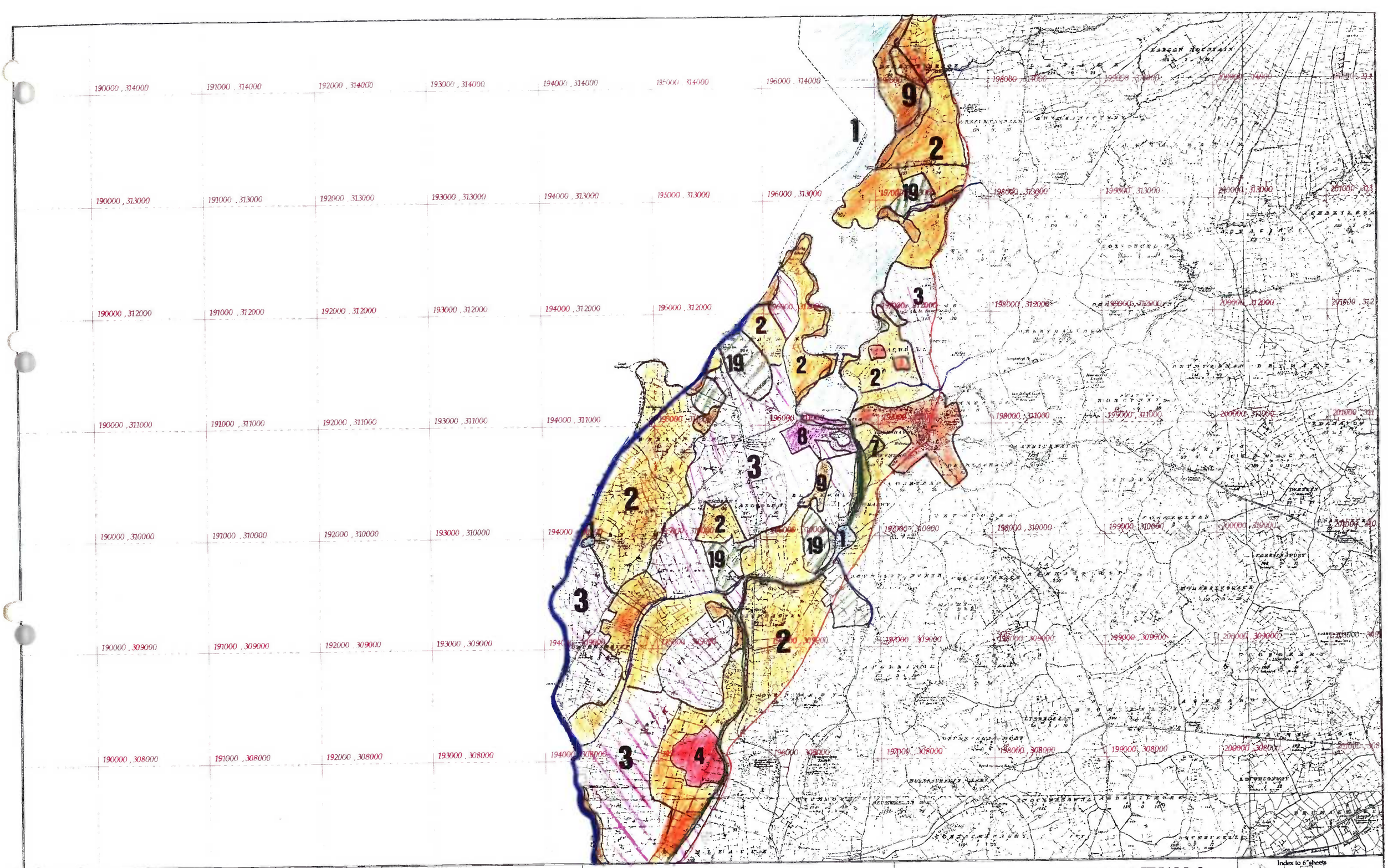

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General Purpose 1:30,000 NPW Map

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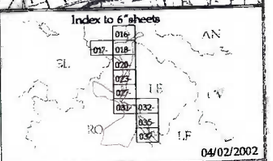

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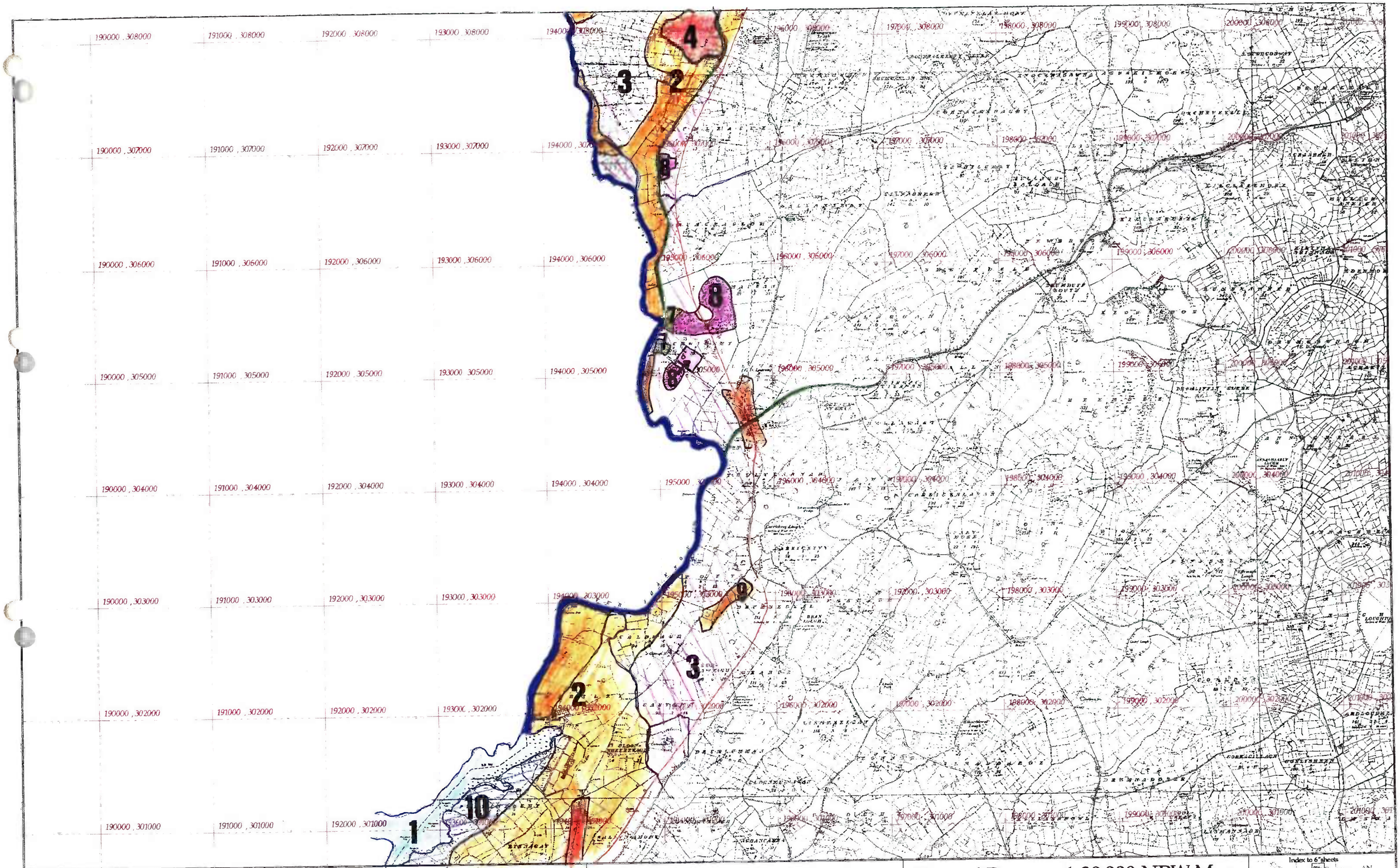

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UPPER SHANNON SURVEY

N

Scale 1:30,000
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General Purpose 1:30,000 NPW Map

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(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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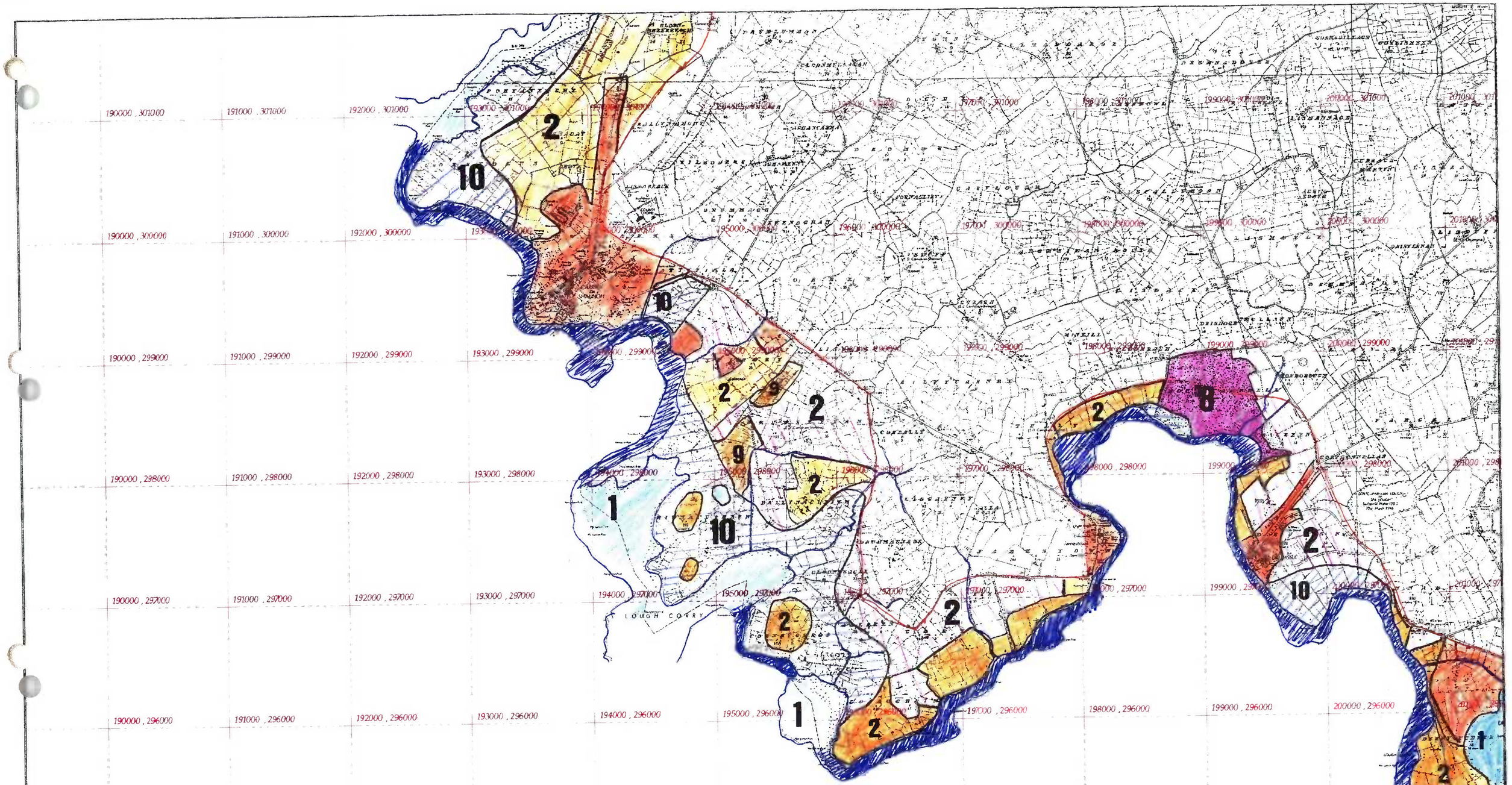

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General Purpose 1:30,000 NPW Map

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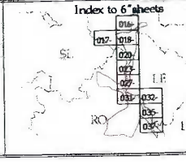

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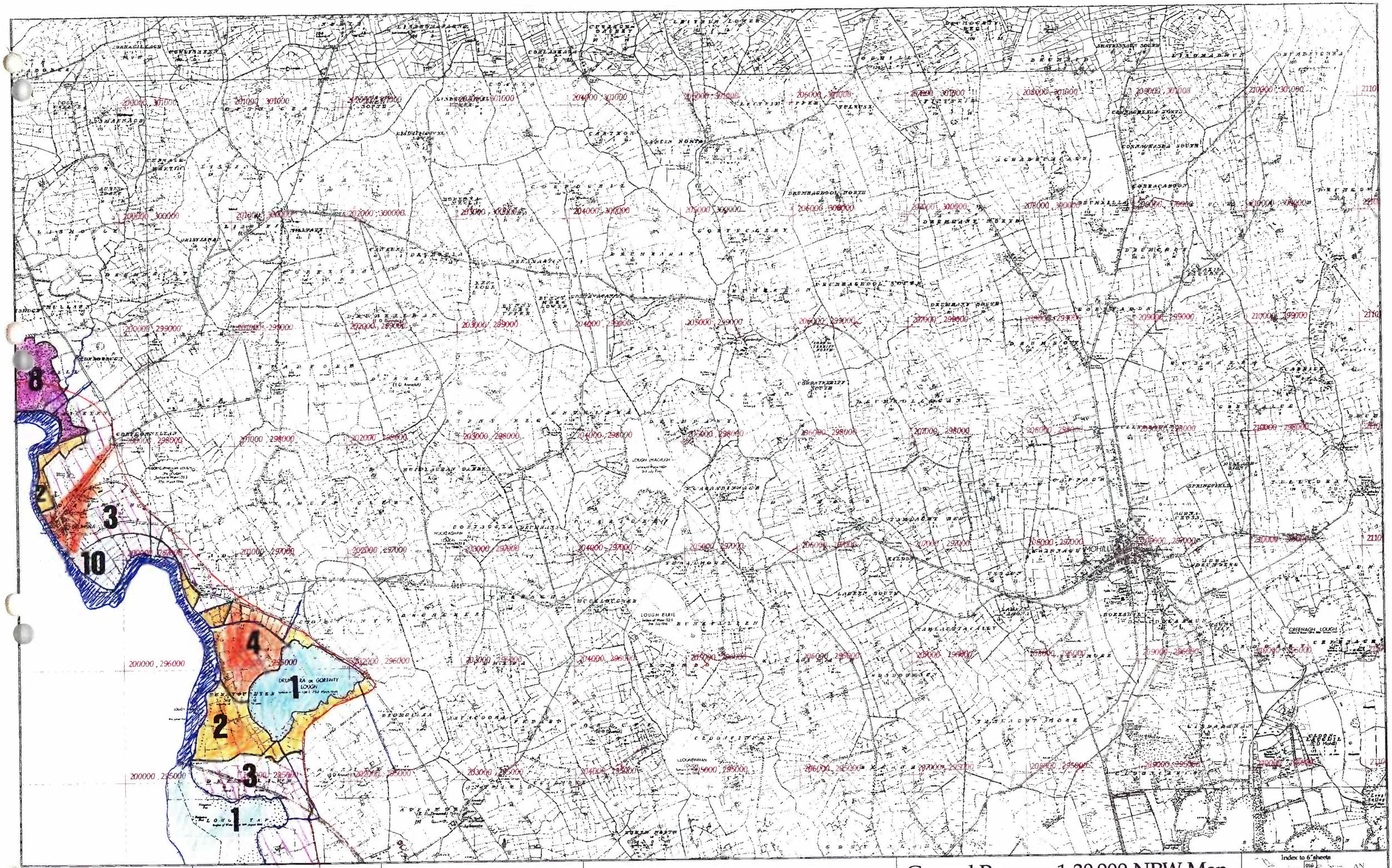

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General Purpose 1:30,000 NPW Map

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General Purpose 1:30,000 NPW Map

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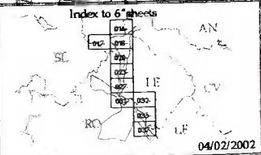

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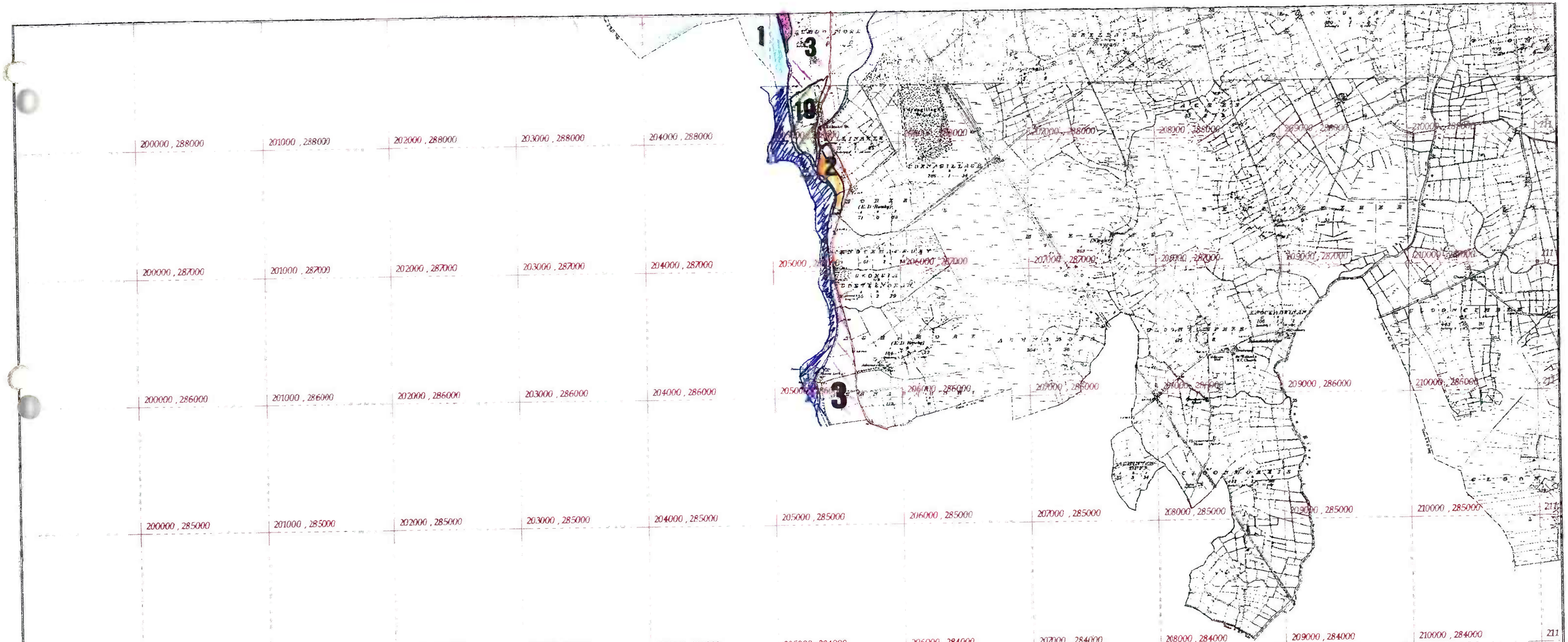

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UPPER SHANNON SURVEY

N

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a dhur an na ceantair / Sites subject to revision

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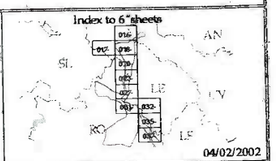

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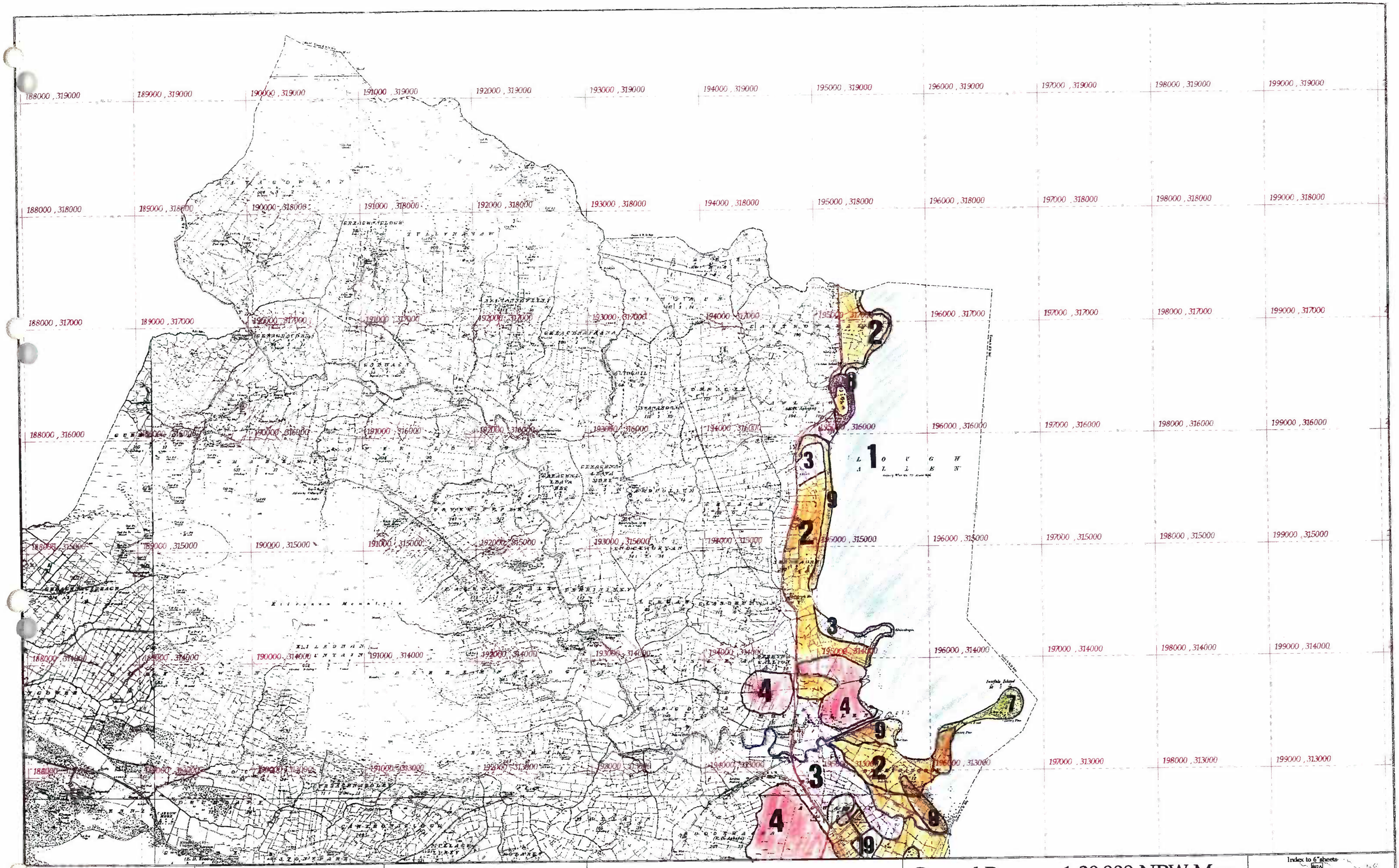

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

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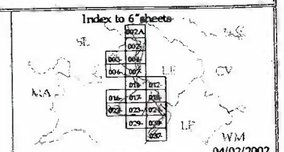

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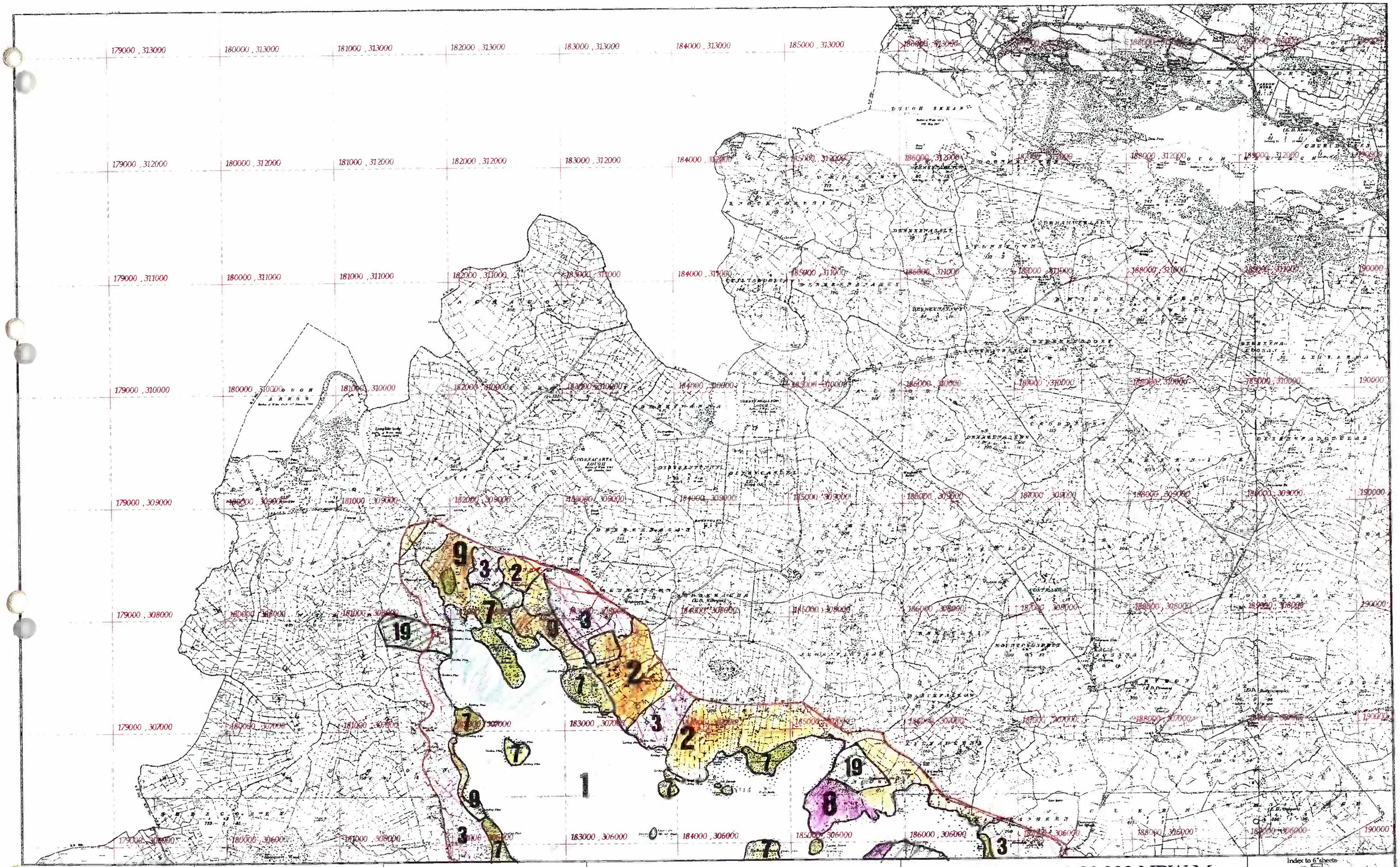

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UPPER SHANNON
SURVEY

N

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0 1km 2km

General Purpose 1:30,000 NPW Map

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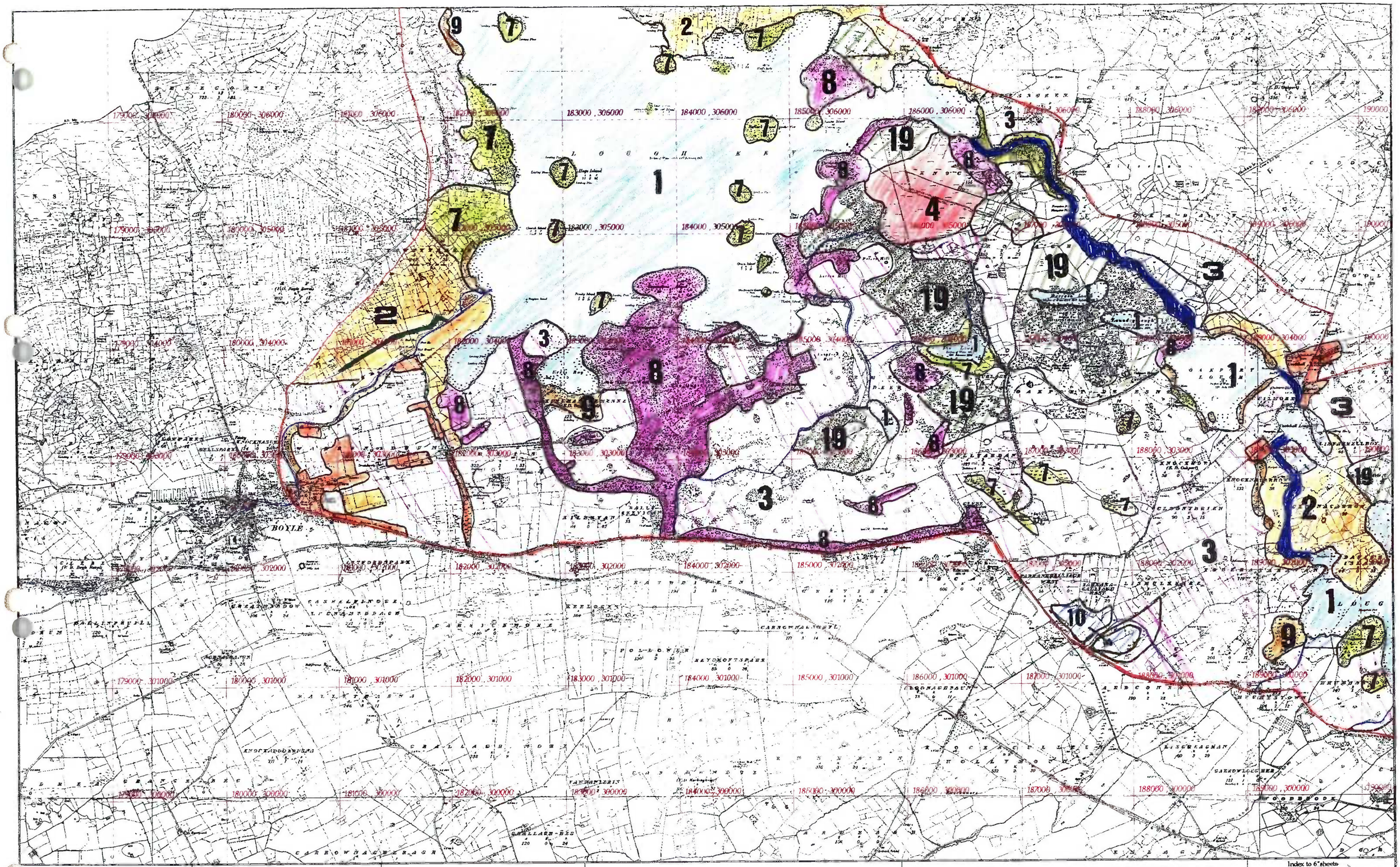

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General Purpose 1:30,000 NPW Map

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UPPER SHANNON SURVEY

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0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

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Index to 6" sheets

SL LE CV MA LF WM

04/02/2002

see map 012

Dúchas The Heritage Service

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

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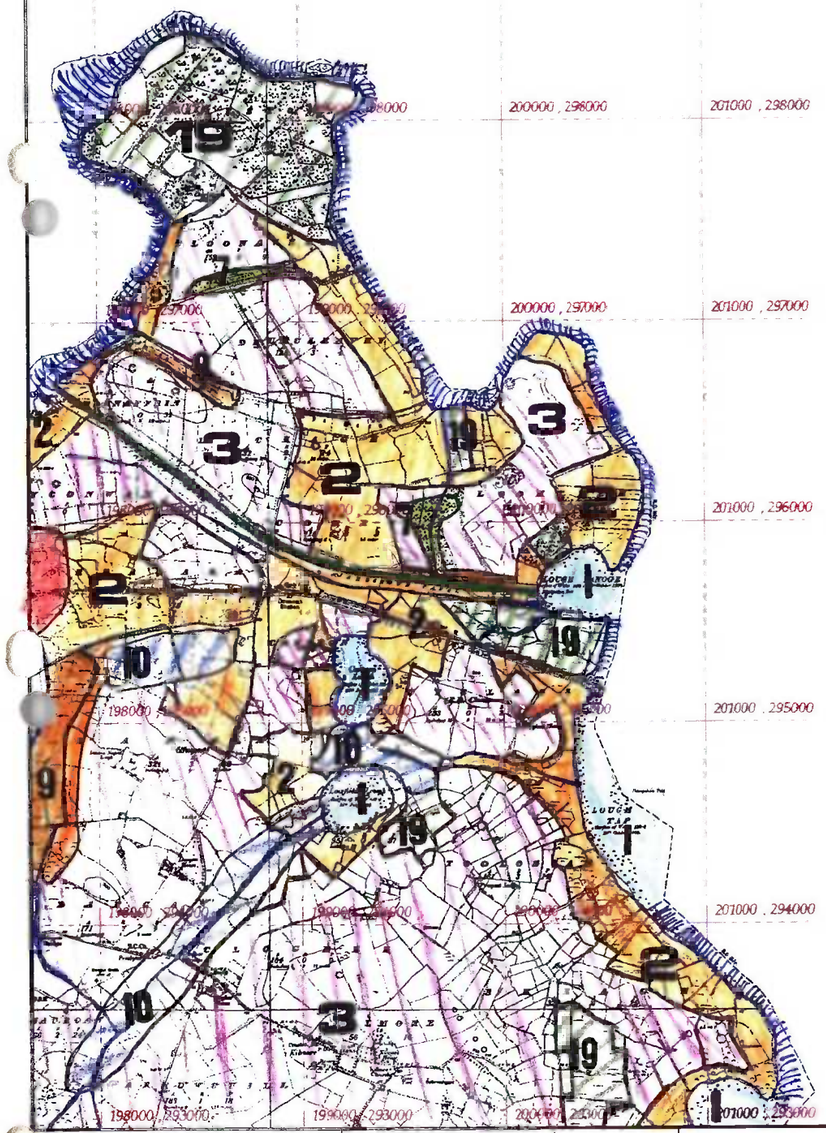

Dúchas The Heritage Service

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General Purpose 1:30,000 NPW Map

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Index to 6" sheets

SL LF CV MA LF WM

04/02/2002

Dúchas The Heritage Service

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General Purpose 1:30,000 NPW Map

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SL LE CV MA LF WM

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General Purpose 1:30,000 NPW Map

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(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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SL MA LE CV LF WM
04/02/2002

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General Purpose 1:30,000 NPW Map

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(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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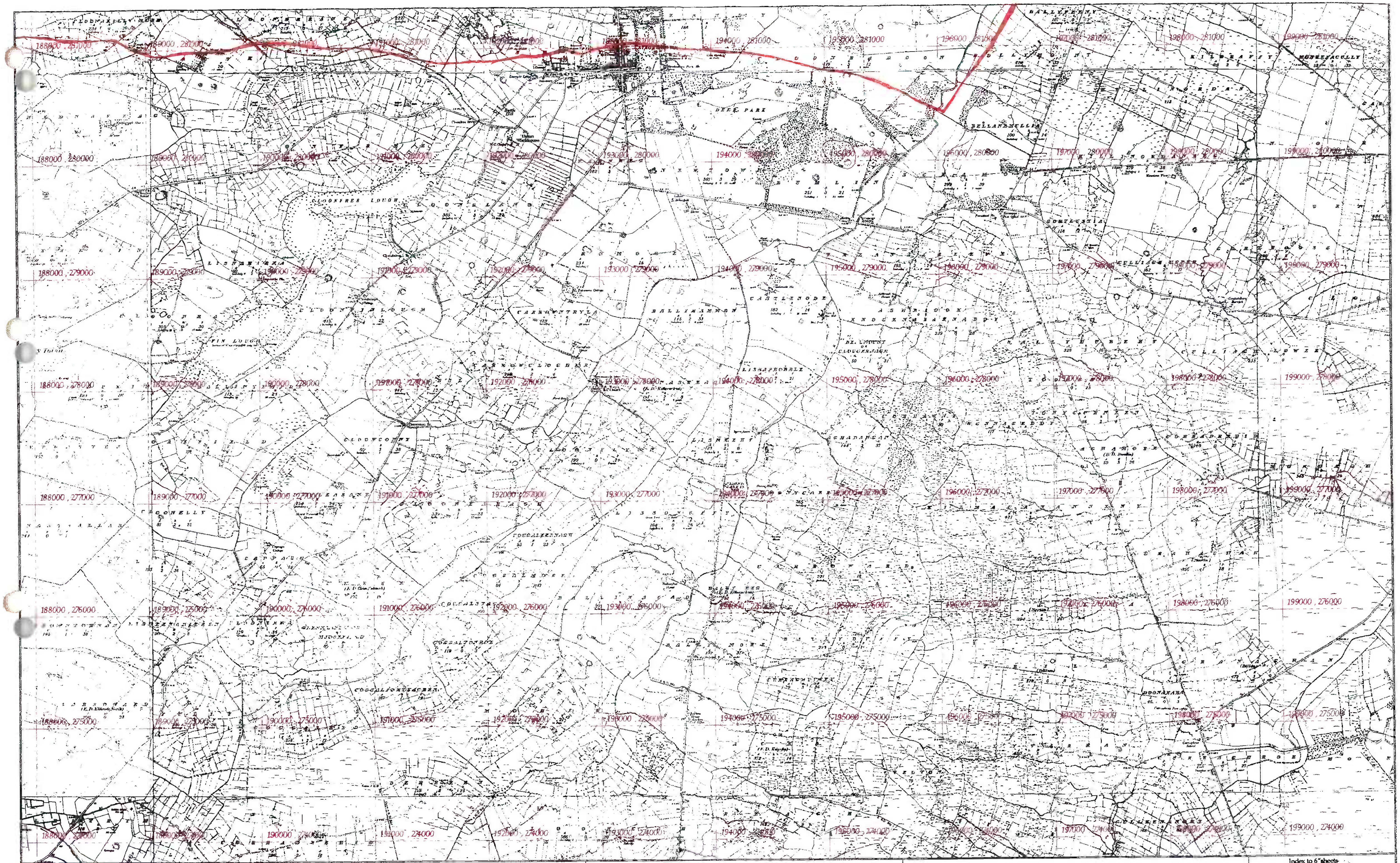

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see map 23

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Scale 1:30,000

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General Purpose 1:30,000 NPW Map

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(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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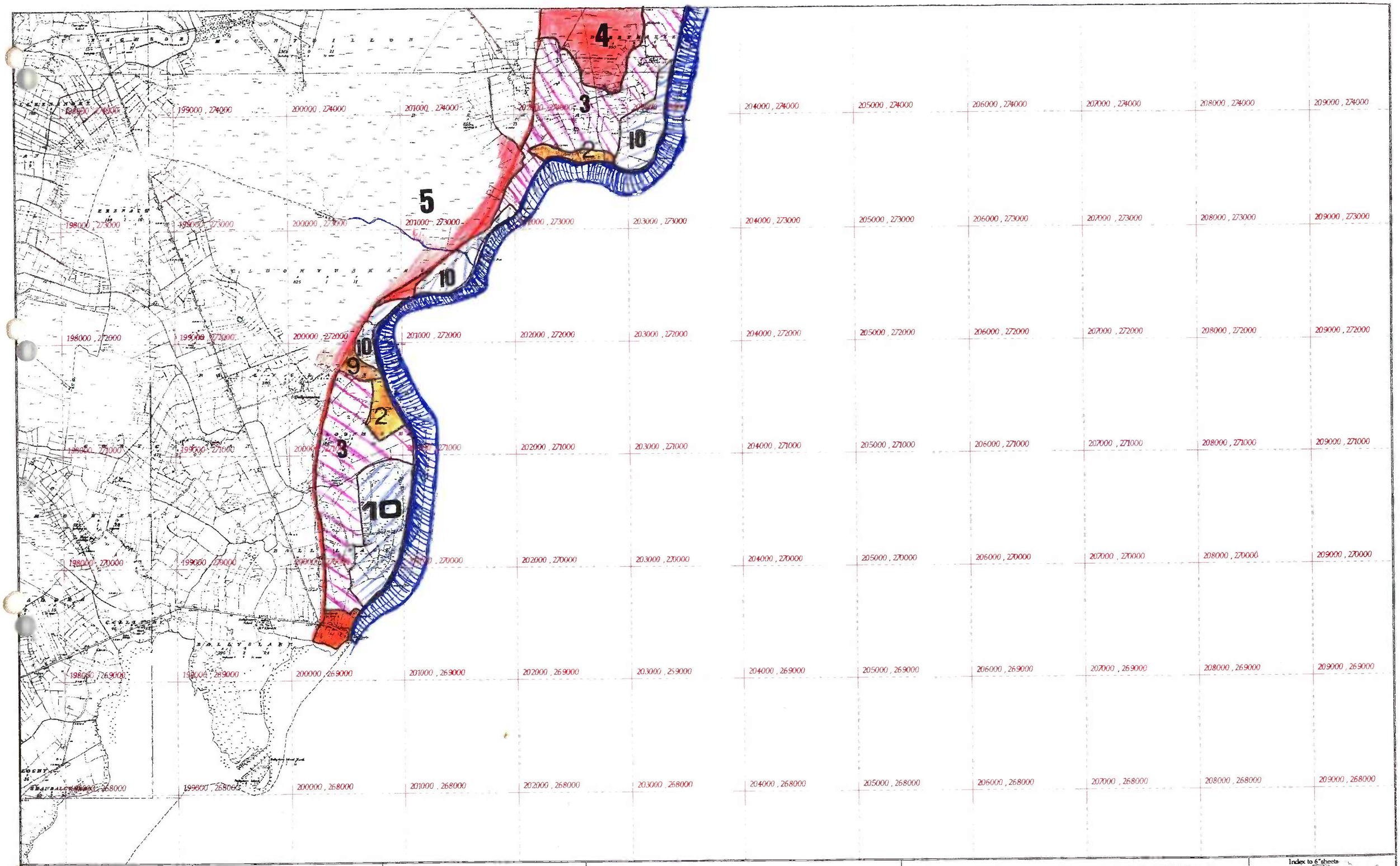

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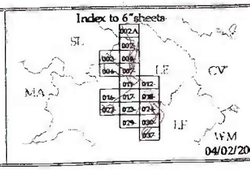

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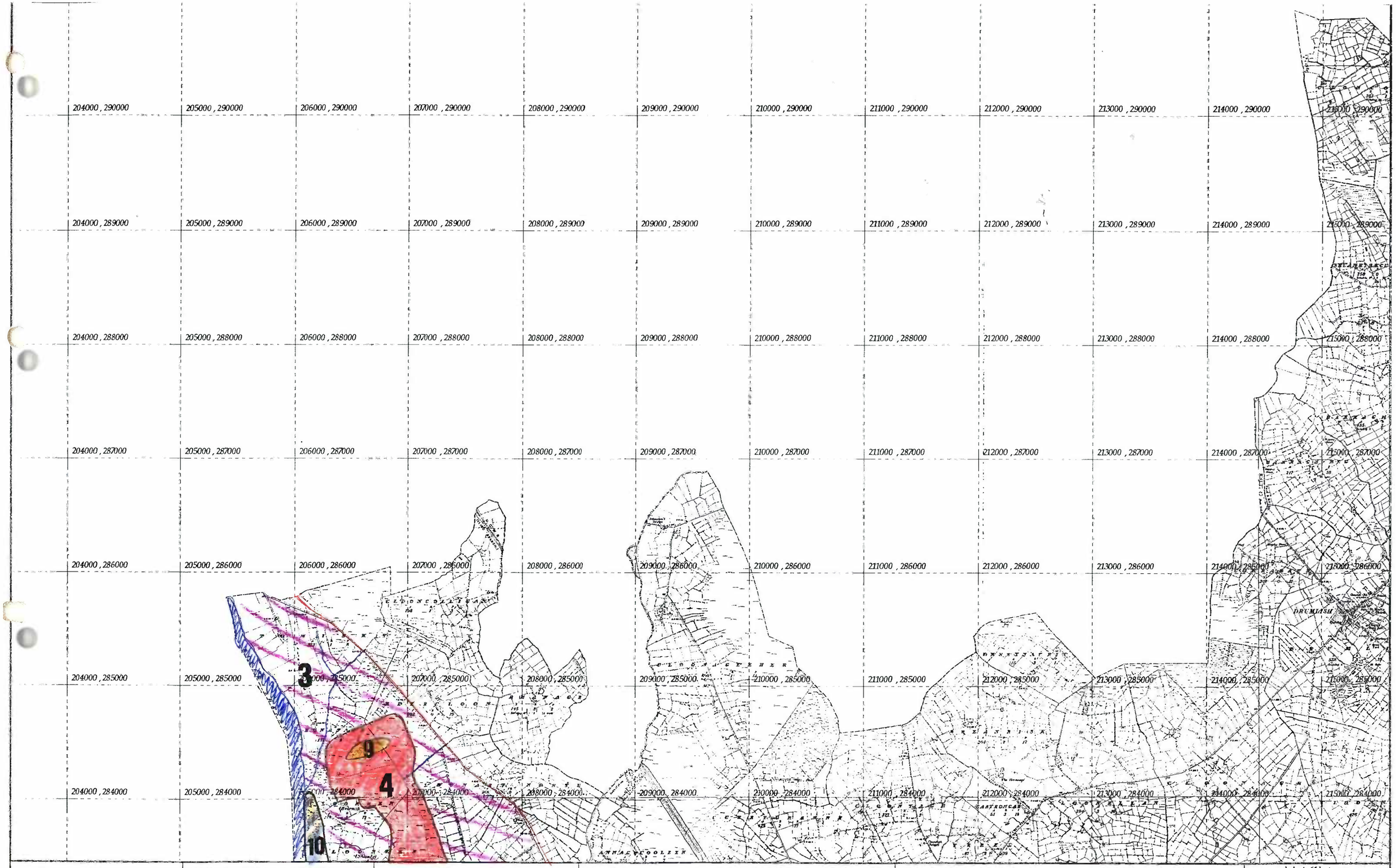

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General Purpose 1:30,000 NPW Map

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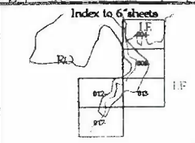

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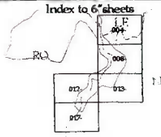
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002

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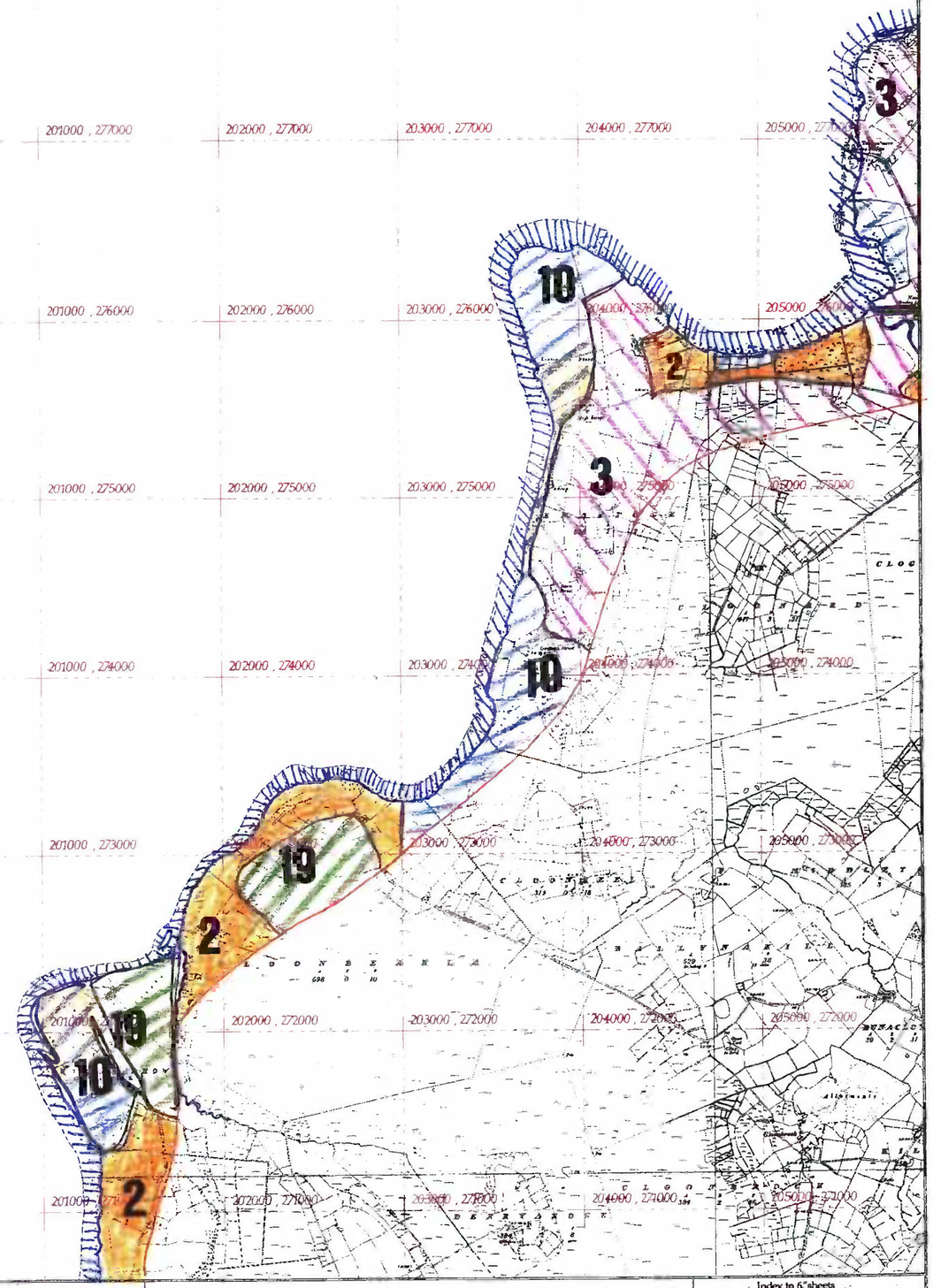


Dúchas The Heritage Service

County: LONGFORD
Sheet: 012-

This is a 1:10560 (6 inch) sheet rescaled to 1:30,000.
This map is not acceptable as a source for digitsing.
Please request a larger scale if required.

UPPER SHANNON SURVEY

Scale 1:30,000

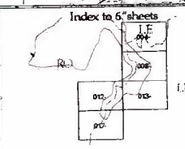
0 1km 2km

General Purpose 1:30,000 NPW Map

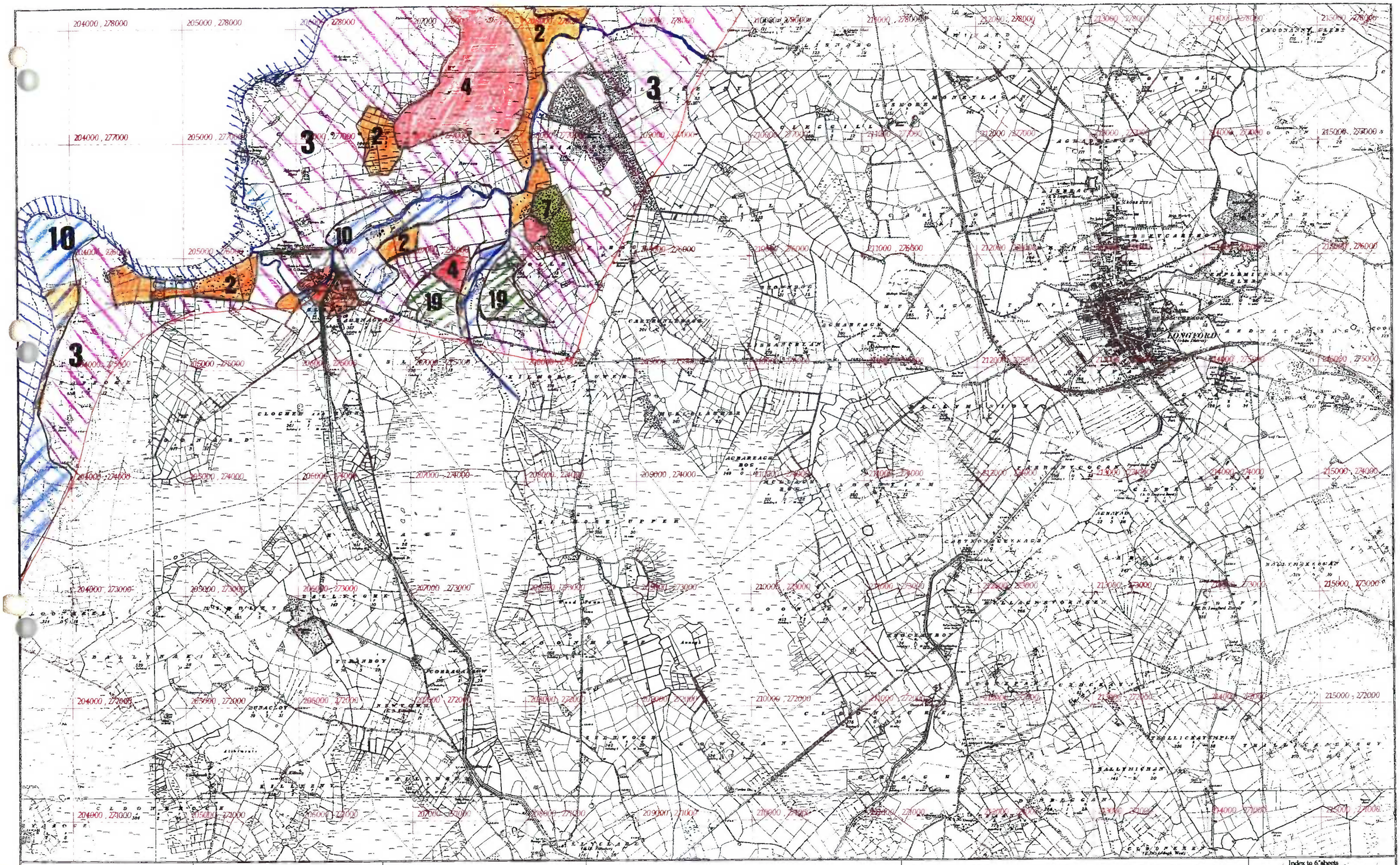
Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002



Dúchas The Heritage Service

County: LONGFORD
Sheet: 013-

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UPPER SHANNON SURVEY

Scale 1:30,000

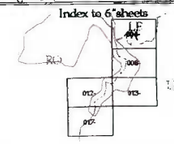
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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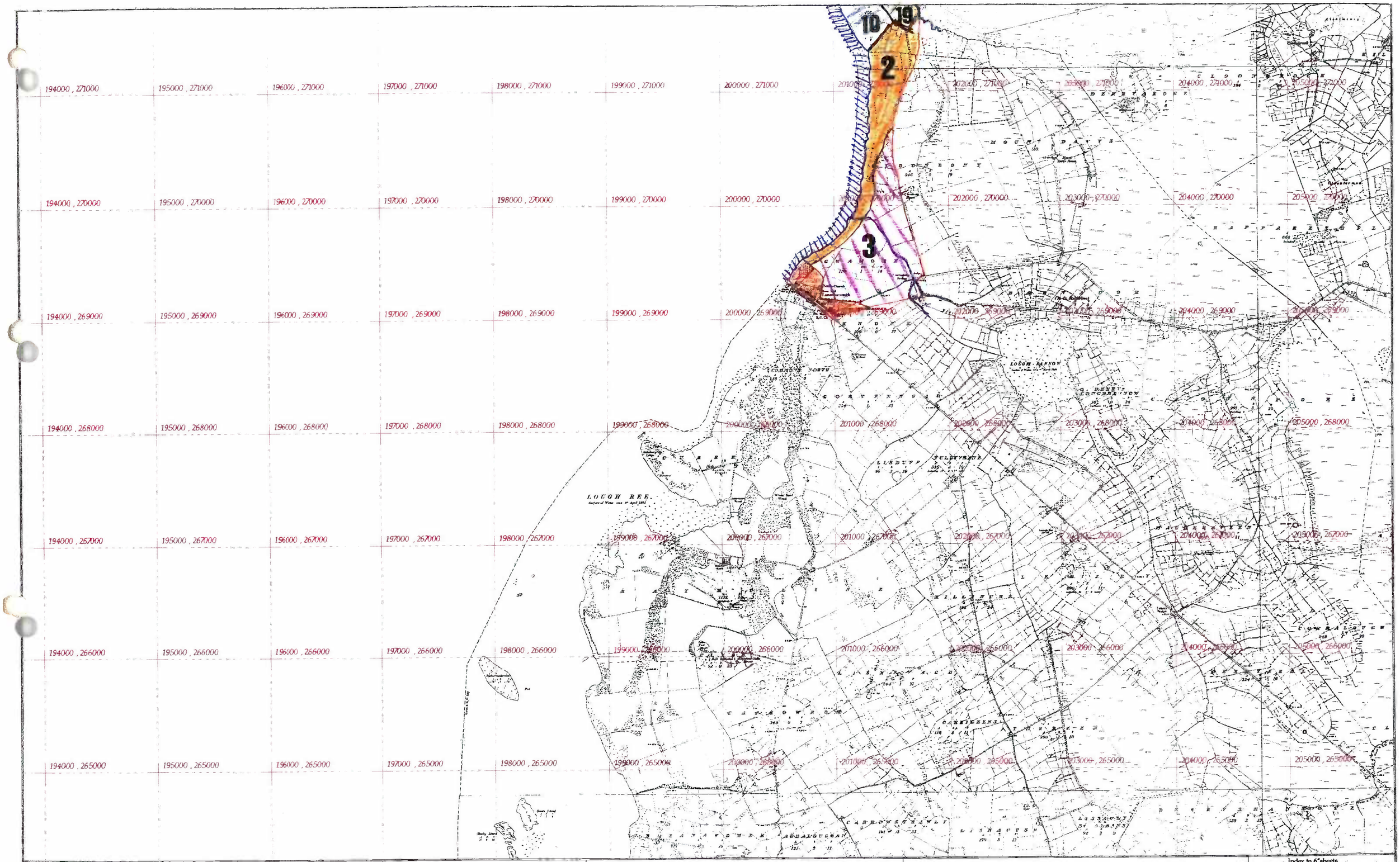

Dúchas The Heritage Service

County: LONGFORD
Sheet: 017-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

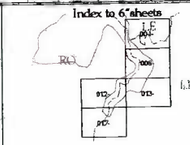
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolúoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002

APPENDIX 4 FLOODING MAPS

Flooding maps were adapted from OPW flooding maps, blue hatching, (OPW 2000, see below for details), supplemented with data gathered during field work in February 2002, red hatching. Permanent water levels of lakes and river are indicated in solid blue. Project boundary is marked in green, limits of OPW survey marked in black.

OPW Flooding Maps

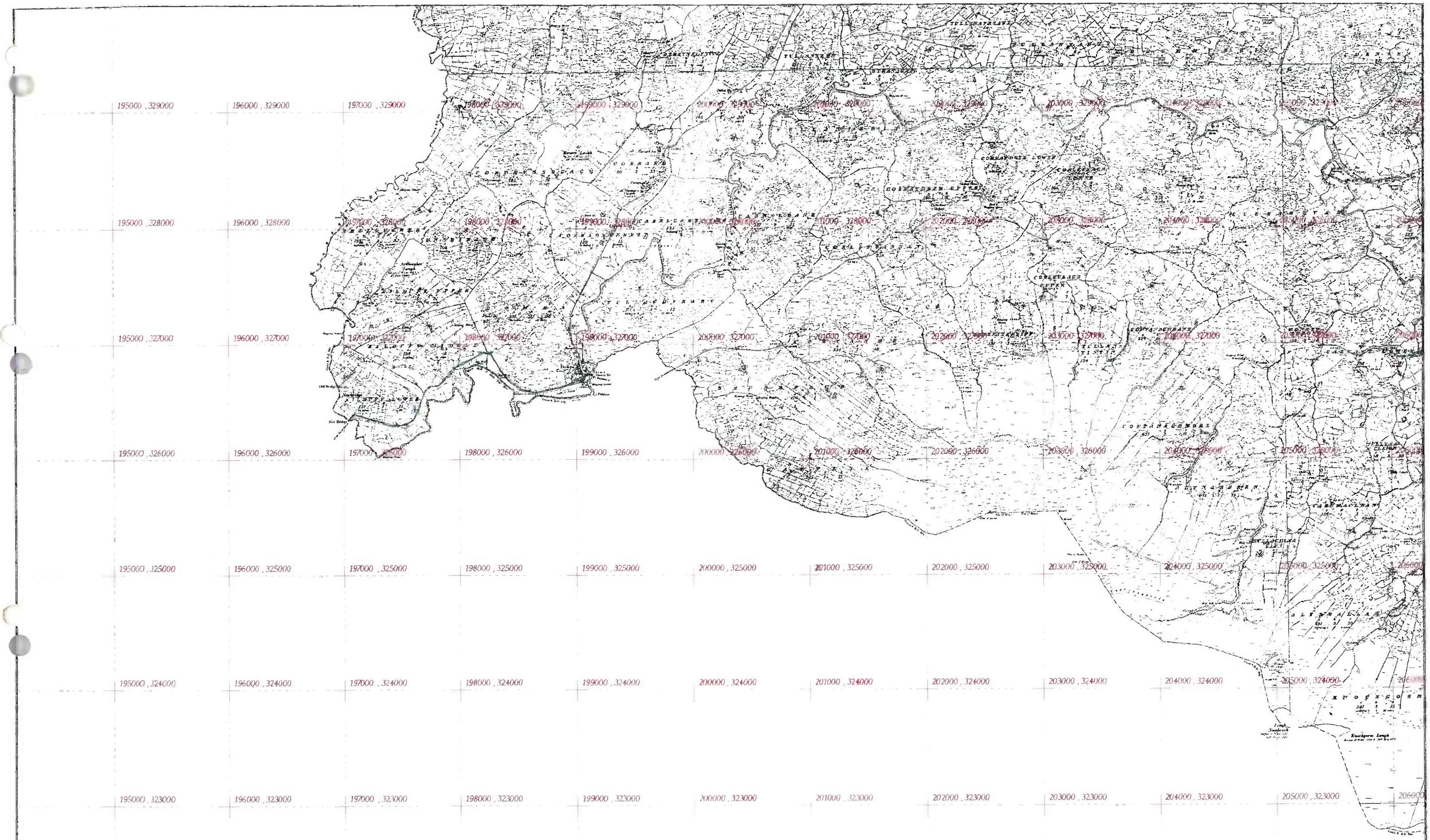
Data gathered in February 2002

Permanent water levels

Project boundary

Limits of OPW survey

Hydrology and Hydrometric Section, OPW (2000). Flooded areas in Shannon Corridor (set of 56 maps). Aerial photographs were taken on 9th January 2000 and flooded areas indicated on 6" maps. These maps do not indicate the greatest extent of flooding possible in winter. The area covered was from Lanesborough north, to the south of Lough Allen. It also includes Kilglass and Grange Loughs but not the small lakes between Elphin and Strokestown. The Boyle tributary west as far as Oakport is also included but Lough Key is omitted. Areas indicated as flooded may include small areas of high ground.



Dúchas The Heritage Service

County: CAVAN
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UPPER SHANNON SURVEY

Scale 1:30,000

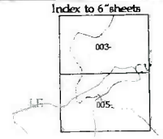
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6"sheets



04/02/2002

Dúchas The Heritage Service

County: LEITRIM
Sheet: 018-

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UPPER SHANNON SURVEY

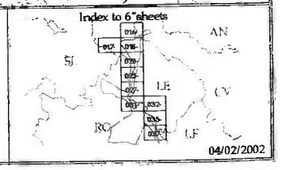
Scale 1:30,000

0 1km 2km

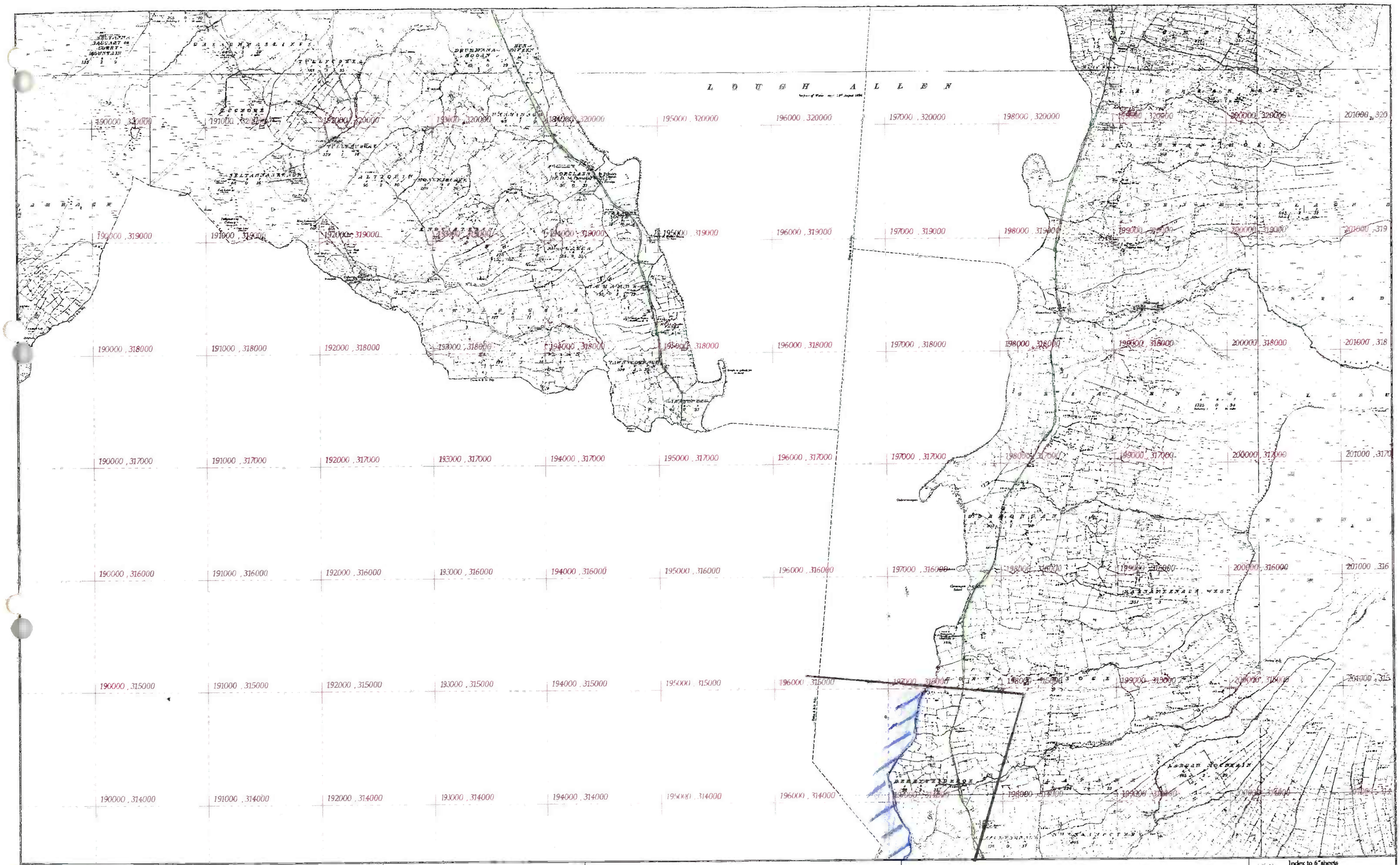
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision
(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002



Dúchas The Heritage Service

County: LEITRIM
Sheet: 020-

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This map is not acceptable as a source for digitising.
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UPPER SHANNON SURVEY

N

Scale 1:30,000

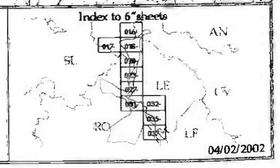
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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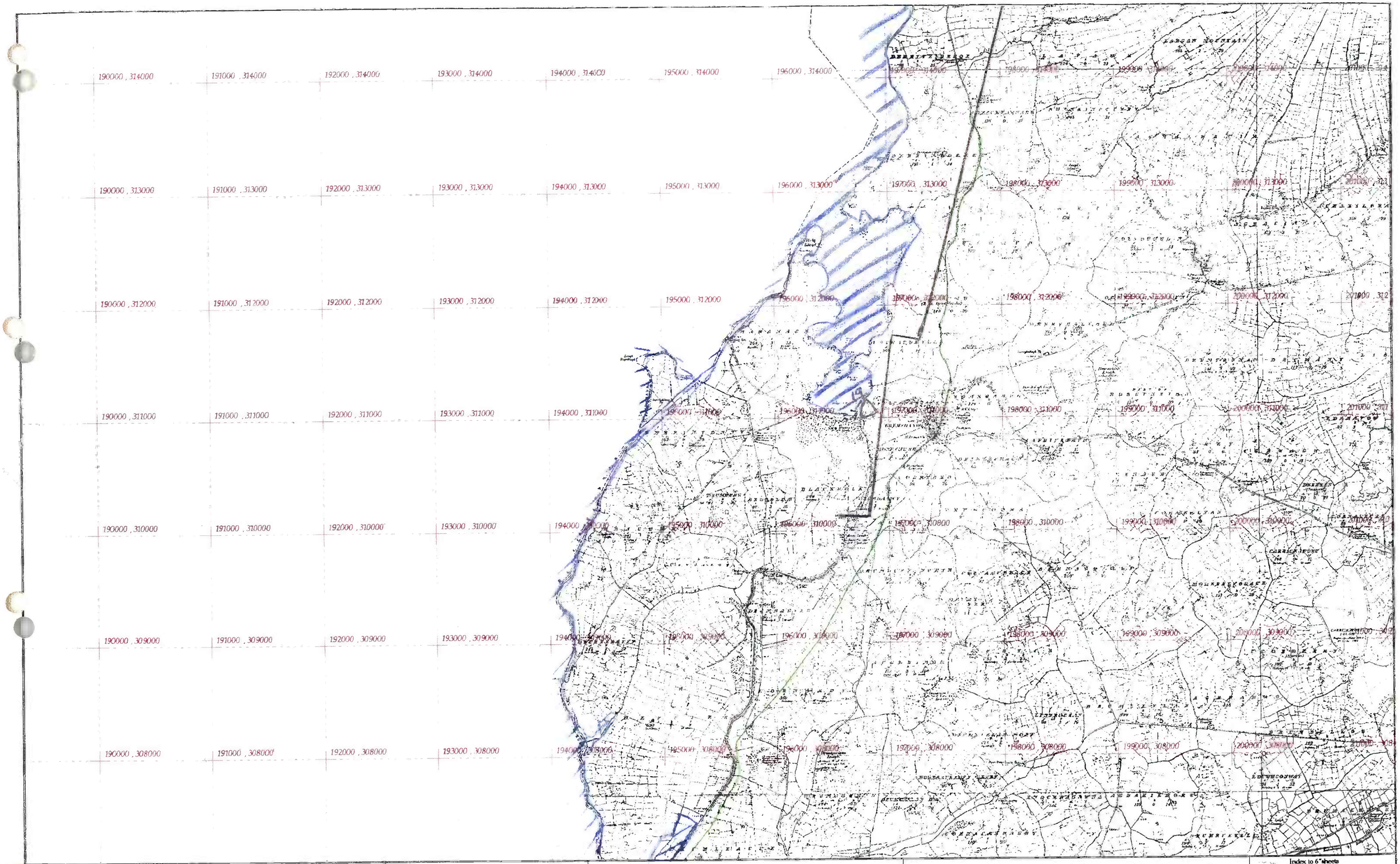

Dúchas The Heritage Service

County: LEITRIM
Sheet: 023-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

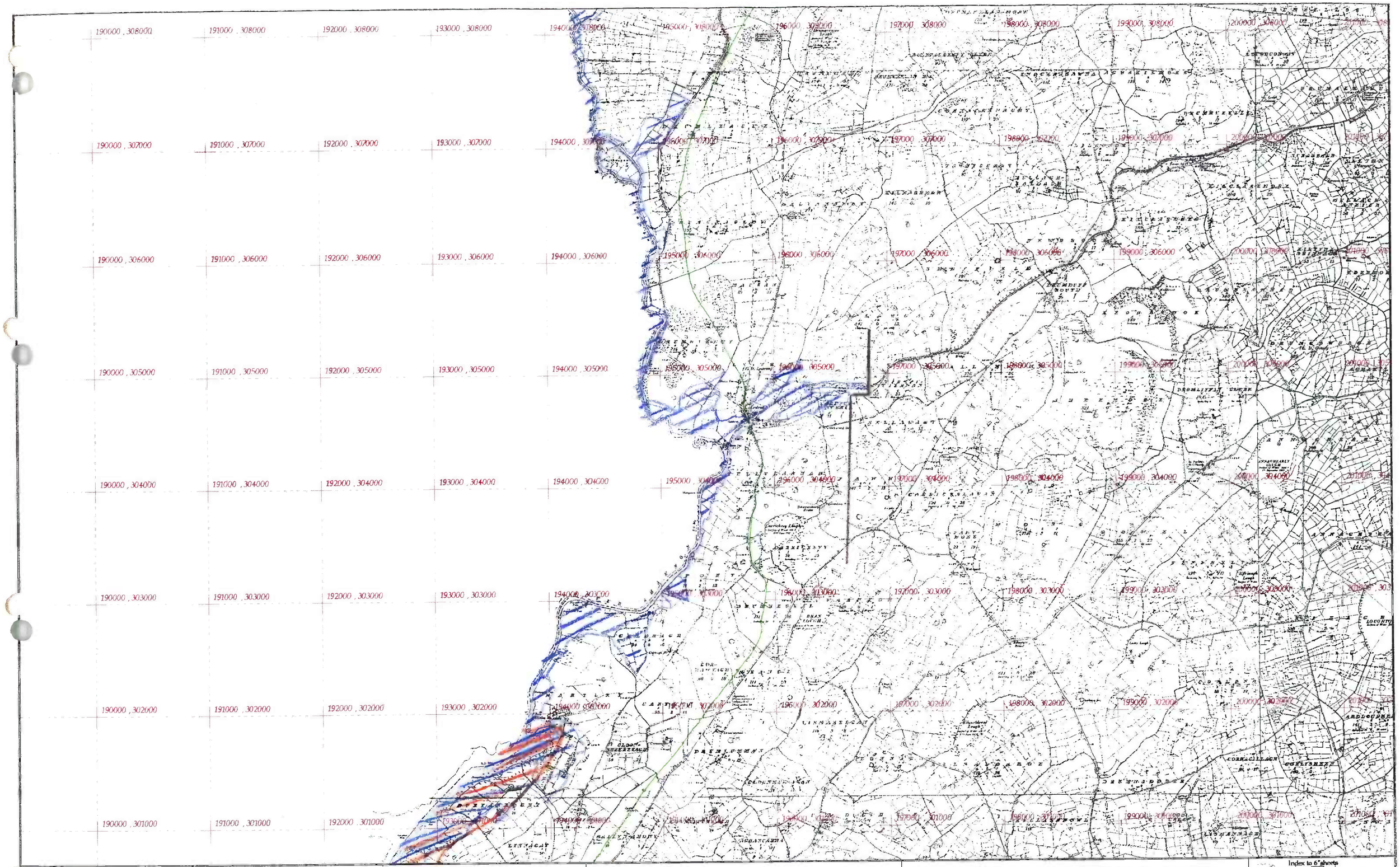
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

04/02/2002



Dúchas The Heritage Service

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UPPER SHANNON SURVEY

Scale 1:30,000

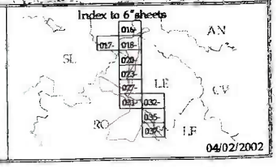
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6"sheets



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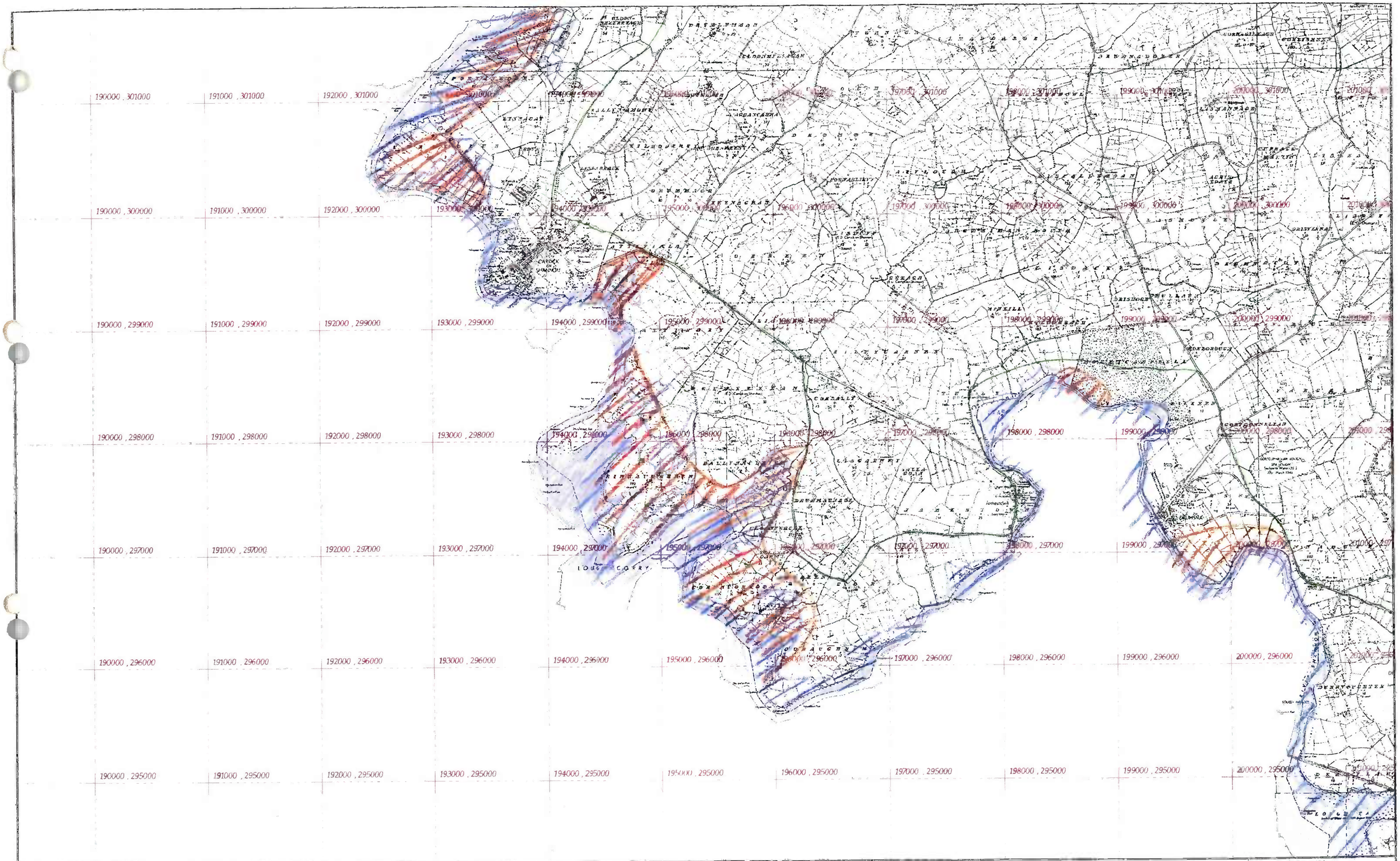

Dúchas The Heritage Service

County: LEITRIM
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UPPER SHANNON SURVEY

N

Scale 1:30,000

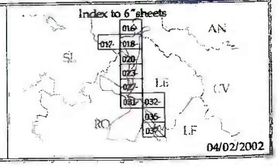
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur ar na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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Dúchas The Heritage Service

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UPPER SHANNON SURVEY

Scale 1:30,000

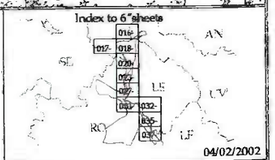
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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UPPER SHANNON SURVEY

Scale 1:30,000

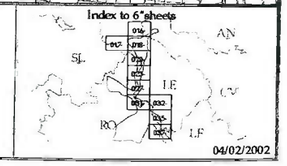
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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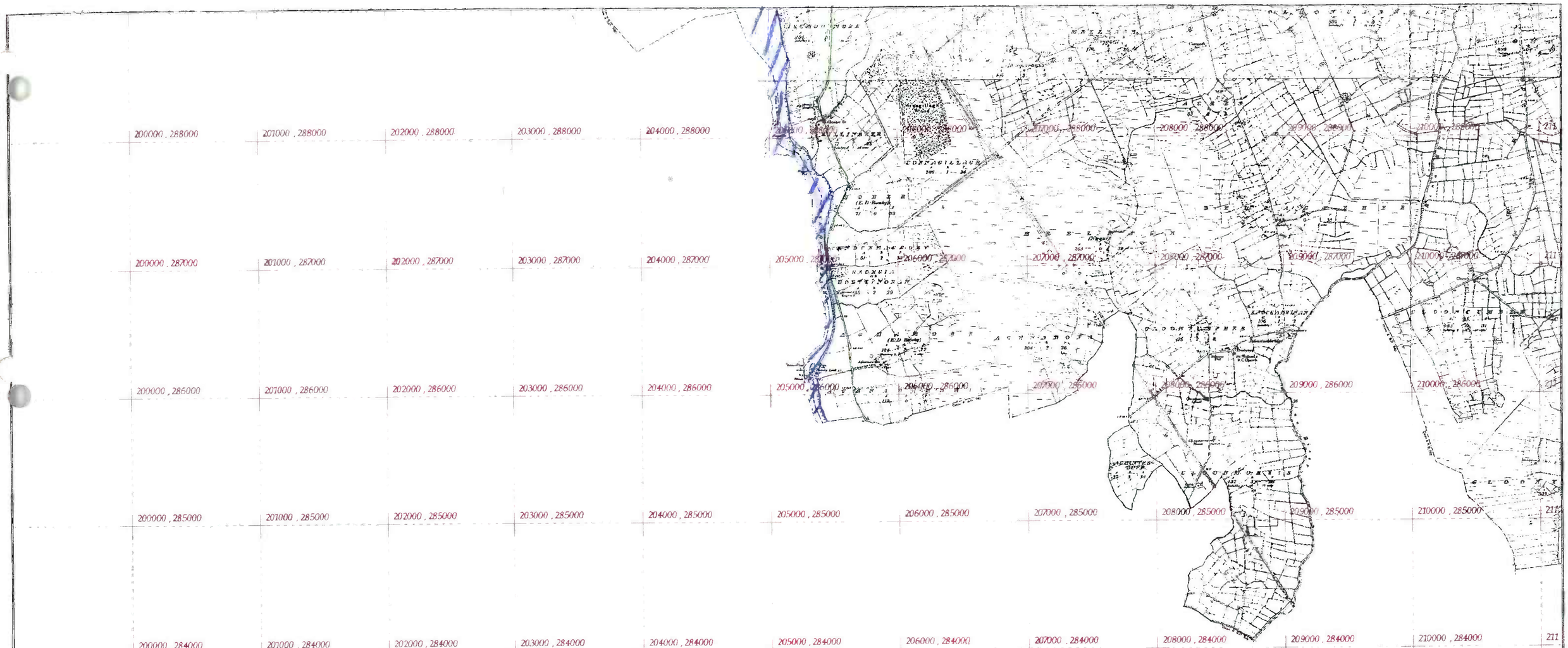

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UPPER SHANNON SURVEY

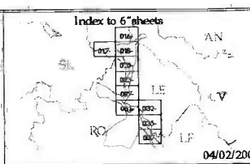
Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision
(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002

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Dúchas The Heritage Service

County: ROSCOMMON
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Scale 1:30,000

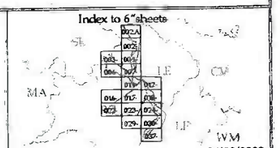
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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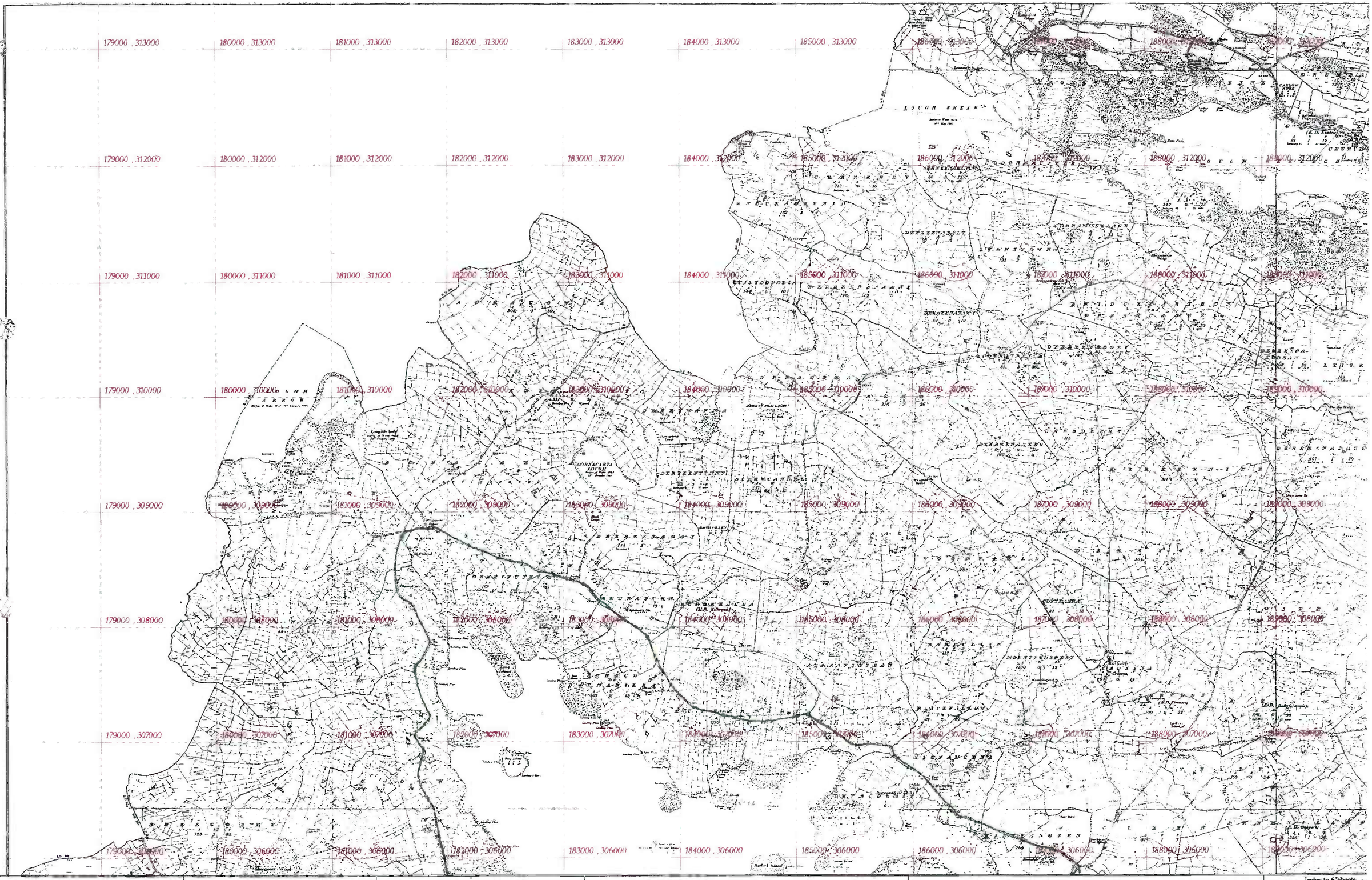

Dúchas The Heritage Service

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Sheet: 003-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

Dúchas The Heritage Service

County: ROSCOMMON
Sheet: 006-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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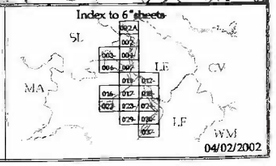

04/02/2002

Dúchas The Heritage Service

County: ROSCOMMON
Sheet: 007-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

0 1km 2km

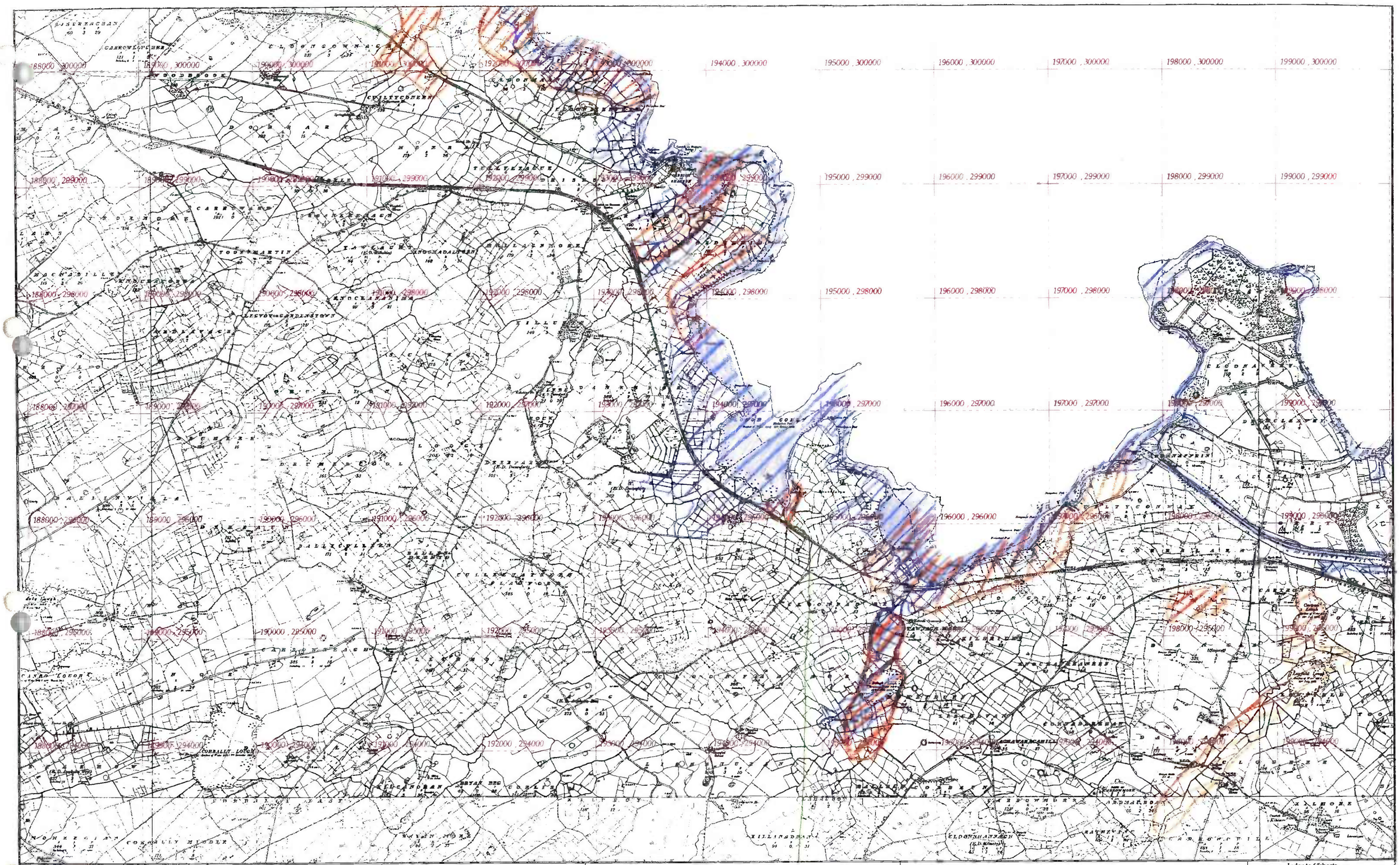
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur ar na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

04/02/2002



Dúchas The Heritage Service

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UPPER SHANNON SURVEY

Scale 1:30,000

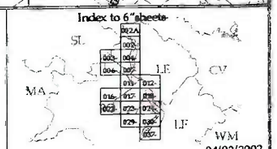
0 1km 2km

General Purpose 1:30,000 NPW Map

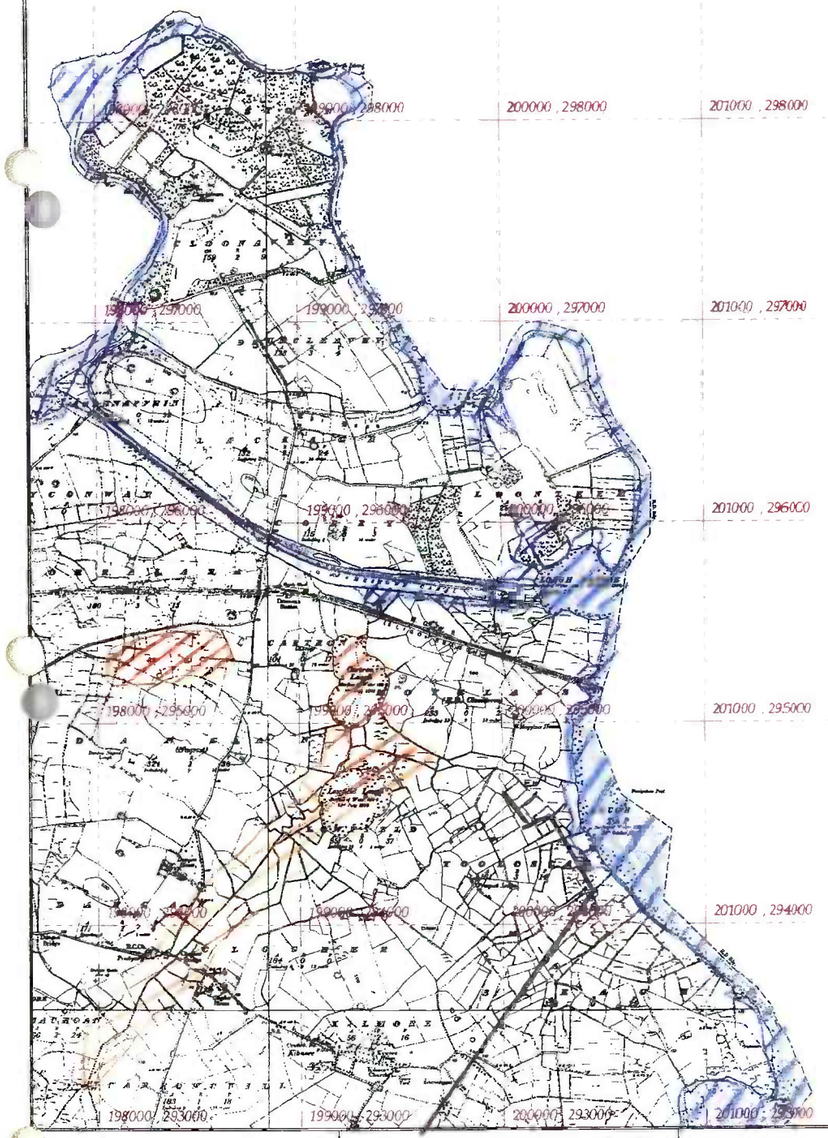
Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002



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UPPER SHANNON SURVEY

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Scale 1:30,000

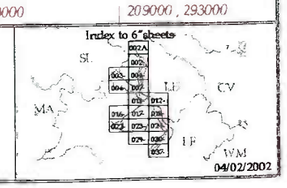
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

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Scale 1:30,000

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General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

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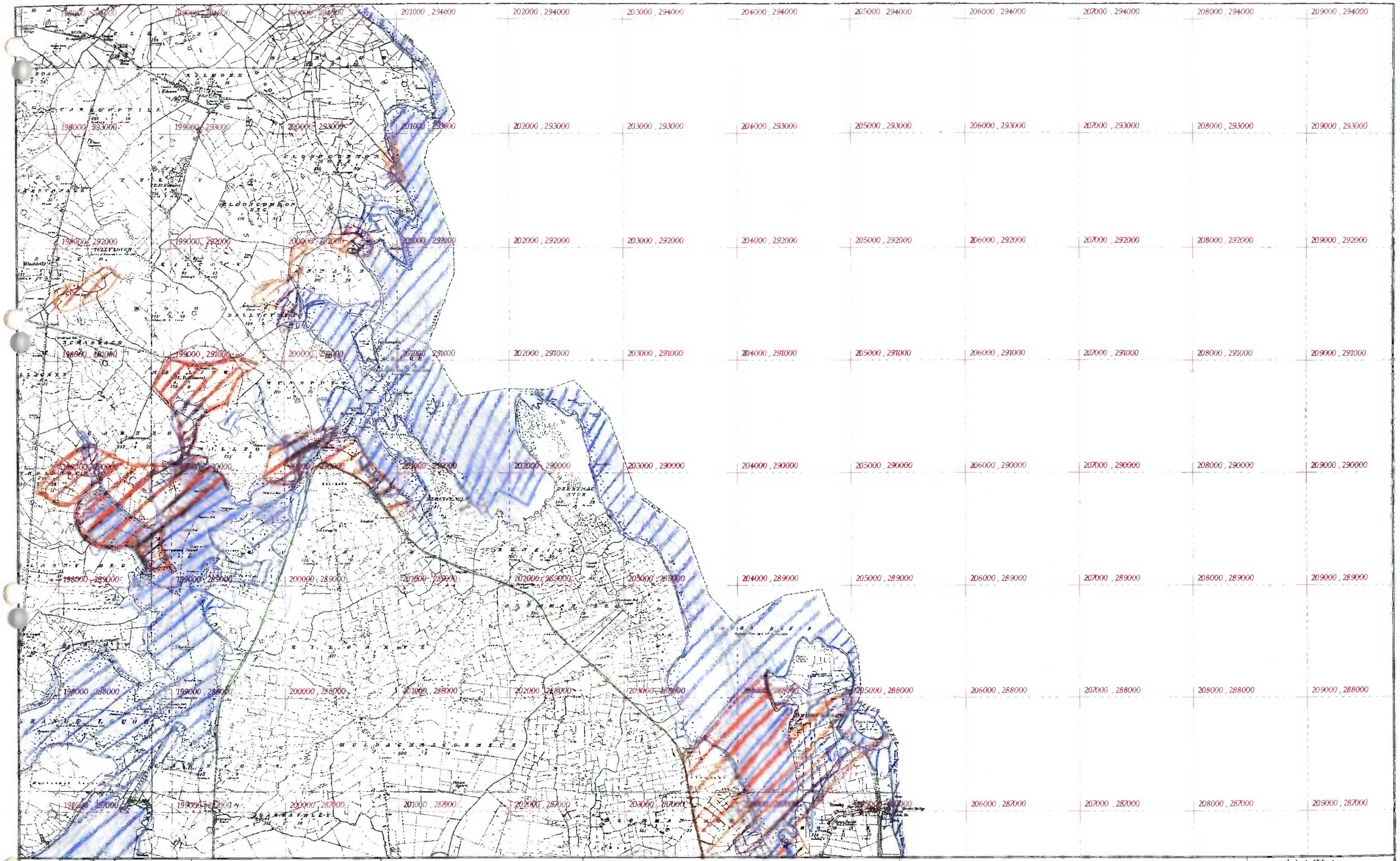

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Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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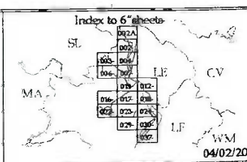

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General Purpose 1:30,000 NPW Map

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(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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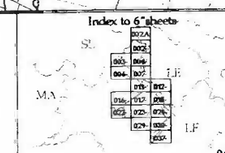

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(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

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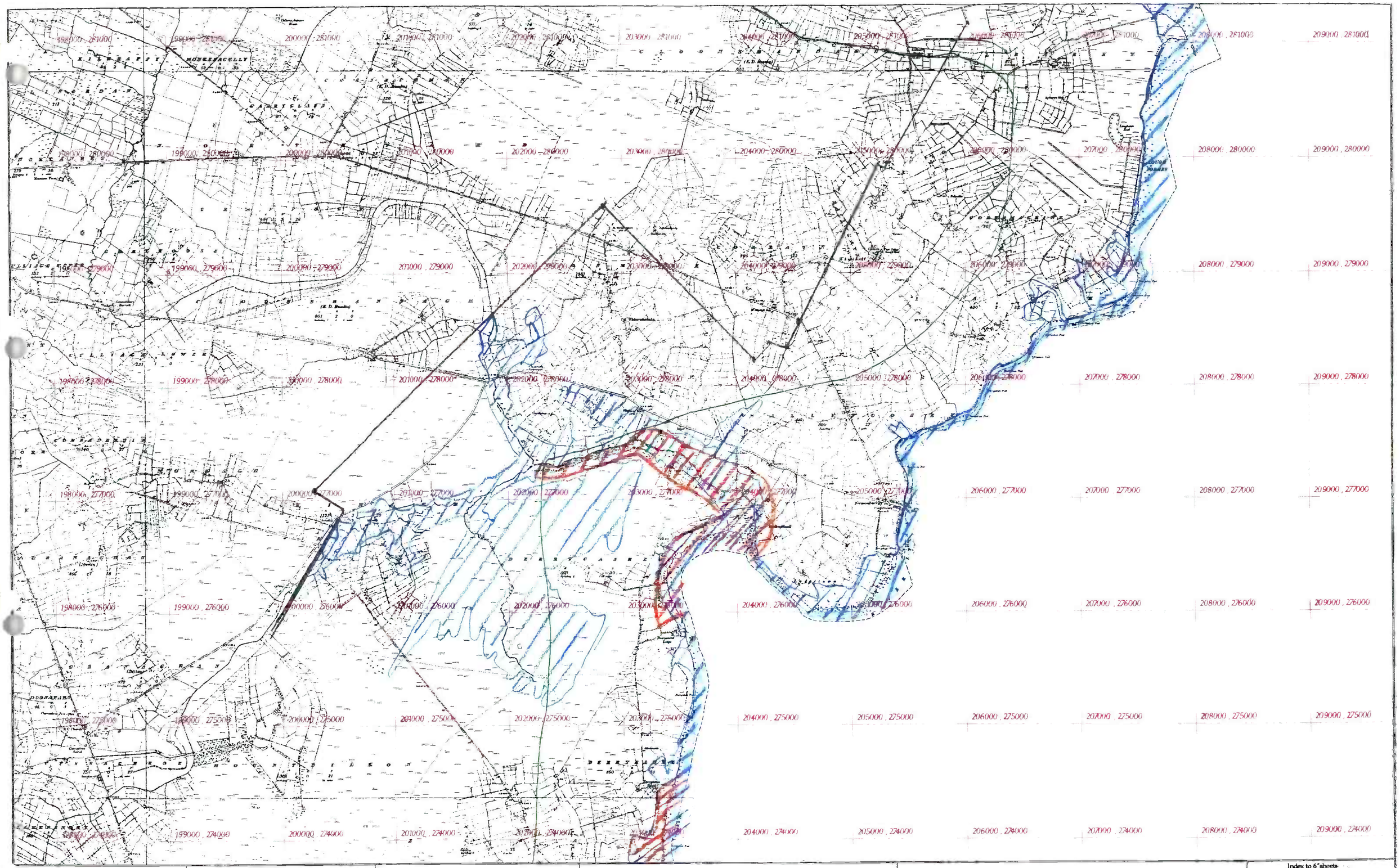

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UPPER SHANNON SURVEY

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General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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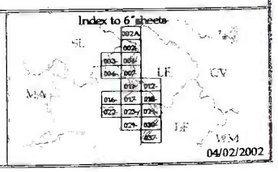

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Dúchas The Heritage Service

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UPPER SHANNON SURVEY

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Scale 1:30,000

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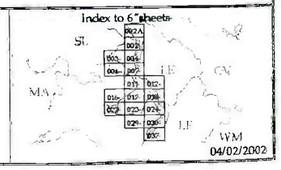
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision
(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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UPPER SHANNON SURVEY

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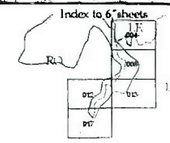
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

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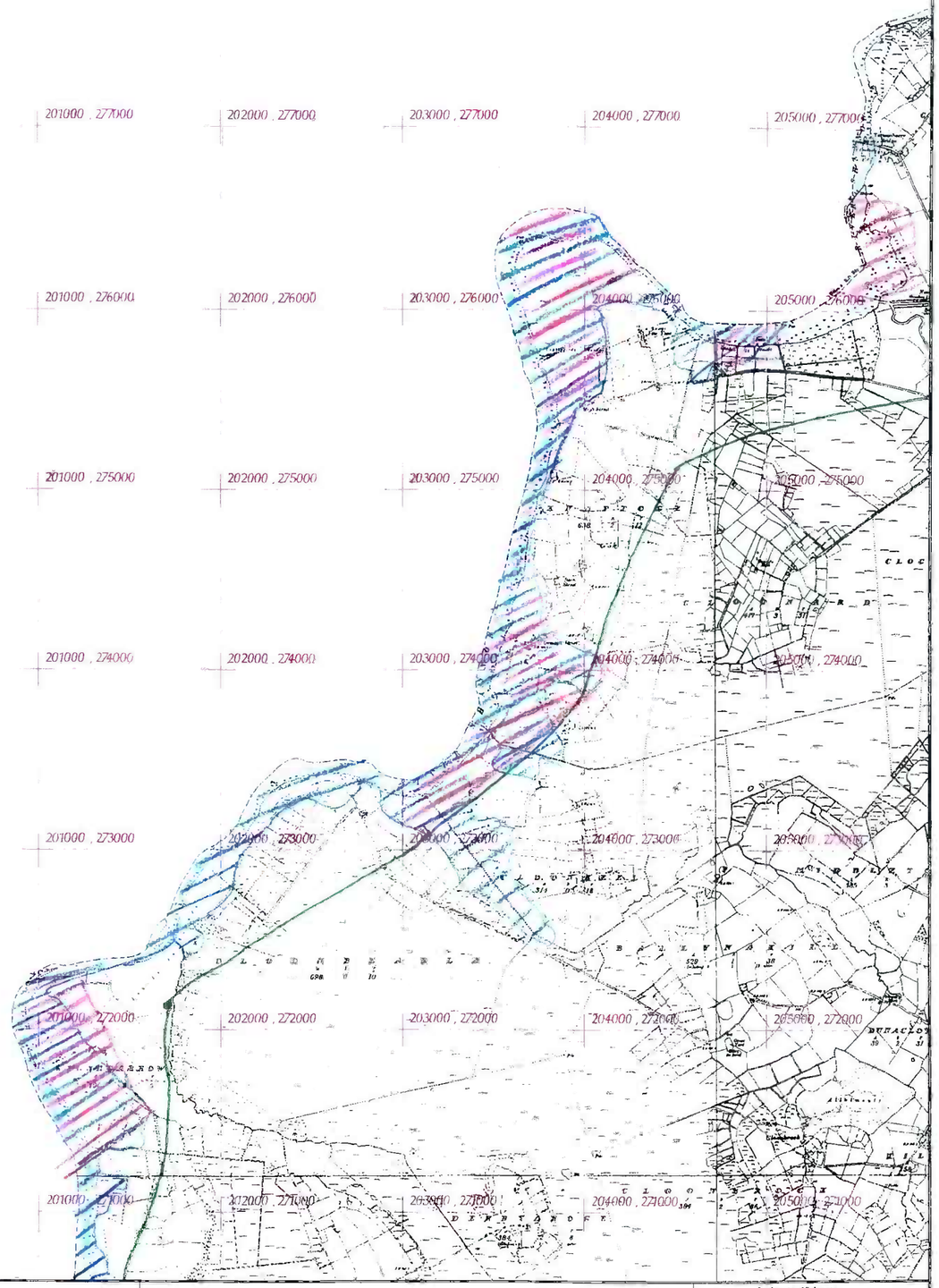

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UPPER SHANNON SURVEY

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Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Fêadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.).

Index to 6" sheets

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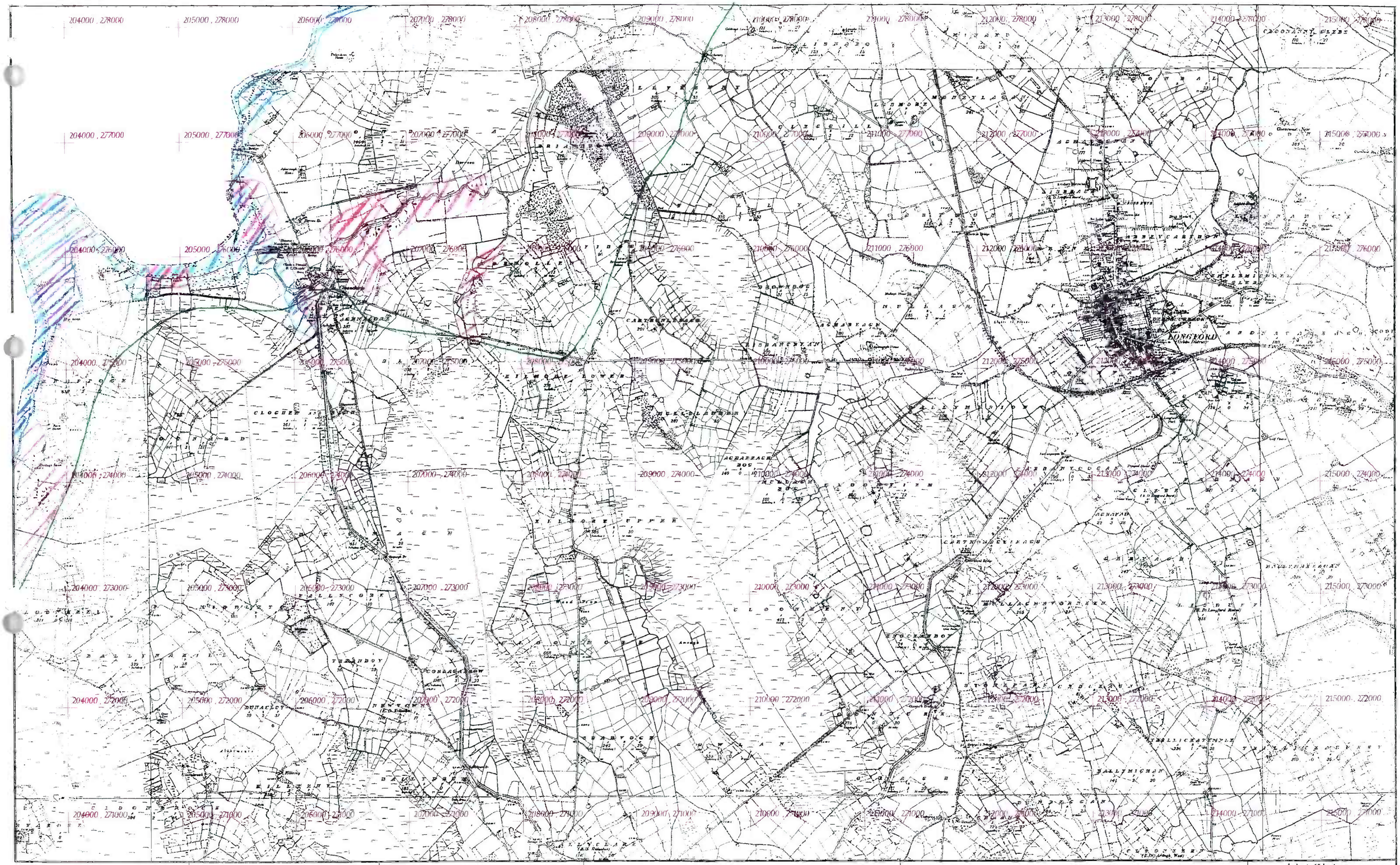

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General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision
(Ní thaispeántar suimh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets
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UPPER SHANNON SURVEY

Scale 1:30,000

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General Purpose 1:30,000 NPW Map

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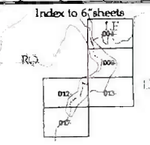
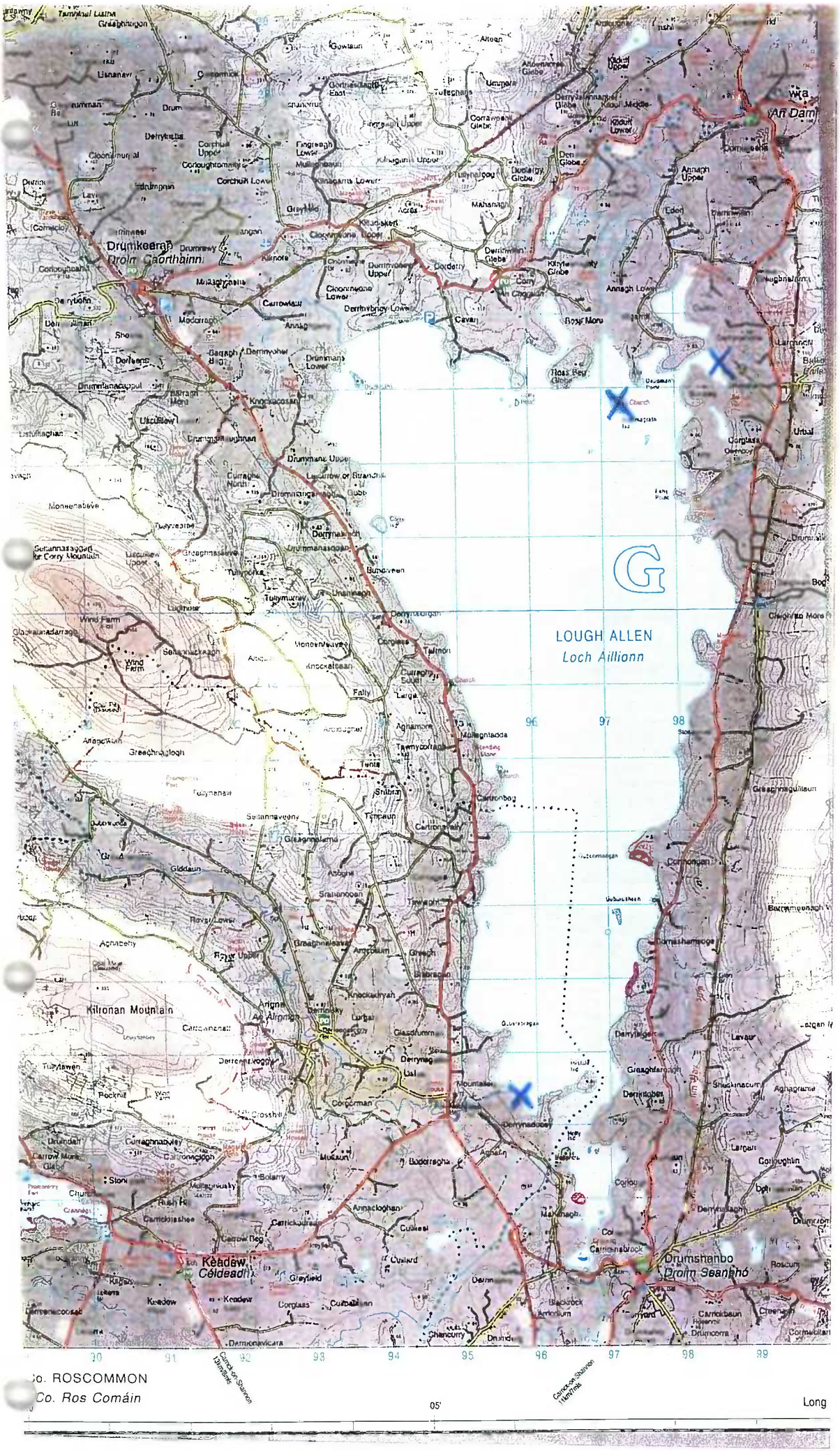


04/02/2002

APPENDIX 5 GREENLAND WHITE-FRONTED GEESE SITES.

Information provided by B. O'Connor for Drumharlow flock and by D. Norriss for Kilglass/Lough Forbes and Drumharlow flocks. Sites are indicated with blue X (X)or hatched blue lines (\\\ ) depending on available information. Current conservation designated areas are indicated using red hatching (/ / /). Four pages.



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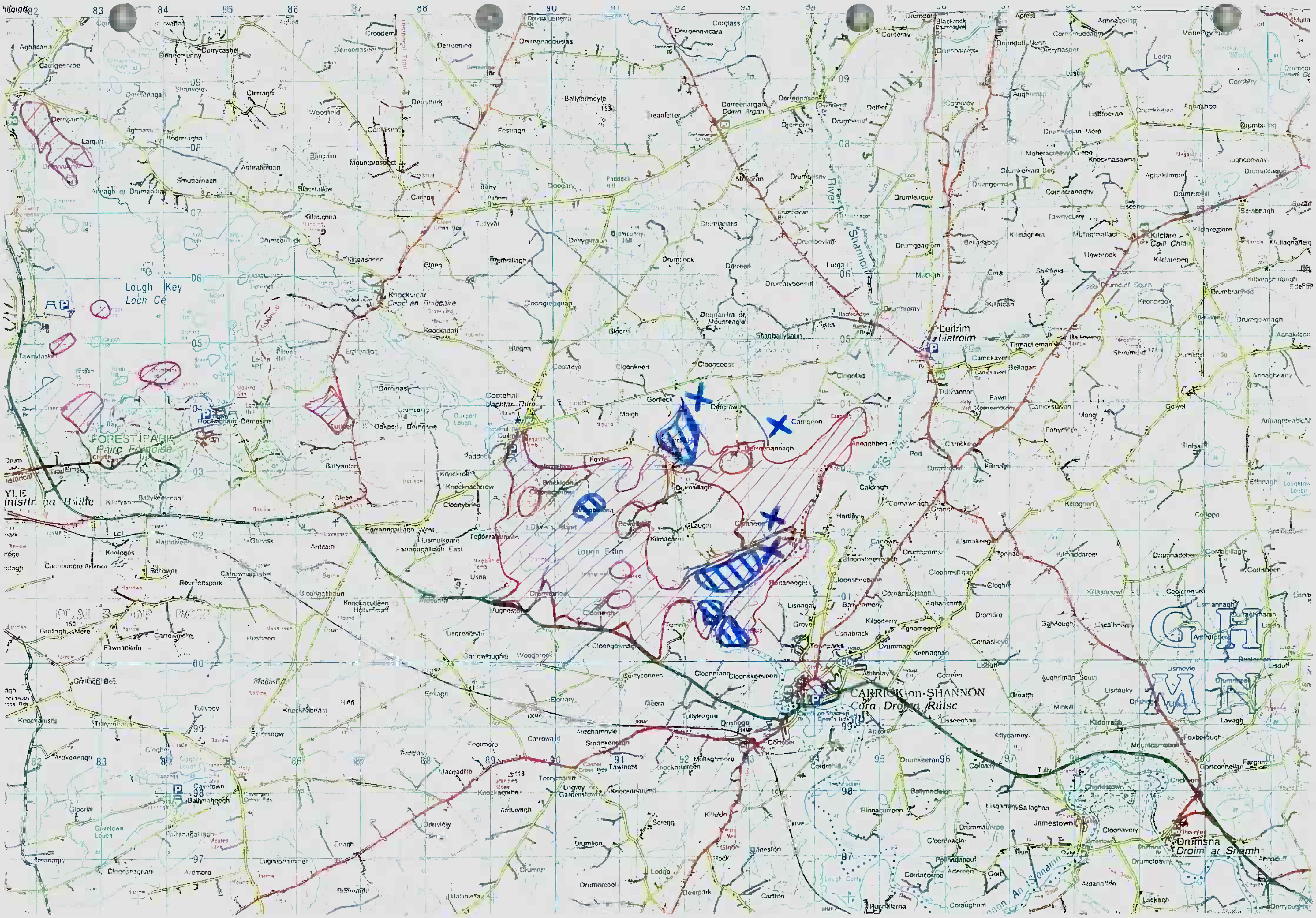
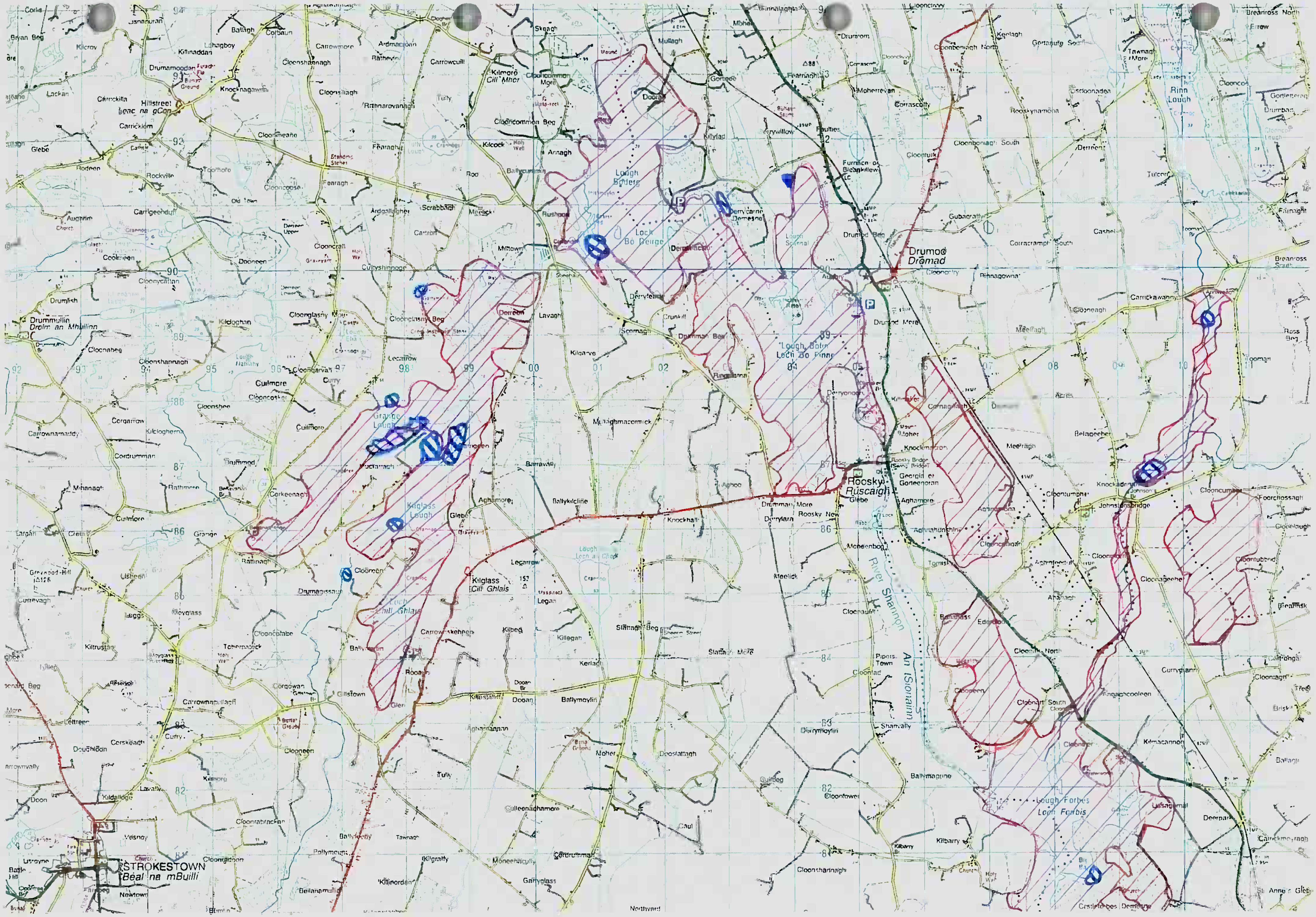
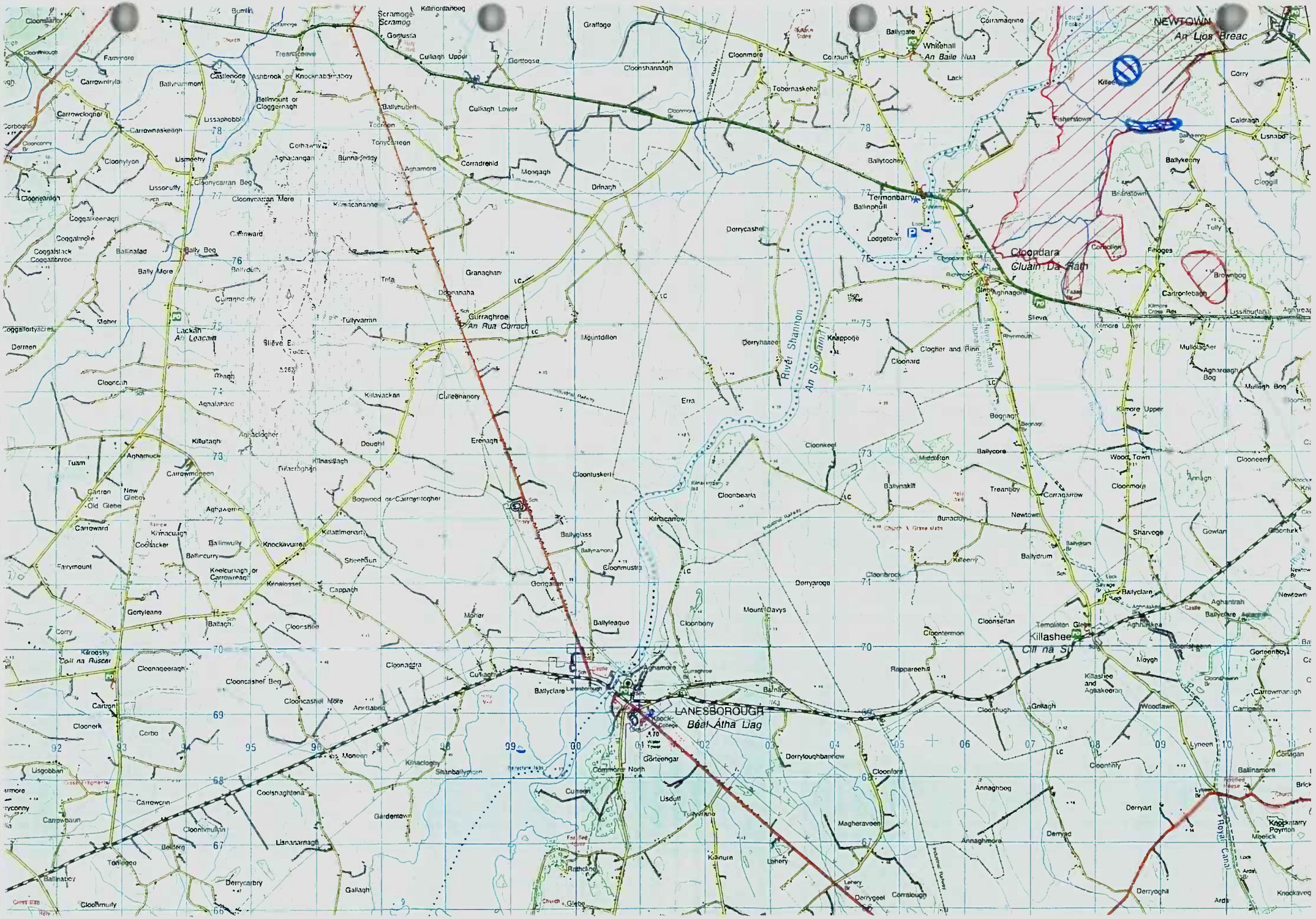
Co. Ros Comáin



CARRICK-on-SHANNON
Cora Droma Rúisc
Leitrim
Liatroim
Drumsna
Droim ar Snámh
River
Shannon
Lough Key
Loch Cé
FOREST PARK
Páirc Foraoise
Lough Erin
Jamestown
Knockvicar
Croc an Bhiocaire
Cootehall
Kilclare
Coill Chláir



STROKESTOWN
Béal na mBuillí
Roosky
Rúscaigh
Drumod
Dromad
River Shannon
An tSionainn
Lough Boderg
Loch Bó Deirge
Lough Bofin
Loch Bó Finne
Lough Forbes
Loch Forbais
Kilglass
Cill Ghlais
Kilglass Lough
Grange Lough
Loch Cill Ghlais
Hillstreet
Leac na gCon
Drummullin
Droim an Mhuilinn
Kilmore
Cill Mhór
Rinn Lough
Lough Scannal
Lough na Cloch


NEWTOWN
An Lios Breac
Whitehall
An Baile Nua
Cloondara
Cluain Da Rath
Termonbarry
River Shannon
An tSionainn
Gurraghroe
An Rua Corrach
LANESBOROUGH
Béal Átha Liag
Killashee
Cill na Sí
Lackan
An Leacan

APPENDIX 6: ZONING MAPS

KEY TO ZONING MAPS


Zone A: Red cross hatching


Zone B. Purple horizontal lines

Zone C. Green hatching

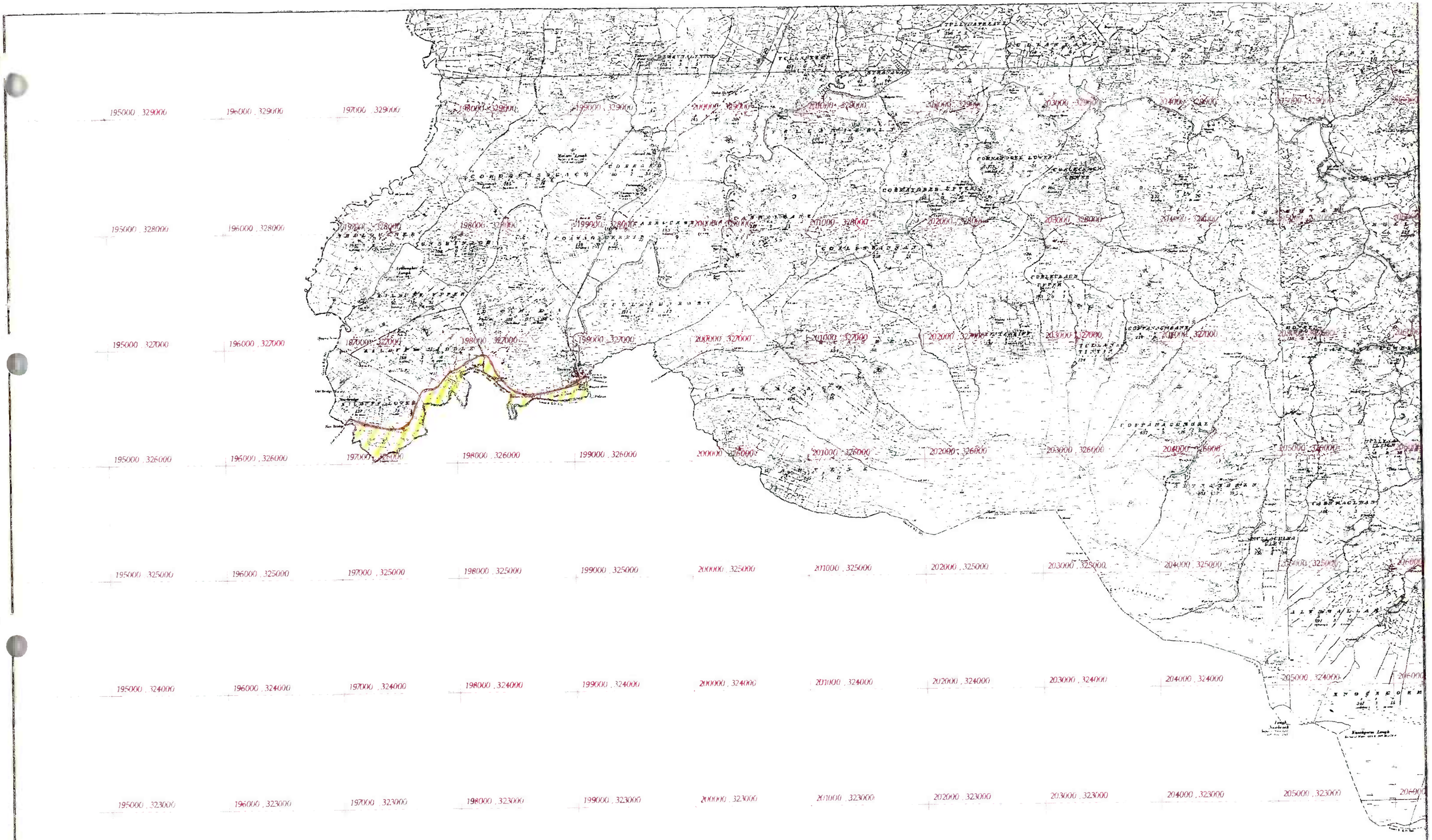

Project boundary: Red line

A Areas of high conservation interest where development is likely to have adverse impacts.

B Areas of interest where proposals for any new developments should be adequately assessed.

C Areas that have been developed, where permissions have been granted for development or for other reasons are of low conservation interest which developments would be assessed mainly on the basis of their impacts on adjacent areas.

The enclosed zoning maps should be used as a guideline to assist in determining the potential impact of any proposed developments. Since little detailed survey work could be carried out during the timeframe of this project it is possible that, following such work, sites may be reassigned to different, more suitable, zones. Sites not included in the following Zone A or B lists are allocated to Zone C since they are considered to have low conservation interest. However, Zone C areas may, in future studies, be found to support species or habitats of conservation interest. Existing infrastructure and planning permissions that have been granted may be mapped in Zones A or B but are actually excluded from them.



Dúchas The Heritage Service

County: CAVAN
Sheet: 005-

This is a 1:10560 (6 inch) sheet rescaled to 1:30,000.
This map is not acceptable as a source for digitising.
Please request a larger scale if required.

UPPER SHANNON SURVEY

Scale 1:30,000

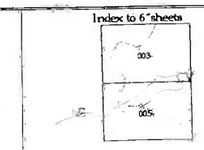
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6"sheets



04/02/2002

Dúchas The Heritage Service

County: LEITRIM
Sheet: 018-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

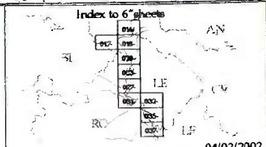
0 1km 2km

General Purpose 1:30,000 NPW Map

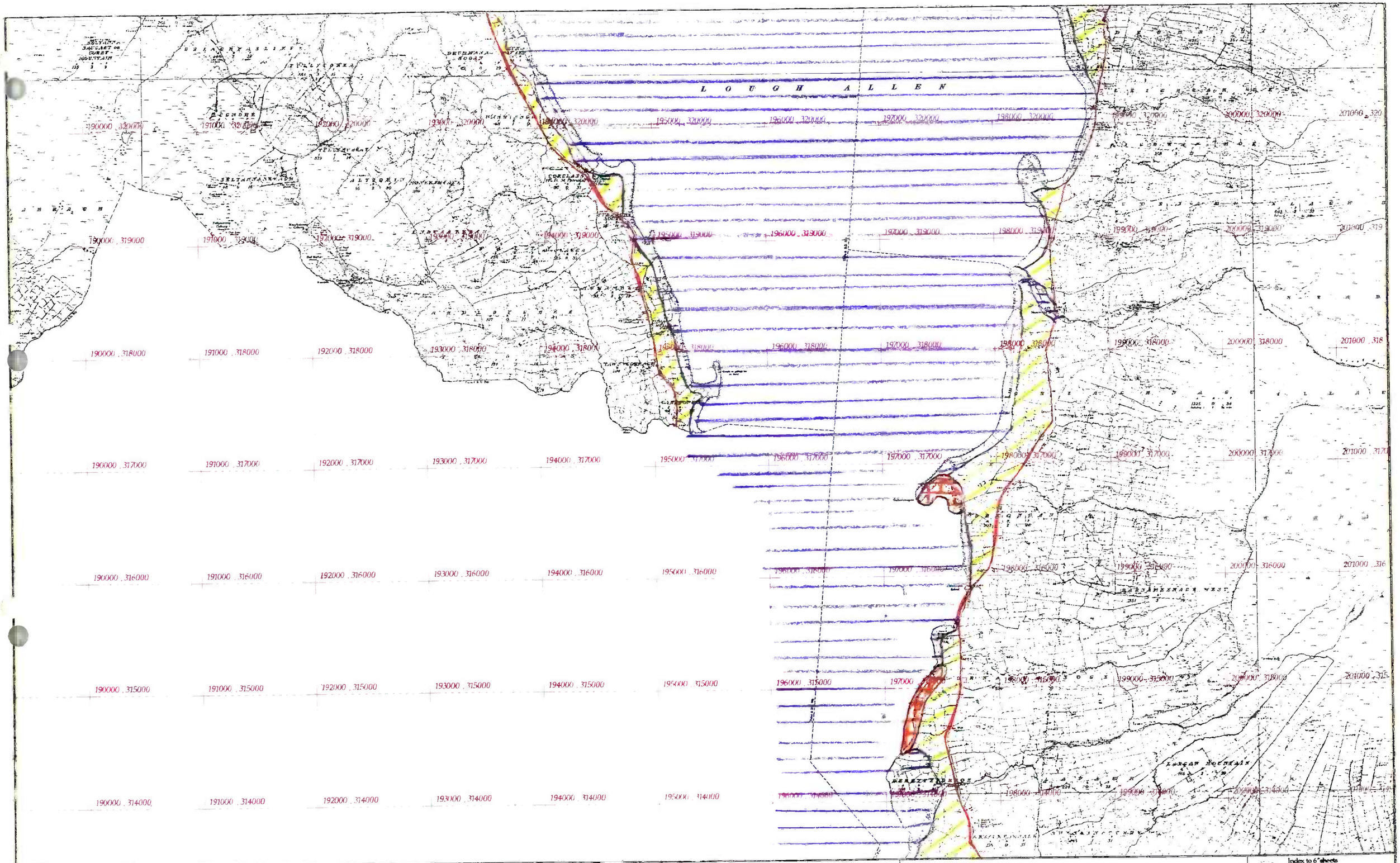
Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002



Dúchas The Heritage Service

County: LEITRIM
Sheet: 020-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

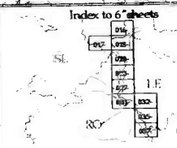
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



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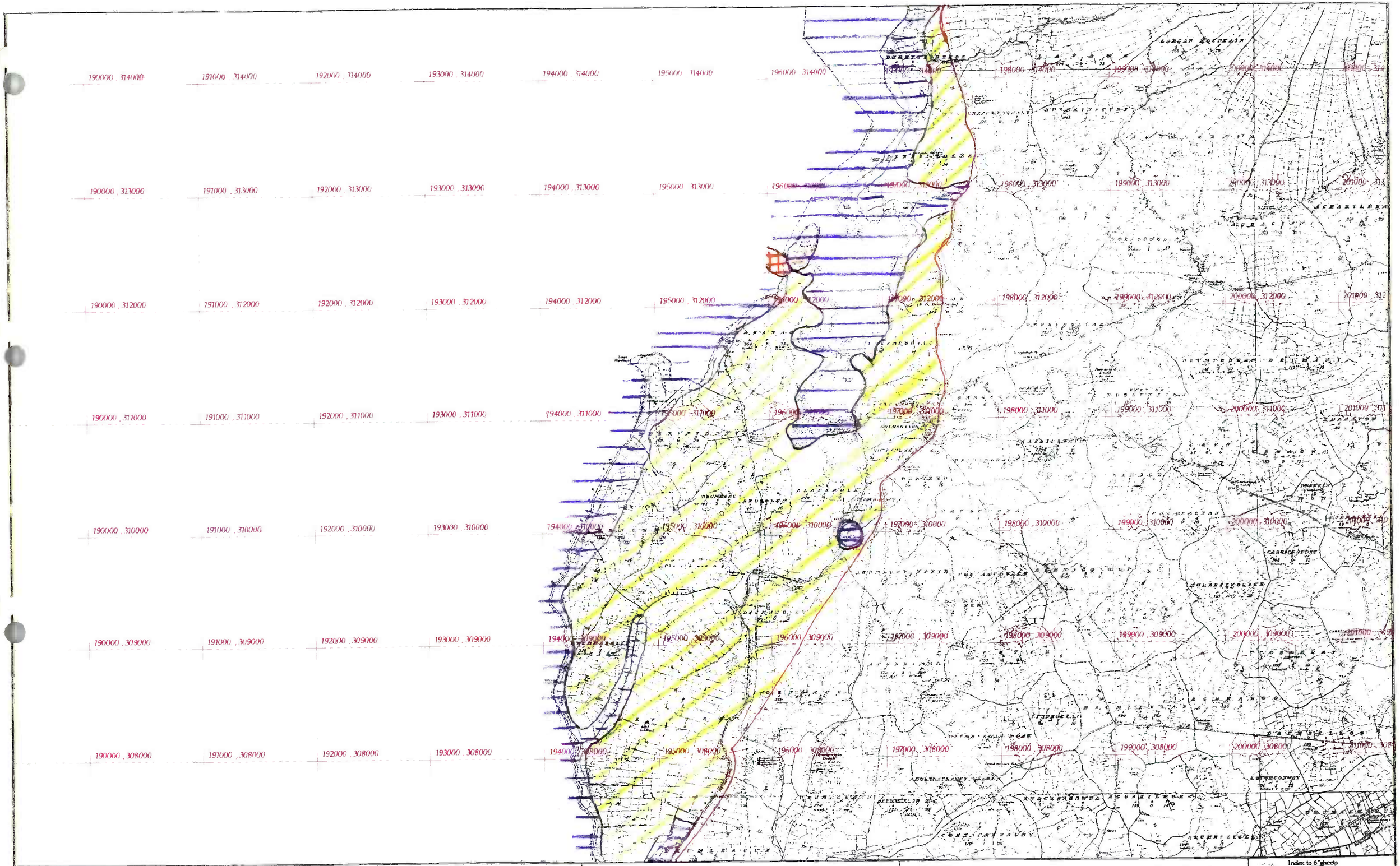

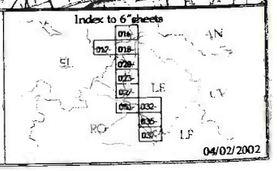

Dúchas The Heritage Service

County: LEITRIM
Sheet: 023-

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UPPER SHANNON
SURVEY

N

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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Macasamhail d'ábhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. 5953)

Index to 6" sheets

04/02/2002

Dúchas The Heritage Service

County: LEITRIM
Sheet: 027-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

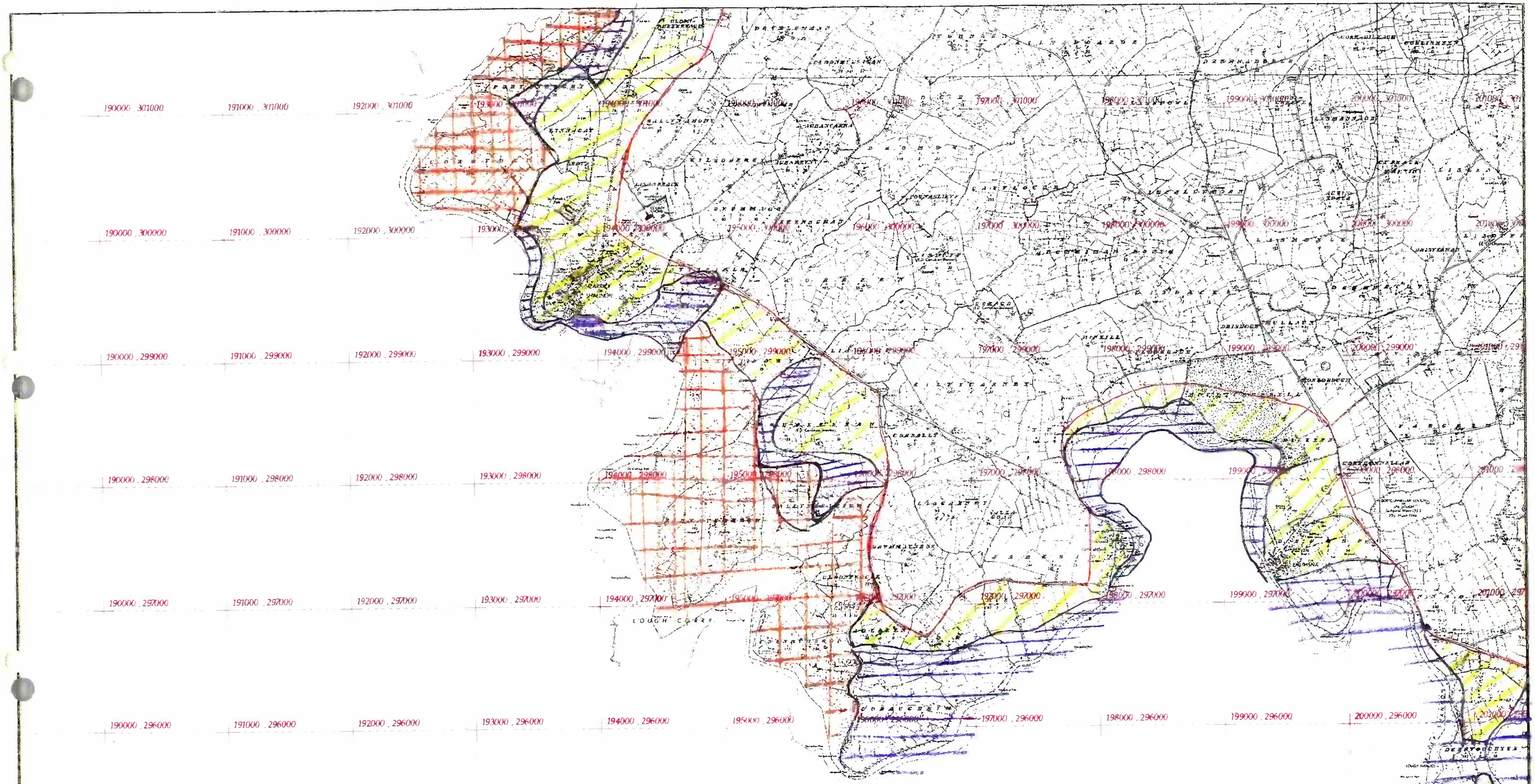
General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

04/02/2002



Dúchas The Heritage Service

County: LEITRIM
Sheet: 031-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

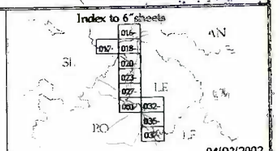
0 1km 2km

General Purpose 1:30,000 NPW Map

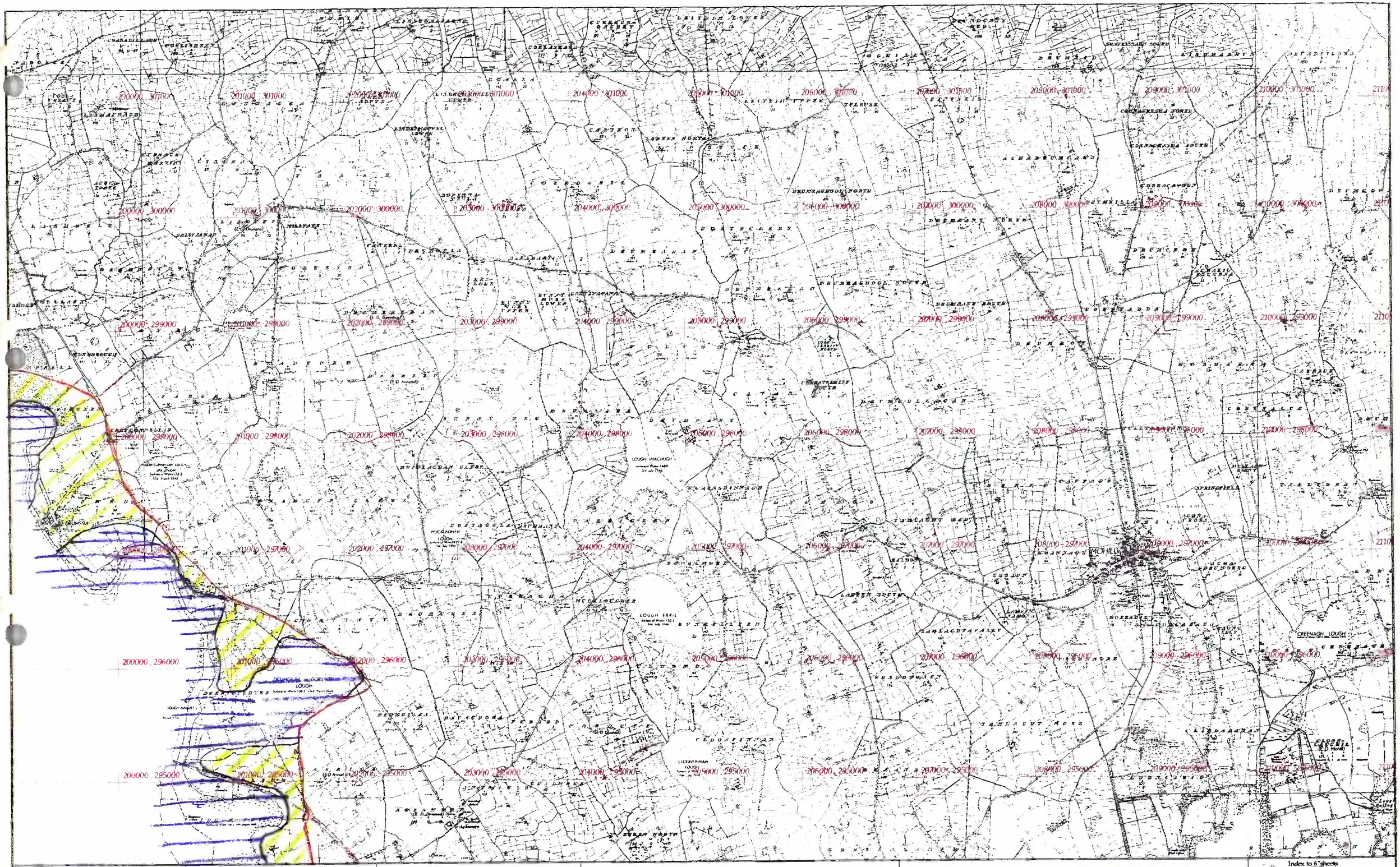
Féadtar athruithe a chur an ná ceantáir / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002



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County: LEITRIM
Sheet: 032-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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Macasamhail d'abhar na Suirbhéarachta Ordonáis le cead ón Rialtas (Ceadúnas Uimh. 5953)

Index to 6" sheets

04/02/2002

Dúchas The Heritage Service

County: LEITRIM
Sheet: 035-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision
(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

04/02/2002

200000 , 288000 | 201000 , 288000 | 202000 , 288000 | 203000 , 288000 | 204000 , 288000 | 205000 , 288000 | 206000 , 288000 | 207000 , 288000 | 208000 , 288000 | 209000 , 288000 | 210000 , 288000 | 211

200000 , 287000 | 201000 , 287000 | 202000 , 287000 | 203000 , 287000 | 204000 , 287000 | 205000 , 287000 | 206000 , 287000 | 207000 , 287000 | 208000 , 287000 | 209000 , 287000 | 210000 , 287000 | 211

200000 , 286000 | 201000 , 286000 | 202000 , 286000 | 203000 , 286000 | 204000 , 286000 | 205000 , 286000 | 206000 , 286000 | 207000 , 286000 | 208000 , 286000 | 209000 , 286000 | 210000 , 286000 | 211

200000 , 285000 | 201000 , 285000 | 202000 , 285000 | 203000 , 285000 | 204000 , 285000 | 205000 , 285000 | 206000 , 285000 | 207000 , 285000 | 208000 , 285000 | 209000 , 285000 | 210000 , 285000 | 211

200000 , 284000 | 201000 , 284000 | 202000 , 284000 | 203000 , 284000 | 204000 , 284000 | 205000 , 284000 | 206000 , 284000 | 207000 , 284000 | 208000 , 284000 | 209000 , 284000 | 210000 , 284000 | 211

200000 , 283000 | 201000 , 283000 | 202000 , 283000 | 203000 , 283000 | 204000 , 283000 | 205000 , 283000 | 206000 , 283000 | 207000 , 283000 | 208000 , 283000 | 209000 , 283000 | 210000 , 283000 | 211

200000 , 282000 | 201000 , 282000 | 202000 , 282000 | 203000 , 282000 | 204000 , 282000 | 205000 , 282000 | 206000 , 282000 | 207000 , 282000 | 208000 , 282000 | 209000 , 282000 | 210000 , 282000 | 211

Dúchas The Heritage Service

County: LEITRIM
Sheet: 037-

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UPPER SHANNON SURVEY

N

Scale 1:30,000

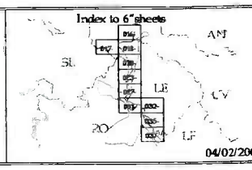
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002

Dúchas The Heritage Service

County: ROSCOMMON
Sheet: 002-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets

04/02/2002

Dúchas The Heritage Service

County: ROSCOMMON
Sheet: 003-

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UPPER SHANNON SURVEY

Scale 1:30,000

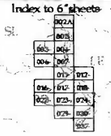
0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

Index to 6" sheets



04/02/2002

Dúchas The Heritage Service

County: ROSCOMMON
Sheet: 004-

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UPPER SHANNON SURVEY

Scale 1:30,000

0 1km 2km

General Purpose 1:30,000 NPW Map

Féadtar athruithe a chur an na ceantair / Sites subject to revision

(Ní thaispeántar suímh gur de spéis géolaíoch amháin iad.) / (Sites solely of geological interest not shown.)

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04/02/2002