

The Development of a Gully Woodland Restoration Plan for the Upper River Dodder Catchment and the Identification and Assessment of Generic Issues of Relevance for Future Similar Projects in Ireland



Upper River Dodder – Photo By Declan Little (Woodlands of Ireland)

A Report to Woodlands of Ireland

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&

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Upper River Dodder – Gully Woodland Restoration Project

1. Introduction

In the summer of 2006, Purser Tarleton Russell Ltd. prepared a report on the potential for forestry on land north of Kippure Mountain in County Dublin that is best described as the upper catchment of the River Dodder. In the report the potential for a native woodland restoration project was clearly identified in the three glens (Slade Brook, Cot Brook and the River Dodder), which run down from Kippure Mountain and join to form the River Dodder in Glenasmole. These glens contain examples of upland gully woodland including species such as rowan (*Sorbus aucuparia*), birch (*Betula pubescens*), willow (*Salix* sp.), holly (*Ilex aquifolium*), oak (*Quercus robur*) and hazel (*Corylus avellana*). There is evidence of previous scattered woodland on the slopes of these glens with numerous dead and dying trees. Although there is successful germination and initial growth of natural regeneration from existing trees, this does not get the opportunity to develop any further due to the browsing pressure of deer, sheep, feral goats and horses. The glens encompass lands in the townlands of Castlekelly, Glassamucky Brakes and Glassavullaun. The owner of these lands has expressed a strong interest in developing this project and in taking appropriate steps in restoring these upland woodlands.

The Native Woodland Scheme operated by the Forest Service in the Department of Agriculture, Fisheries and Food currently funds the development of New Native Woodland and Native Woodland Conservation projects. There is increasing interest in, and recognition of, the importance of riparian woodland development and management amongst many groups including fisheries boards, ecologists and foresters and this is reflected in the scheme. Although this project comprises both Riparian Woodland and Bog Woodland elements, it involves the restoration of native woodland that does not neatly fit into a single Native Woodland category as defined by Fossitt (2000) or the sub-categories of wet woodland described in the Native Woodland Scheme Manual. In this regard the project merits attention as a case study in upland native woodland or gully woodland restoration in Ireland. Woodlands of Ireland, which provides technical support to the Native Woodland Scheme, agreed to fund a project based around this particular site. This project forms a case study, which will be used to explore the practical issues surrounding operations necessary in the restoration and management of upland gully woodland.

2. Project Objectives

The objectives of this project are:

1. To conduct a brief desk based review of similar projects developed internationally.
2. To develop a fully costed native woodland restoration plan for the site, as a case study for similar sites.
3. To prepare a list of operational issues specific to riparian woodland development and restoration and to suggest ways in which such issues can be best addressed by foresters, ecologists and landowners and catered for within the Forest Service Native Woodland Scheme.

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3. Review of Similar Project Developed Internationally

In conducting this review, a search for similar projects developed internationally was made and although projects were found around the world, the most relevant and instructive ones were found to be from Scotland, England and Wales. This is not surprising given the similarities in our shared histories, climate, ecology and land uses.

In **Scotland** the Scottish Forestry Grant Scheme (SFGS), which is now closed, allowed 90% funding for improving riparian habitat and for native woodlands. Riparian woodland management grants were provided for work which:

- Creates new woodland within riparian zones.
- Helps improve water quality and/or reduce erosion.
- Contributes to wet woodland Habitat Action Plans.
- Contributes to the objectives of Catchment Management Plans.
- Contributes to Forest Habitat Networks.
- Had a minimum area of 0.25 hectares.

This scheme has since been replaced with what are called “Rural Development Contracts”. This change came about following experience that the SFGS was too prescriptive and restrictive and did not facilitate the development of projects appropriate to the specific site in question. The new “Rural Development Contracts” cover general activities such as:

- Woodland Improvement
- Woodland Creation
- Sustainable Management of Forests

There are more specific measures within these general activities but the new scheme is far less specific and more flexible than the SFGS. These contracts are being used for projects similar to the Upper River Dodder Gully Woodland Restoration Project. Proposals with a strong community involvement and benefit are particularly favoured. There is also now a “challenge fund” set aside for innovative forestry proposals, particularly pioneering case studies and pilot projects which may fall outside the terms of a Rural Development Contract.

In **Wales**, the Better Woodlands For Wales (BWW) scheme offers two main grants for native woodlands which are:

- Woodland Improvement Grant
- Restocking Grant

In the context of this project, these allow for “patch planting” where an area based grant is paid on a pro rata basis for the cumulative area of patches. The use of natural regeneration and the cost of ground preparation in advance of natural regeneration is also supported.

In **England**, grants for a number of general activities are available under the English Woodland Grant Scheme (EWGS) which is similar to the old Scottish Forestry Grant Scheme. Under this scheme it would be possible to bring

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forward a native woodland restoration project although operational cost limits apply which could be restrictive in individual circumstances.

Outside of these grant schemes there have been some similar projects developed, in Scotland in particular, with similar issues and receiving special funding from charitable trusts, environmental NGO's and private donors. charities / similar. Two such case studies are discussed as follows:

Case Study 1

Glen Affric, Scotland – Regeneration of Caledonian Pine Forests

The last 20 years has seen a significant change in Scottish Forest Policy whereby the conservation and rejuvenation of moribund and overgrazed native Caledonian Pine Forests has been prioritised. It is useful to briefly look at a case study from Scotland of how these forests are being conserved and regenerated.

The case study chosen is from a Scottish Charity **Trees for Life**, which operates in the Glen Affric upland area of central Scotland and with which a member of the project team has some personal experience. The primary goal of **Trees for Life** is to regenerate and restore the native Caledonian Forest to a large contiguous area in the Highlands of Scotland. In so doing they hope to counteract the centuries of deforestation which have led to the almost complete loss of Scotland's native woodlands, but also to be pioneers in the emerging field of ecological restoration.

In general terms, the **Trees for Life** project has centred on the erection of exclosures to deer and sheep in partnership with state bodies, land owners, local farmers and interest groups. Exclosures are strategically located in areas of existing parent trees of different species and where they form a link in a corridor between different areas of woodland remnants. Exclosures vary in size from the very small (e.g. 0.01 ha. protecting small outlying clumps of aspen, eared willow and dwarf birch), to the very large (e.g. 283 hectares enclosed around remnant scattered pine trees). Different strategies apply within different exclosures, some relying exclusively on natural regeneration, some exclusively on enrichment planting of trees of local provenance but most using a mixture of the two.

The following principles have been followed:

- Mimic nature wherever possible
- Work outwards from areas of strength, where the ecosystem is closest to its natural condition
- Pay particular attention to keystone species
- Utilise pioneer species and natural succession to facilitate the restoration process
- Re-create ecological niches where they have been lost
- Re-establish ecological linkages (both genetic and species associations)
- Control and / or remove introduced species
- Remove or mitigate limiting factors preventing restoration taking place naturally
- Let nature do most of the work

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While these principles apply to native woodland restoration in general, most of them have relevance in the context of the Upper Dodder Project. Exclosures are normally erected by professional contractors using helicopters to drop fencing materials to remote locations. Following the completion of an exclosure the following operations are carried out:

- Enrichment planting
- Manual application of rock phosphate in some areas to beat competition from heather
- Regular patrolling and maintenance of perimeter of deer fence
- Monitoring of permanent plots within the exclosure

Fire control has not been used by Trees for Life and if it does occur, fire will be regarded as a natural disturbance which in turn will facilitate regeneration. In some other Caledonian forest restoration projects, carefully controlled burning has been used in order to mimic a natural disturbance and so facilitate regeneration of pioneers.

While the project is on-going with a seemingly exponential growth in members, volunteers, staff, funding, areas conserved etc. since humble beginnings in 1989, it has undoubtedly been tremendously successful. The following specific example illustrates this:

At Coille Ruaigh na Cuileige (Wooded Hill of the Midges) an exclosure of 50 hectares was erected in 1990. Prior to this a survey carried out by Edinburgh University estimated that there were approximately 2,000 naturally regenerating pine seedlings per hectare with an average age of 10 years but an average height of just 8.5 cm. No planting and no further treatment was carried out. Six years later in 1996 the average height had increased to 21.5 cm. Coning commenced on some of the young trees in 2000 (10 years after the exclosure was erected). The latest survey in 2006 showed an average height of over 3 meters with some trees up to 7.5 meters in height. There is also now an abundance of trees such as rowan, alder, birch, juniper and holly and also the creeping lady's tresses orchid, all absent or suppressed prior to the exclosure.

Case Study 2

Scottish Borders Upland Cleuch¹ and Scrub Woodland Habitat Action Plan (Scottish Borders Council)

This is a project funded by the Scottish Borders Council with the following objectives:

1. Determine the status of the upland cleuch and scrub woodland habitat in Scottish Borders
2. Increase area of upland cleuch and scrub woodland in Scottish Borders
3. Restore and where appropriate enhance existing upland cleuch and scrub woodland in Scottish Borders

¹ A cleuch is a Scottish term for a mountain gully, ravine or steep sided valley.

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4. Promote education and awareness initiatives focussed on upland cleuch and woodland

The project aims to address key issues relating to overgrazing, undergrazing, scrub clearance, excessive burning, inappropriate planting (including afforestation), lack of information, illegal collecting of rare plants and inappropriate bracken spraying. A number of specific sites have been restored under both a Riparian Woodland and Forest Habitat Networks Project and an Ancient Woodland Restoration Project, run by the Borders Forest Trust, the Tweed Foundation and the Borders Farming and Wildlife Advisory Group.

Support has also been received from Scottish Natural Heritage and Millennium Forest for Scotland to identify sites containing a particular species (*Juniperus communis*) and this has led to Juniper restoration being carried out at seven sites with landowners and Forestry Commission Scotland.

The Key actions of the project are identified as follows:

1. Maintain and enhance existing areas and create additional areas of juniper in prioritised sites
2. Maintain and enhance existing areas and create additional areas of aspen in prioritised sites
3. Develop and adopt robust guidance for management of upland cleuch and scrub woodland
4. Develop the supply of locally sourced seed stock to ensure genetic integrity
5. Conduct a desk top review of the requirements of priority species associated with this habitat
6. Evaluate opportunities to maintain and create transitional habitats e.g. grassland / upland cleuch and scrub woodland / woodland
7. Enhance the integrity of the local habitat network including enhanced connectivity between areas of upland cleuch and scrub woodland
8. Improve the control and management of feral goats to reduce impacts on upland cleuch and scrub woodland
9. Ensure that all relevant species and habitat data are made available to Scottish Borders Biological Record Centre and the Council's Ecology Officer
10. Hold training events to improve biological recording of upland cleuch and scrub woodland habitats

4. A Fully Costed Native Woodland Restoration Plan for the Site, as a Case Study for Similar Sites

This has been completed and is presented in **Appendix A**

5. A Discussion of Operational and Practical Issues Specific to Upland Gully Woodland Development / Restoration

In the course of preparing a Native Woodland Restoration Plan for the Upper River Dodder a number of issues arose which present difficulties in the

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context of a potential Native Woodland Scheme application. These issues are discussed as follows:

Native Woodland Conservation or New Native Woodland?

From the outset, this project has been best described as native woodland restoration. There is remnant “woodland” on the site to be conserved and that will act as a nucleus around which the woodland will be restored. Much of the operational plan is based around this remnant “woodland” and the treatments prescribed are akin to those that would be used in a native woodland conservation project e.g. use of exclosures to protect natural regeneration. However, the site is for all other intents and purposes best described as a “green field site”. From this point of view it best fits into Element 2 of the Native Woodland Scheme (New Native Woodland) and this has been the assumption adopted for the purpose of this report.

Difficulties with Area Based Payment for Linear Type Work

This is a difficulty shared with riparian woodland projects under the Native Woodland Scheme. The difficulty lies in the fact that a linear woodland such as this will result in a disproportionately large fence line for a small enclosed area. Table 1 below illustrates this point.

Area (ha.)	Width (m)	Length (m)	Distance (m)	Deer Fence Cost @ €15/m
10	316	316	1265	€18,974
10	300	333	1267	€19,000
10	250	400	1300	€19,500
10	200	500	1400	€21,000
10	150	667	1633	€24,500
10	100	1000	2200	€33,000
10	50	2000	4100	€61,500

Table 1: Comparative Cost of Deer Fencing for 10 Ha. of Different Dimensions

This is a difficult issue but might be addressed through the use of a scale of grant rates for linear projects such as this based on minimum width criteria. As already stated, this is an issue shared with riparian woodland which, in general terms becomes narrower towards the source of the watercourse. Therefore, it would make sense to make some form of consideration for this when calculating an appropriate grant rate.

Compliance Difficulties With Regard to Ratio of Woodland Area to Open Space / Non Wooded Habitat

At present an allowance is made for 20% open space / non wooded habitat under the Native Woodland Scheme. As one climbs in altitude toward the “tree line” or what would be the tree line in fully restored landscape the ratio of woodland cover to open space naturally changes – eventually becoming 0% woodland and 100% open space. Trees and “woodland” at these altitudes should be considered an important component of our native woodland. If the Native Woodland Scheme is to become the means by which such tree cover is restored then greater flexibility will need to be applied with regard to the natural dispersion and scattering of trees at these altitudes. This natural

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dispersion will follow different soil types, areas of relative shelter, stream gullies and areas inaccessible to browsers.

Clearly, any scheme for these upland areas must ensure value for money and grants should obviously not be paid for areas enclosed that have undergone no treatment. However, the Forest Service is somewhat protected in this regard because the scheme is cost based and if costs are lower than the grant then the full grant cannot be claimed.

Difficulties Associated with Remote Locations

Upland tree cover / woodland such as that on the Upper Dodder is by its nature remote and difficult to access. These are generally wild areas and it is neither practical nor desirable to develop vehicular access to them. In most cases, the ecological restoration of these areas will involve the erection of enclosures to exclude browsing mammals such as deer, sheep and goats. This involves the import of substantial quantities of fencing materials.

The only practical way to import these materials is by helicopter using pre-planned GPS located drop off centres. This method is commonly used in similar projects internationally and is also used in Ireland by the NPWS in delivery of materials for board-walked paths in National Parks. Although there is a substantial cost in both the planning and operational phases of such deliveries, in most cases it is less expensive than the labour cost of carrying materials to site.

Conservation Designations

Many of our upland areas are designated as candidate Special Areas of Conservation (cSACs) as they contain a variety of habitats and species of EU conservation interest – these include the following habitats (codes are shown in brackets and priority habitats are marked with an asterisk):

- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) (3110)
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Iso'to-Nanojuncetea* (3130)
- Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation (3150)
- Natural dystrophic lakes and ponds (3160)
- Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (3260)
- Northern Atlantic wet heaths with *Erica tetralix* (4010)
- European dry heaths (4030)
- Alpine and Boreal heaths (4060)
- *Juniperus communis* formations on heaths or calcareous grasslands (5130)
- Calaminarian grasslands of the *Violetalia calaminariae* (6130)
- Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometea*) (*important orchid sites) (6210)
- *Species-rich *Nardus* grasslands on siliceous substrates in mountain areas (and sub-mountain areas in continental Europe) (6230)

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- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (6410)
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels (6430)
- Active Blanket bog (7130)
- Blanket bog (7130) (non active)
- Depressions on peat substrates of the *Rhynchosporion* (7150)
- *Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (7210)
- Alkaline fens (7230)
- Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) (8110)
- Calcareous and calcshist screes of the montane to alpine levels (*Thlaspietea rotundifolii*) (8120)
- Caves not open to the public (8310)
- Calcareous rocky slopes with chasmophytic vegetation (8210)
- Siliceous rocky slopes with chasmophytic vegetation (8220)
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles (91A0)
- *Bog woodland (91D0)
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion*, *Alnion incanae*, *Salicion albae*) (91E0)

Any works associated with the restoration of upland native woodlands must be assessed to ensure that they do not adversely impact on any of the above habitats. These site designations might also potentially cause constraints for some proposed site works such as fencing, fire control, etc.

Narrow Aquatic Buffer Zone (ABZ) for Upland Streams

Under the Native Woodland Scheme, it is appropriate to have 20% canopy cover within the Aquatic Buffer Zone (ABZ). In the case of upland streams with steep gullies and narrow water courses, there can be a natural concentration of trees within the ABZ with little natural tree cover outside of this zone. If the Native Woodland Scheme is to be applied to such woodland then clarification is required with regard to whether or not it is acceptable to achieve 20% canopy cover within the ABZ with little or no woodland development outside of this zone. This issue ties in with earlier issues concerning the linear nature of such woodland and the ratio of woodland to open space and will need to be addressed in that context.

Fencing/Commonage Issues

In line with constraints imposed by site designations there may also be issues regarding the erection of fencing within commonage areas.

Multiple Land Ownership

Although not an issue for this particular project, water courses often delineate property boundaries. Indeed, in this case the River Dodder marks the townland boundary between Castlekelly and Glassamucky Brakes. Multiple

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ownership along either side of a river or upland gully will present problems for the effective development of native woodland projects of this nature.

This issue is addressed in a recent review of forest policy carried out for the Heritage Council which states that *“A strategic site identification / (NWS) dissemination / project delivery programme will be required on a county-by-county basis. Currently, there is no formal network to deliver such a programme. Support should be given toward the development and running of such a network in order to identify key areas, approach land owners on an independent basis, outline support mechanisms (NWS) and ensure the delivery of successful projects. Key players may include: NPWS, Forest Service, Woodlands of Ireland, County Councils, Fisheries Boards, private sector consultants and contractors.”*

Fisheries Considerations

The Eastern Regional Fisheries Board has been involved in the development of this project and their assistance in this regard is greatly appreciated. Fish stock and other data have been collected by the Board and these are presented in **Appendix B**.

A Native Woodland Scheme Challenge Fund

Projects such as this Upper River Dodder Gully Woodland Restoration Project are currently unusual in Ireland and there may be little justification in adapting an already successful scheme for the sake of one or two upland projects. This is not to understate the value of such upland woodlands, particularly in the context of climate change and potential flood preventative measures. However, it may be more sensible to create a Native Woodland Scheme Challenge Fund, similar to that operated in Scotland, whereby innovative pilot projects such as this can be funded without the constraints of the normal scheme. In a small way, such a system is in operation through the funding provided by Woodlands of Ireland for this report. However, it may be worth considering the development of this funding mechanism to facilitate larger scale native woodland projects that do not fit comfortably within the scope of the Native Woodland Scheme.

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APPENDIX A: DRAFT NATIVE WOODLAND SCHEME PLAN

Contract No.

PART 1: GENERAL INFORMATION

NWS Element (tick as relevant)

Element 1: Conservation [] OR
Element 2: Establishment [X]

Contact details

Participating Ecologist:

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NWS Dates: 6th – 8th February 2002

Participating Forester:

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NWS Dates: 1st – 3rd July 2002

Site location and area

Townland(s):

Castlekelly & Glassamucky Brakes

OS Map No.:

Sheet 56 (Discovery 1:50,000 series)

County:

Dublin

Total Area of Site (ha):

21.68 ha.

PART 2: SITE OVERVIEW

Site parameters

Altitude, Aspect & Exposure:

The site ranges in altitude from approximately 870 feet (265 meters) to approximately 1,300 feet (396 meters). It runs in a north-west to south-east direction. Being a gully, the site is therefore largely composed of two facing slopes along this axis. The gully site is generally sheltered although outside of the gully (and the former woodland area) the hillside is very exposed.

Slope:

The site is characterised by steep slopes forming a gully that runs in a south-east to north-west direction. There are therefore both north-east and south-west facing slopes. These vary in gradient, ranging from areas of exposed rock above the river forming a precipice to gentle. Slope has been a factor with regard to surviving trees on the site with a greater concentration of surviving stems on steeper, inaccessible slopes.

Climatic Factors:

The combination of altitude and exposure result in a relatively marginal environment for tree growth. Rainfall on the site is approximately 1200 mm per annum.

Soil assessment:

The dominant soil type on the site is a peaty podzol which occupies most of the slopes on either side of the gully. However, the site also contains some gley soils in areas influenced by the watercourse and its tributaries. These include minerotrophic gleys and humic gleys which are concentrated in the narrow riparian zone. Small areas of brown acid earths also occur, underlain by glacial till.

Drainage & Fertility:

Both drainage and fertility vary with soil type. However, in general terms, the site is well drained and moderately fertile. **Appendix C** presents a map indicating the location of flushed areas where drainage is somewhat impeded in gley soils and where mineral deposits result in greater fertility.

Adjacent habitat types and land uses

The principal habitats that adjoin the site include extensive areas of intact upland blanket bog (PB2) to the west and large areas of cutover bog (PB4), which are found to south west and to the east between the gully and the 'white road'. A mosaic of dry-humic acid grassland (GS3) and dense bracken (HD1) are found on better drained soils at the northern end of the site.

The site is surrounded by open hillside, predominantly heather dominated moorland which is used for extensive sheep grazing and some game shooting. There are extensive old areas of cutover bog in the surrounding landscape but there is no longer any active peat cutting in this area.

Conservation status / designations

The Upper River Dodder is located within the Wicklow Mountains candidate Special Area of Conservation (Site Code: 002122). The southern section of the site is also designated as a Special Protection Area (Wicklow Mountains SPA (Site Code: 004040). The entire site is designated as sensitive to fisheries and as a highly sensitive landscape. Under the Forest Service Indicative Forest Strategy, the site is crudely designated as having potential for woodland.

Special habitats and species

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Merlin (*Falco columbarius*), was observed during one of the site visits. Red grouse (*Lagopus lagopus*) have also been recorded from this area (Paddy Purser, pers. obs.). Both of these bird species are listed under Annex I of the EU Birds Directive and are a qualifying interest for the designation of the site as a SPA.

The tributary watercourses of the Dodder River contain a resident population of brown trout (*Salmo trutta*).

Site history

The site is located on the boundary of the townlands of Castlekelly and Glassamucky Brakes. Glassamucky translates as the “stream of the swineherd”. Both townlands are in the parish (and District Electoral Division) of Tallaght. The lands are historically associated with Glenasmole Lodge (also known as Heathfield Lodge and Cobbe’s Lodge) which is situated to the north of the site. This was originally built by George Grierson, a wealthy Dublin printer, in 1792 who leased the land from Thomas Cobbe who in turn leased from his father who was the Archbishop of Dublin at the time. Glenasmole Lodge was used for hunting and shooting and the Griersons were great entertainers. Grierson's three daughters lived in the lodge after his death and they altered it to the style of a Swiss Chalet with thatched roof. They brought back plants and mementos from all over the world to Glenasmole. The house was burned down and rebuilt circa 1812 on a plan designed by the Griersons. Glenasmole is associated with the fianna legends and there were many stories of Finn McCool in the glen.

Current use(s)

The site is currently used in conjunction with the surrounding hillside as an extensive grazing area for sheep. A feral herd of goats and some horses also graze the site. There are no historic management records for the site other than the fact that it has been used as a sporting (shooting) estate for much of the last two centuries. The gully clearly supported considerable tree cover in the past which has simply been unable to regenerate in recent decades due to the pressure of browsing deer, sheep, goats and horses.

Weaknesses and threats

The threats to this woodland are principally browsing mammals, namely deer, sheep, goats and horses. The un-checked presence of these mammals on the site has meant that regeneration from the existing trees has been unable to break through and develop.

Other threats are:

- fire from both the burning of moorland and the setting alight of cars on the edge of the public road.
- *Rhododendron ponticum* has colonised the northern (lower) end of the site and is spreading up the gully.
- Wind is destabilising mature trees on the site which then facilitates further browsing from mammals. In the absence of surviving regeneration this is resulting in a loss of existing tree cover and biodiversity. Wind is only a problem for older trees as there is sufficient shelter on the site for trees to grow and survive.

PART 3: ECOLOGICAL SURVEY

Timing of ecological fieldwork

The site was visited by the team on several occasions during 2008 to get an overview of the species present – this was valuable as the early visit enabled us to find evidence of natural regeneration of mountain ash (*Sorbus aucuparia*) within the site, which was less evident in the later visit. The dates of the field survey were the 22nd April 2008, 21st August 2008 and 14th October 2008.

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General ecological overview

This upland site is located along the banks and valley sides of a tributary watercourse of the River Dodder. Three main tributaries of the Dodder rise high in the Dublin/Wicklow Mountains – the Slade Brook rises on the northern slopes of Seefingan Mountain, the Cot Brook rises on the northern slopes below the ridge between Seefingan and Kippure Mountain and the Upper Dodder has two main tributaries; Mareens Brook and Tromanallison, which rise above the Lough Brays and on Kippure Mountain respectively.

The area under consideration as part of this native woodland scheme proposal is the section of the Upper Dodder between the confluence of Mareens Brook and Tromanallison and an unnamed watercourse at O 123 180 and extends south to the boundary of open moorland and upland farmed grassland at O 116 195. This watercourse is bounded by open moorland near the confluence and then flows through a deeply cut steeply sided valley northwards to the lands associated with Glenasmole Lodge.

Main existing habitats

The principal habitats encountered within the site include:

- Upland blanket bog (PB2)/wet heath (HH3) mosaic
- Poor fen and flush (PF2)
- Dense bracken (HD1)/dry humid acid grassland (GS3) mosaic
- Eroding/upland river (FW1)
- Exposed siliceous rock (ER1)
- Remnants of montane riparian woodland (WN5)

The dominant habitat on the upper slopes of the valley is **upland blanket bog (PB2)**, which occurs on a variety of peat depths within the site and occasional forms a mosaic with **wet heath (HH3)** on areas of shallower peats on the valley slopes. This is especially true at the southern end of the site where river flows through a plateau area, with only a gentle drop in slope before entering the steep sided valley below.

Typical species encountered in the area of **intact blanket bog (PB2)** include purple moor-grass (*Molinia caerulea*), ling heather (*Calluna vulgaris*), cross-leaved heath (*Erica tetralix*), bell heather (*Erica cinerea*), common cottongrass (*Eriophorum angustifolium*), hare's-tail cottongrass (*Eriophorum vaginatum*), bog asphodel (*Narthecium ossifragum*) and deergrass (*Trichophorum cespitosum*). *Sphagnum* mosses encountered include *Sphagnum capillifolium* and *Sphagnum papillosum*. Where soils are shallower these slopes tend to support areas of **wet heath (HH3)**, which contain extensive areas of heath rush (*Juncus squarrosus*) in addition to the species detailed above. Lands to the east and west of the valley contain extensive areas of **cutover bog (PB4)**. These areas are no longer actively cut and many of them are regenerating well.

The watercourse itself is best described as an **eroding/upland river (FW1)**, which is often very fast flowing and consists of a series of boulder falls, with several waterfalls in the steepest part of the valley at O 120 189. Due to the spate nature of this oligotrophic river there is virtually no in stream vegetation and the river banks are also typically unvegetated showing signs of recent flooding events in terms of debris and other material. Species encountered along the river banks include bracken (*Pteridium aquilinum*), wood sorrel (*Oxalis acetosella*), great wood rush (*Luzula sylvatica*), bilberry (*Vaccinium myrtillus*) and a variety of bent grasses (*Agrostis capillaris* and *Agrostis canina*). A small number of side streams enter the site from the eastern side – notably at O 119 192 and O 120 191.

The valley slopes above the watercourse are occasionally bisected by a series of **wet flushes (PF2)**. Here rushes (*Juncus effusus*, *Juncus articulatus*) form mono-dominant stands with occasional tormentil (*Potentilla erecta*), heath rush (*Juncus squarrosus*), sheep's sorrel (*Rumex acetosella*), tufted hair-grass (*Deschampsia flexuosa*), marsh pennywort (*Hydrocotyle vulgaris*), sphagnum mosses, lousewort (*Pedicularis sylvatica*), marsh violet (*Viola palustris*) and common butterwort (*Pinguicula vulgaris*). The sedges; glaucous sedge (*Carex flacca*) and greater tussock sedge (*Carex paniculata*) were also recorded.

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Areas of **dense bracken (HD1)** and **dry humid acid grassland (GS3)** form a mosaic on areas of mineral soils and on better drained steeper soils, notably on the western sides of the valley. Typical species present include bracken with occasional bilberry, ling heather, great wood rush, heath wood rush (*Luzula multiflora*) and hard fern (*Blechnum spicant*). Other species include red fescue (*Festuca rubra*), creeping bent (*Agrostis stolonifera*), velvet bent (*Agrostis canina*), common bent (*Agrostis capillaris*), mat grass (*Nardus stricta*), Yorkshire fog (*Holcus lanatus*), wood sorrel, wood sage (*Teucrium scorodonia*), white and red clover (*Trifolium repens* and *Trifolium pratense*), daisy (*Bellis perennis*), tormentil, sheep's sorrel and heath bedstraw (*Galium saxatile*). Purple moor-grass is occasional.

Small areas of **exposed siliceous rock (ER1)** are found adjacent to the waterfalls and in the steep sided ravine sections of the site. Vegetation in these areas is often limited to mosses and liverworts in the splash zones of the waterfalls but in other areas dense growth of great wood rush and hard ferns can be found.

The areas of remnant woodland within the site are best described as **montane riparian woodland (WN5)**. Tree species recorded include mountain ash (*Sorbus aucuparia*), downy birch (*Betula pubescens*), eared willow (*Salix aurita*), rusty willow (*Salix cinerea* subsp. *atrocinerea*) and in more sheltered areas hazel (*Corylus avellana*), oak (*Quercus robur*), hawthorn (*Crataegus monogyna*) and holly (*Ilex aquifolium*). Honeysuckle (*Lonicera periclymenum*) was found on birch. Many of the trees recorded show extensive browsing damage by deer, sheep and goats including bark stripping and browsing on lower branches. A large number of trees have died and remained standing, or more commonly slipped down the bank due to erosion at the base of the tree by animals seeking shelter. The ground flora beneath the woodland is varied and dominated by elements of both dry humid acid grassland and blanket bog/wet heath.

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Table 2:
List of the main plant species found in the habitats and their relative abundance indicated using the DAFOR scale

Latin Name	Common Name	Upland blanket bog (PB2)/wet heath (HH3)	Poor fen and flush (PF2)	Dense bracken (HD1)/dry humid acid grassland (GS3)	Exposed siliceous rock (ER1)	Riparian Woodland (WN5)
Canopy layer						
<i>Quercus robur</i>	English oak					R
Understorey layer						
<i>Betula pubescens</i>	Downy birch					A
<i>Sorbus aucuparia</i>	Mountain ash					A
<i>Salix aurita</i>	Eared willow					O
<i>Salix cinerea</i> subsp. <i>atrocinerea</i>	Rusty willow					O
<i>Corylus avellana</i>	Hazel					R
<i>Crataegus monogyna</i>	Hawthorn					R
<i>Ilex aquilinum</i>	Holly					R
Field layer						
<i>Agrostis canina</i>	Velvet bent			A		O
<i>Agrostis capillaris</i>	Common bent			A		O
<i>Agrostis stolonifera</i>	Creeping bent			A		
<i>Anthoxanthum odoratum</i>	Sweet vernal grass			O		
<i>Bellis perennis</i>	Daisy			R		
<i>Blechnum spicant</i>	Hard fern	R		O	O	O
<i>Calluna vulgaris</i>	Ling heather	D		O		O

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Latin Name	Common Name	Upland blanket bog (PB2)/wet heath (HH3)	Poor fen and flush (PF2)	Dense bracken (HD1)/dry humid acid grassland (GS3)	Exposed siliceous rock (ER1)	Riparian Woodland (WN5)
<i>Carex flacca</i>	Glaucous sedge		R	R		
<i>Carex paniculata</i>	Greater tussock-sedge		R			
<i>Deschampsia flexuosa</i>	Tufted hair-grass	O	R	O		
<i>Erica cinerea</i>	Bell heather	R		R		
<i>Erica tetralix</i>	Cross-leaved heath	O				O
<i>Eriophorum angustifolium</i>	Common cottongrass	O				
<i>Eriophorum vaginatum</i>	Hare's-tail cottongrass	O				
<i>Festuca rubra</i>	Red fescue			O		O
<i>Galium saxatile</i>	Heath bedstraw	O	R	O		
<i>Holcus lanatus</i>	Yorkshire fog			R		
<i>Hydrocotyle vulgaris</i>	Marsh pennywort		O			
<i>Juncus articulatus</i>	Jointed rush		O			
<i>Juncus effusus</i>	Soft rush	O	D			
<i>Juncus squarrosus</i>	Heath rush	O	O			
<i>Lonicera periclymenum</i>	Honeysuckle					R
<i>Luzula multiflora</i>	Heath wood rush	O				
<i>Luzula sylvatica</i>	Great wood rush	O	O	O	O	
<i>Molinia caerulea</i>	Purple moor-grass	A	A			
<i>Nardus stricta</i>	Mat grass	R		O		
<i>Narthecium ossifragum</i>	Bog asphodel	R	R			
<i>Oxalis acetosella</i>	Wood sorrel			F		
<i>Pedicularis sylvatica</i>	Lousewort	R	R			

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Latin Name	Common Name	Upland blanket bog (PB2)/wet heath (HH3)	Poor fen and flush (PF2)	Dense bracken (HD1)/dry humid acid grassland (GS3)	Exposed siliceous rock (ER1)	Riparian Woodland (WN5)
<i>Pinguicula vulgaris</i>	Common butterwort		R			
<i>Potentilla erecta</i>	Tormentil	O	R	O		O
<i>Pteridium aquilinum</i>	Bracken			D		
<i>Rumex acetosella</i>	Sheep's sorrel	O	O	O		
<i>Succisa pratensis</i>	Devil's bit scabious		O			
<i>Teucrium scorodonia</i>	Wood sage			O	O	
<i>Trichophorum cespitosum</i>	Deergrass	O				
<i>Trifolium pratense</i>	Red clover			R		
<i>Trifolium repens</i>	White clover			R		
<i>Vaccinium myrtillus</i>	Bilberry	O		O		
<i>Viola palustris</i>	Marsh violet	O	O		O	
Ground layer (Bryophytes & Lichens)						
<i>Sphagnum capillifolium</i>		R	O			
<i>Sphagnum papillosum</i>		R	O			
<i>Polytrichum commune</i>			F			

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Small features of biodiversity value

There were several signs of badger (*Meles meles*) activity noted during the survey including a latrine at O 12358 17860 and a sett at O 123 183. There was evidence of fox (*Vulpes vulpes*) also using the site. Other species recorded include common upland species such as meadow pipit (*Anthus pratensis*) and skylark (*Alauda arvensis*).

The locations of individual flushes within the site were mapped as these areas should be avoided when the locations of exclosures are considered. These locations are presented in **Table 3** below.

Table 3. Locations of flushes within the site.

Grid Letter	Easting	Northing
O	11856	19329
O	12045	19034
O	12445	18028
O	12548	17810
O	12344	18130
O	12099	18986
O	12191	18692
O	12243	18563
O	12258	18507
O	12307	18372
O	12331	18312
O	12414	18116

Native woodland type(s)

The woodland within this site does not easily fit into any of the categories described by Fossitt (2001). It can be generally classified as a riparian woodland (WN5) in an upland context and shows some elements of bog woodland (WN7). It is described as a montane alluvial woodland by Little *et. alia* (2008). This type of open upland woodland, which has almost disappeared from the Irish landscape, may well be worth a unique semi-natural woodland classification of its own. There are woodland remnants and individual trees scattered over the site. These have been individually recorded and their distribution per species is presented in **Appendix C**.

Based on the soils, the ground vegetation, the existing tree cover, the elevation and climate it is recommended that the most suitable native woodland type for this site is **Oak-birch-holly woodland**. Although there is only two oak trees present in the lower section of the gully there are good examples of birch and mountain ash dominated areas with an occasional scattering of holly and hazel throughout. The presence of these species coupled with a ground story dominated by ling, bilberry and wood rush with occasional hard fern and frequent bracken would indicate that this is the native woodland type most likely to occur naturally on this site and to succeed.

PART 4: OBJECTIVES

The main ecological management objectives for the site include the following:

- The restoration and expansion of montane alluvial / gully woodland within the site.
- Retention of habitats of ecological interest (flushes).
- Retention of features of biodiversity interest (badger setts).

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- Removal of non-native invasive species such as *Rhododendron ponticum* from the site.
- Increase biodiversity within the site through increased presence of seed/berry/nut bearing tree species (such as mountain ash, holly and hazel).
- Recreate an ecological corridor linking the lowland enclosed farmland areas with upland open moorland.
- Improve cover for feeding and breeding birds in this upland valley.
- Improve the fisheries value of the watercourse through increased provision of food sources for in-stream fauna (leaf litter, invertebrates, etc.).
- Assist in reducing erosion in this valley.
- Improve regulation and control of water flow thereby reducing flooding events downstream.

Medium- to long-term vision

The medium to long term vision of this project is to:

- Restore native woodland to this upland site and in so doing help to restore the ecological and landscape integrity of the upper River Dodder.
- Provide a case study of best practice in upland woodland restoration.
- Provide a case study in the regulation of water movement from hillside to watercourse using native tree cover as a flood preventative measure.

Short-term objectives

The short term management objectives are to:

- Provide protection in the form of fenced exclosures for existing natural regeneration of trees from browsing mammals.
- Provide protection in the form of fenced exclosures from browsing mammals in areas not currently exhibiting regeneration of trees but deemed to have potential in this regard. Conduct some manual scarification on these sites to assist in this process.
- Establish new areas of tree cover through planting and protect using fenced exclosures.
- Control and remove *Rhododendron ponticum* from the site.

Part 5: Operations

Summary of the Management Plan:

A detailed operational and cost plan including exact location of exclosures, species mix etc. will be prepared as part of a formal Native Woodland Scheme Application. For the purpose of this report, the management plan can be summarised as follows:

- Provide protection in the form of fenced exclosures for existing natural regeneration of trees from browsing mammals
- Provide protection in the form of fenced exclosures from browsing mammals in areas not currently exhibiting regeneration of trees but deemed to have potential in this regard. Conduct some manual scarification on these sites to assist in this process.
- Establish new areas of tree cover through planting and protect using fenced exclosures.
- Remove invasive *Rhododendron ponticum* from the site

Operations

1. It is proposed to erect 6 x 1ha. exclosures as follows:

- 2 x 1 ha. deer fenced exclosures protecting existing regeneration of birch, rowan, willow and hazel. There will be no treatment within these exclosures. Sample plots

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recording baseline data for existing regeneration will be taken at the time of fence erection and these plots will be monitored annually with a repeat measurement in year 4.

- 2 x 1 ha. deer fenced exclosures in areas of existing tree cover with regenerative potential through wind or avian dispersal. These plots will receive treatment in the form of manual scarification using mattocks / hoedads and bracken whipping for three seasons.
 - 2 x 1 ha. deer fenced exclosures in areas where trees are moribund or lost. These plots will be planted irregularly, predominantly with birch and rowan, with approximately 2,000 stems / hectare. Planting sites will be selected using the principle of mimicking nature, i.e. on micro-sites within the exclosure with no attention paid to either spacing or stocking. These plots will receive bracken whipping for three seasons.
2. Fencing material to be delivered to the site using a helicopter
 3. Rhododendron at northern section of site to be manually cut and chemically controlled using Roundup Biactive as per best practice guidelines. Follow up chemical control will be carried out as required in years 2, 3 and 4.

Schedule & Costing:

A detailed operational and cost plan including exact location of exclosures, species mix etc. will be prepared as part of a Native Woodland Scheme Application. However, an indicative operation and cost plan for the first four years of the project based on the proposed plans of the project forester and ecologist is presented below:

Operation	Year 1	Year 2	Year 3	Year 4
Delivery of Materials to Site Helicopter ½ Day	€2,000			
Deer Fencing 6 x 1 ha. exclosures @ €10,000	€60,000			
Manual Scarification 2 x 1 ha. exclosures @ €500	€1,000			
Plants (2,000 / ha.) 2 x 1 ha. exclosures @ €1,000	€2,000		€500	
Planting (2,000 / ha.) 2 x 1 ha. exclosures @ €500	€1,000		€500	
Bracken Whipping 4 x 1 ha. exclosures @ €250	€1,000	€1,000	€1,000	
Rhododendron control Manual & Chemical in Year 1 Chemical in Years 2-4	€4,000	€1,000	€500	€500
Management & Monitoring	€10,000	€2,000	€2,000	€2,000
Total	€81,000	€4,000	€4,500	€2,500

A New Native Woodland Grant of €6,920 per hectare should be available for this project (over 4 years) which if applied to the proposed 6 exclosures, each of 1 ha., will not cover the cost of the proposed work.

References

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- Council of the European Communities (1979). **Council Directive of 02 April 1979 on the conservation of wild birds (79/409/EEC)**. O.J.L. 103, 25 April 1979.
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Fossitt, J. A. (2000). **A Guide to Habitats in Ireland.** The Heritage Council, Kilkenny, Co. Kilkenny.
Hayden, T. and R. Harrington (2000). **Exploring Irish Mammals.** Town and Country House Ltd., Trinity House, Charleston Rd., Ranelagh, Dublin 6.
Lynas, P., S. F. Newton and J. A. Robinson (2007). **The Status of Birds in Ireland: an Analysis of Conservation Concern 2008-2013.** Irish Birds. No. 8.

PART 6: DECLARATION

We, the undersigned, declare that we have jointly prepared this Native Woodland Plan as part of the application for this site under the Native Woodland Scheme, in accordance with the terms and condition of the scheme.

Participating Forester

Signature _____ Date _____

Participating Ecologist

Signature _____ Date _____

Applicant

Signature _____ Date _____

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Appendix B: Electro-Fishing Survey of Upper Dodder 2008 Report Prepared By Dublin District, Eastern Region Fisheries Board

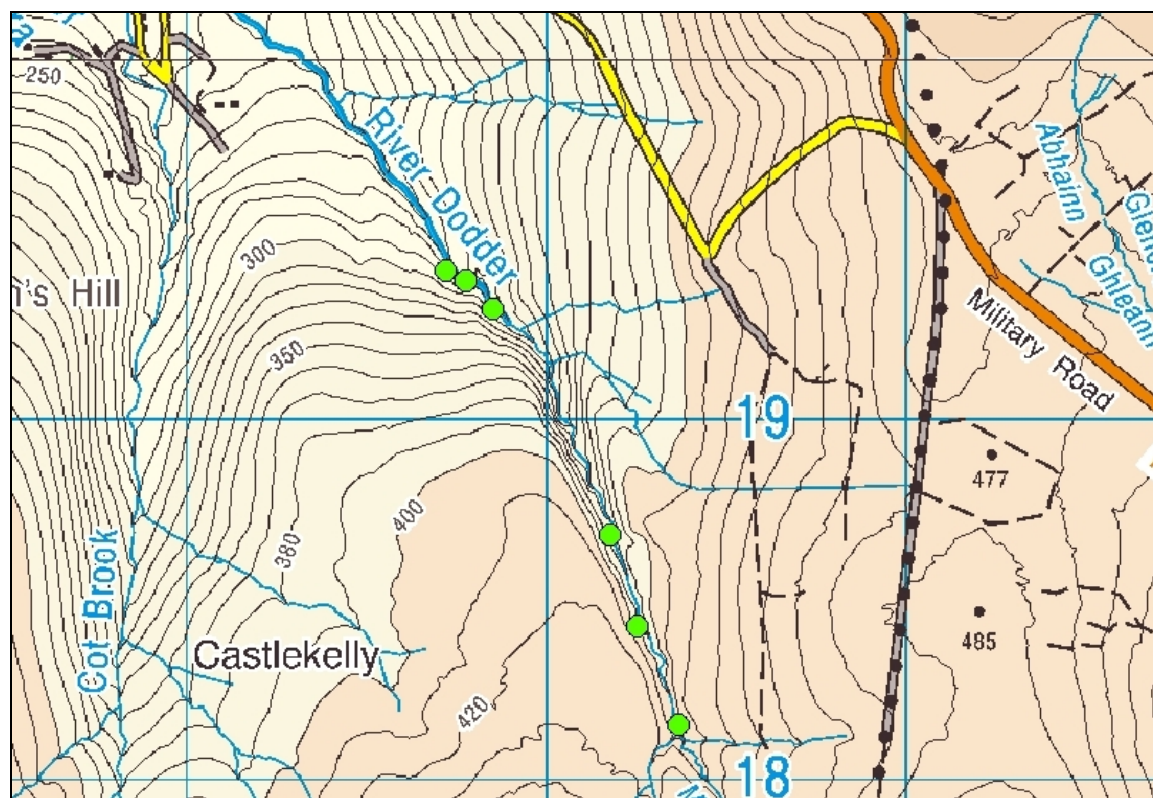


The electro-fishing survey on the upper Dodder was carried out over 2 days, 02/10/08 and 03/10/08. Six sites were fished in total, starting upstream and working down. Each site was 30 metres in length.

We electro fished these sites using a *safari 550* backpack unit that immobilises fish using an electric current.

The stream was dominated by boulder/ pool sequence habitat typical of high energy, high gradient upland streams. Pools measured to up to 1.5 metres in depth with a limited amount of smaller substrate such as gravel and sand. Stream width varied from 1 to 2 metres but this included exposed boulders so the wetted width would be less.

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**Figure 1: Map of electro-fishing sites
(with upstream site 1 at bottom of map)**

Site No.	Grid Reference	Fish Present
1	X312362 Y218628	No
2	X312187 Y218685	No
3	X311930 Y219253	No
4	X311859 Y219309	No
5	X311778 Y219394	No
6	X311722 Y219470	Yes

Table: 1. Fish presence at various sites

The results we achieved on 5 of the sites we electro-fished were that there were no fish present, the exception being the most downstream site where fish were recorded. The site where we got fish was just inside the boundary of the overall woodland restoration site. The species present at this site were *Salmo trutta* (brown trout). 7 fish in total were caught, processed and released unharmed. Measurements for these fish varied from 6cm to 15cm, with the majority being in the 10 to 15cm group.

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Size (cm)	Brown Trout
6	
7	-
8	-
9	-
10	-
11	
12	
13	
14	
15	

Table: 2. Size distribution of trout captured

Conclusion

While the absence of fish at most sites could be explained by low conductivity of the water affecting the electrical conductivity and thus the efficiency of our equipment, it is unlikely. It is known that *Salmo trutta* have a limit in terms of altitude and first order streams in high catchments will have an absence of fish species. Other limiting factors include lack of spawning pebble/gravel due to the high energy nature of these mountainous streams, this along with nutrient poor habitat mean that trout, if present will be slow growing and in low numbers.

The only site where we recorded fish was site 6. It was interesting that different year classes were recorded here showing that this section of the stream offers a habitat to a variety of age groups. Just one 6cm trout was recorded which would be in the year 0+ age group, indicating spawning had occurred last winter upstream or in the vicinity of the site.

The other fish were in the 10cm to 15cm length group, and due to nutrients available, they could be up to 3 years old. Trout migrate downstream as they grow due to competition and space requirements showing that spawning habitat is available upstream.

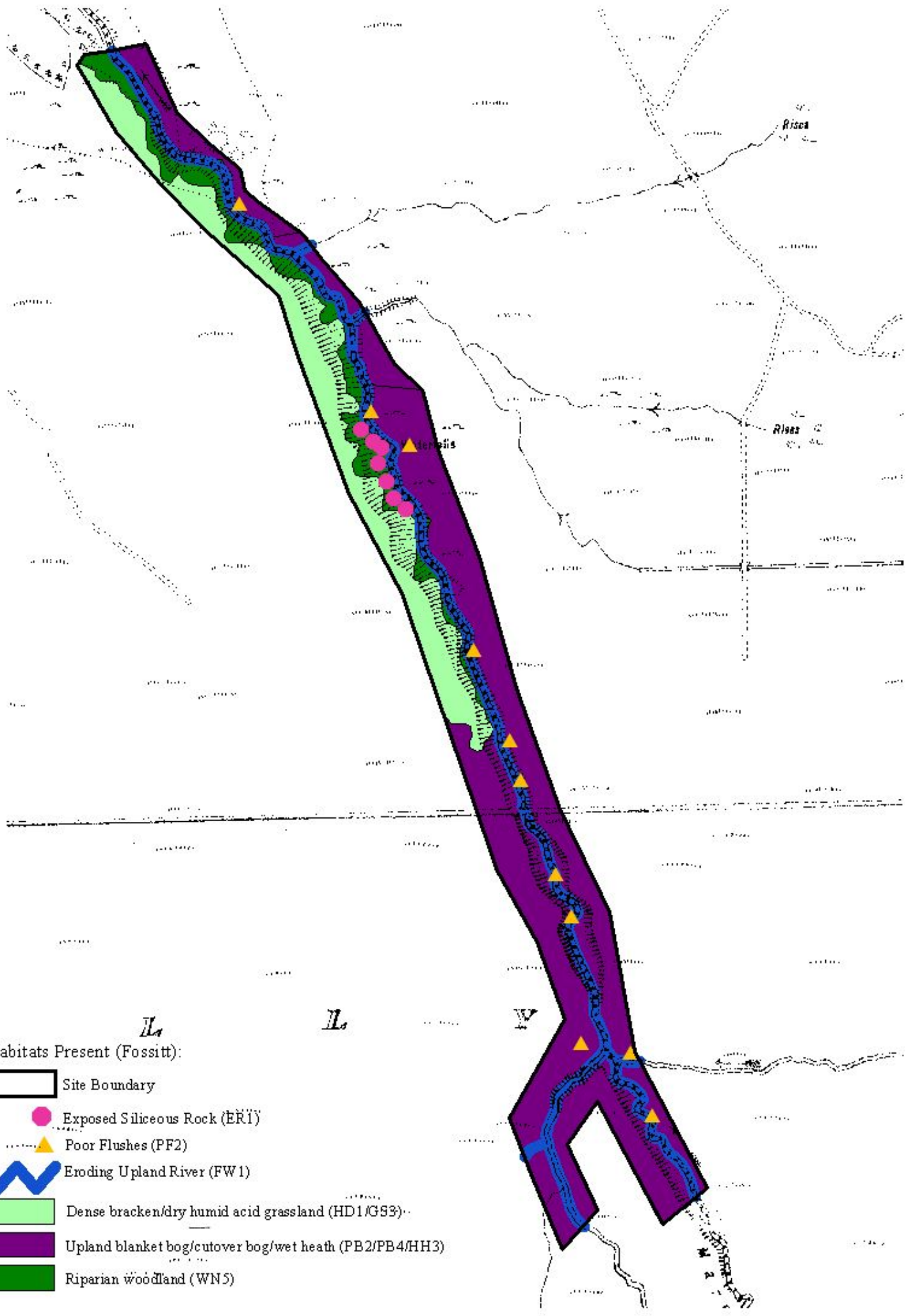
The presence of trout at the most downstream site is positive in that the distance between this site (6) and sites 4 & 5 is relatively short (<100metres) with no visible barriers to migration and suggests that sites 4 & 5 have the potential to hold fish.

Sites 1,2 & 3 are further upstream, with a large waterfall in between site 3 and 4 that would be impassable to migrating fish so it is unlikely that fish would inhabit these sites.

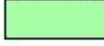

As the woodland scheme progresses and the riparian zone hopefully develops, it will be interesting to carry out this electro-fishing survey at the 3 downstream sites in the future.

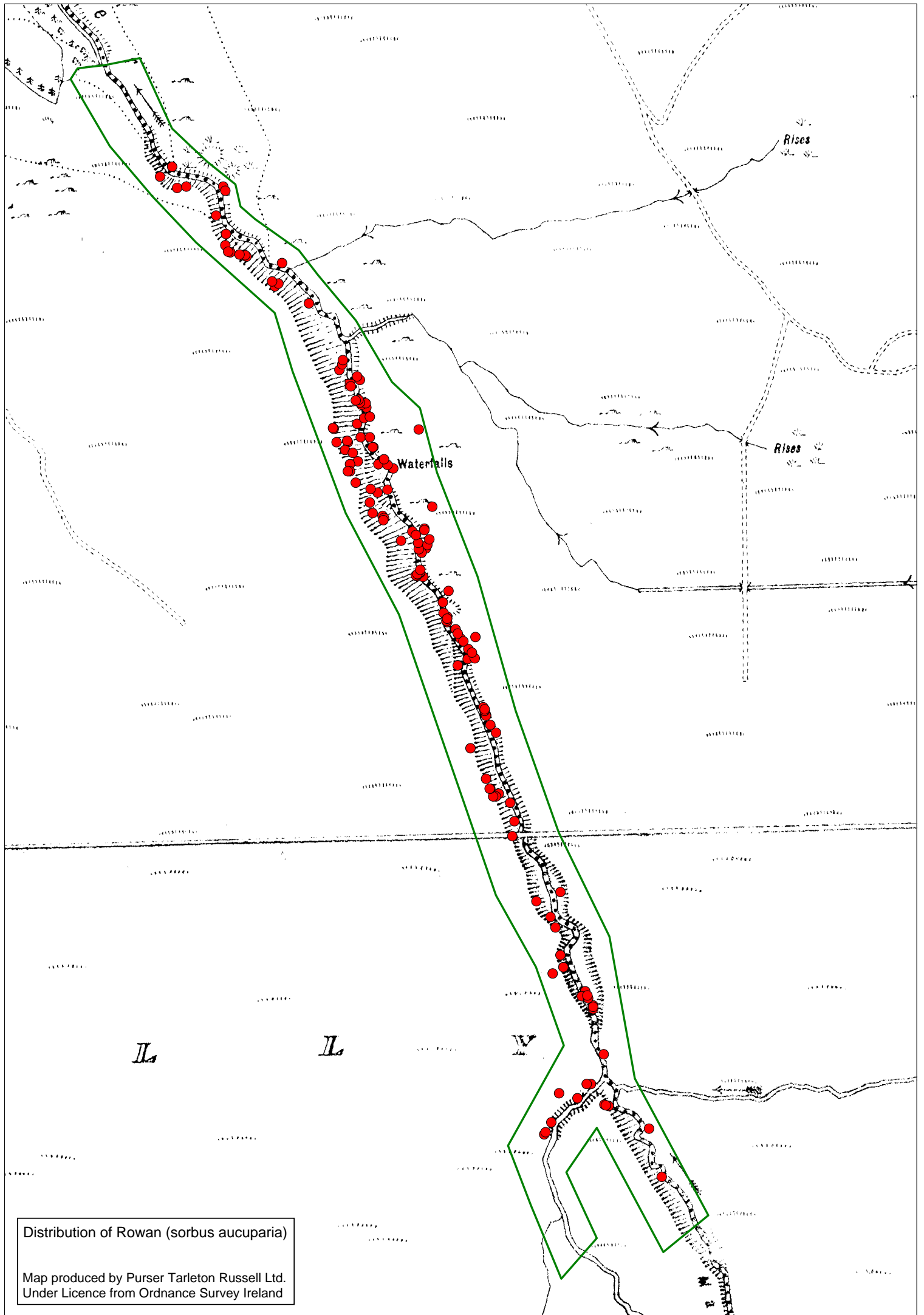
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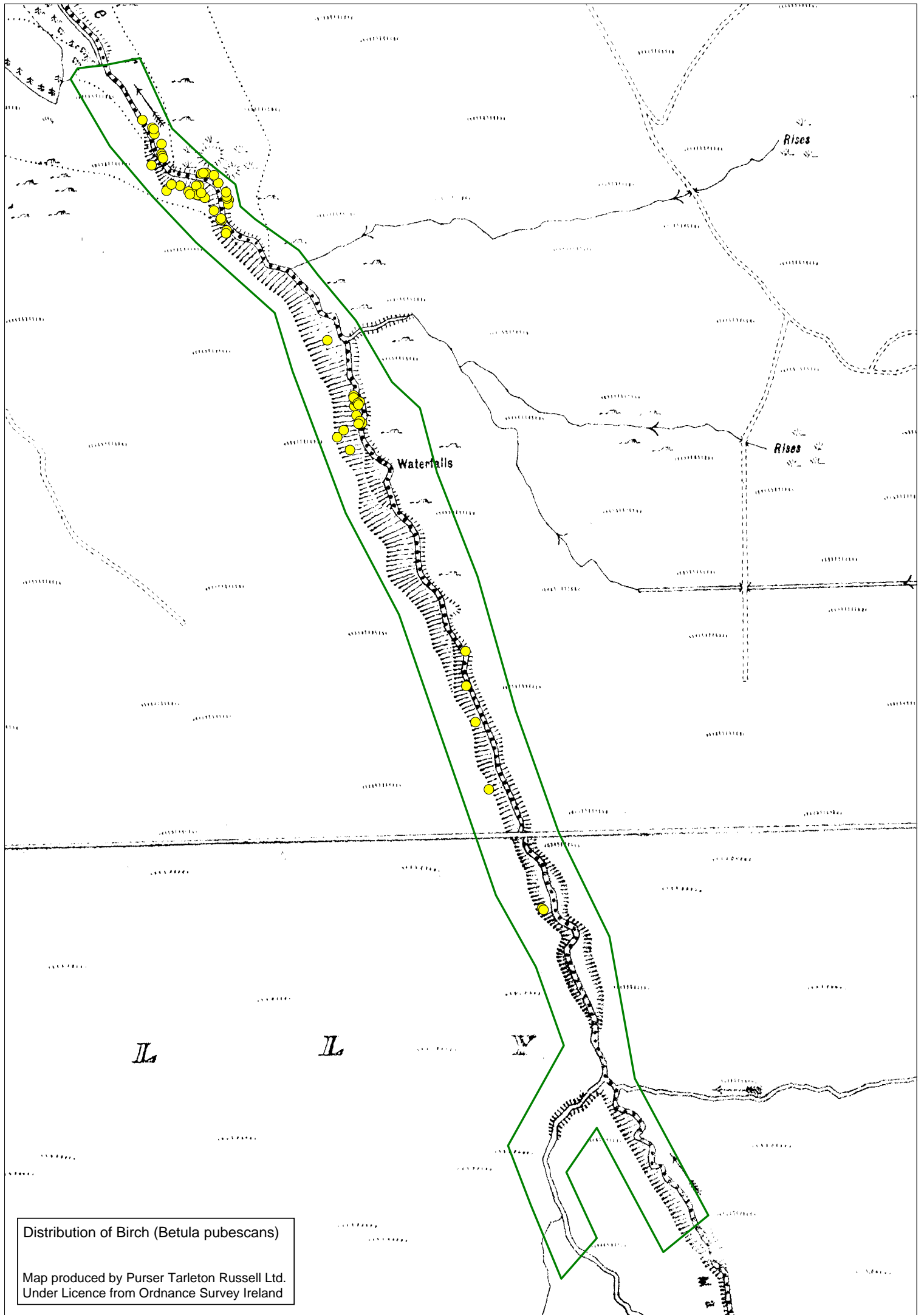
APPENDIX C: MAPS



Habitats Present (Fossitt):

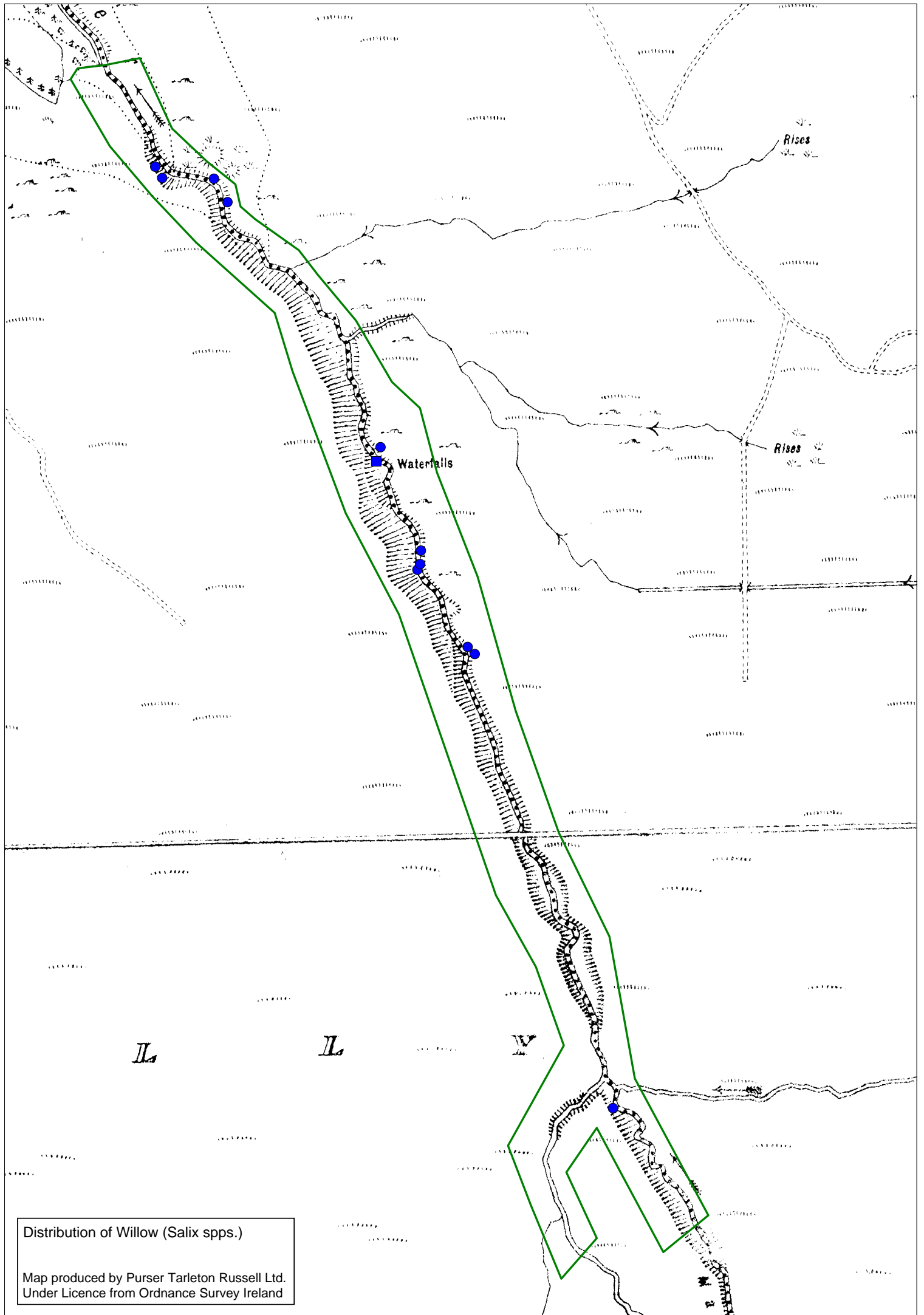
-  Site Boundary
-  Exposed Siliceous Rock (ER1)
-  Poor Flushes (PF2)
-  Eroding Upland River (FW1)
-  Dense bracken/dry humid acid grassland (HD1/GS3)
-  Upland blanket bog/cutover bog/wet heath (PB2/PB4/HH3)
-  Riparian woodland (WN5)

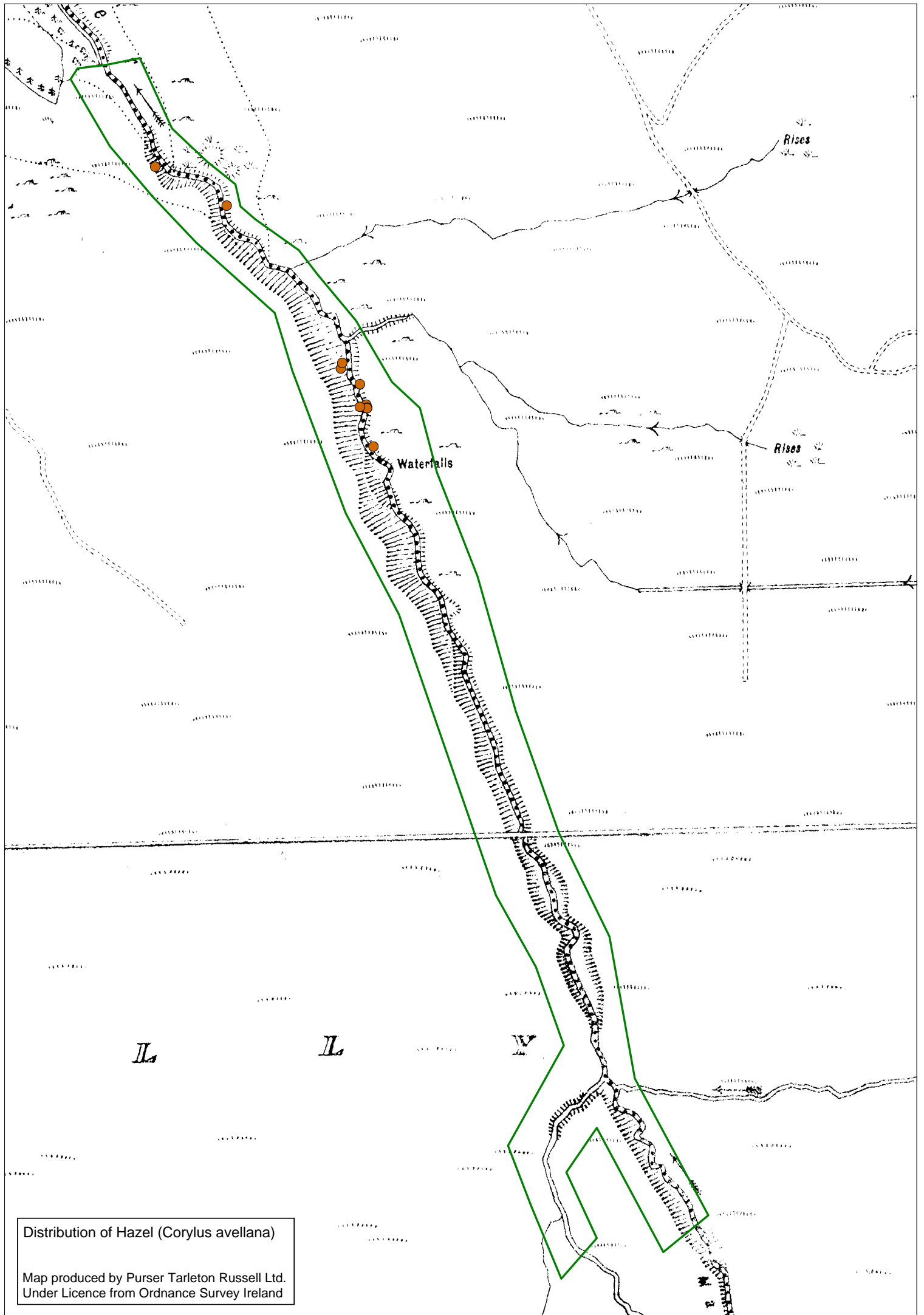




Distribution of Birch (*Betula pubescens*)

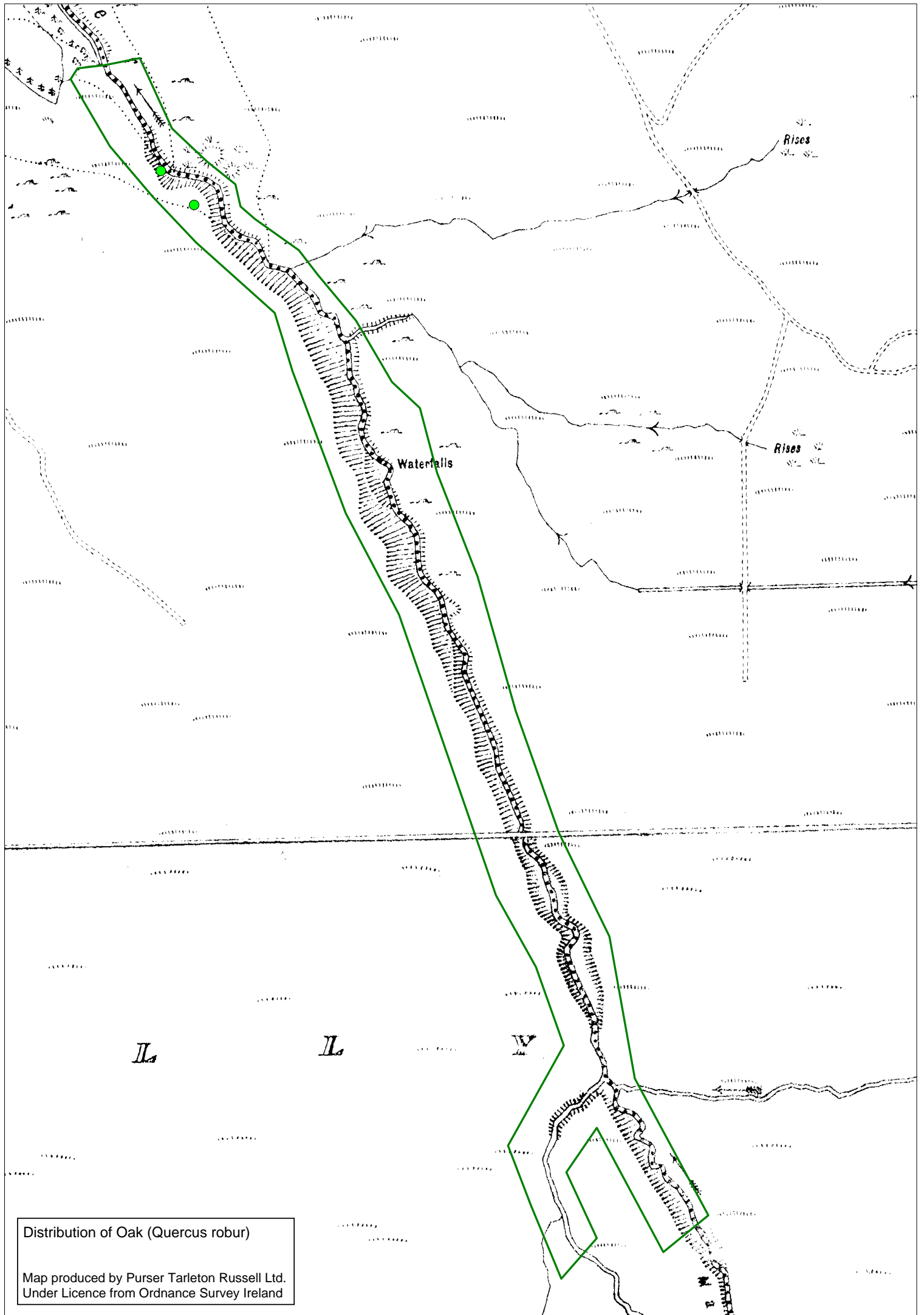
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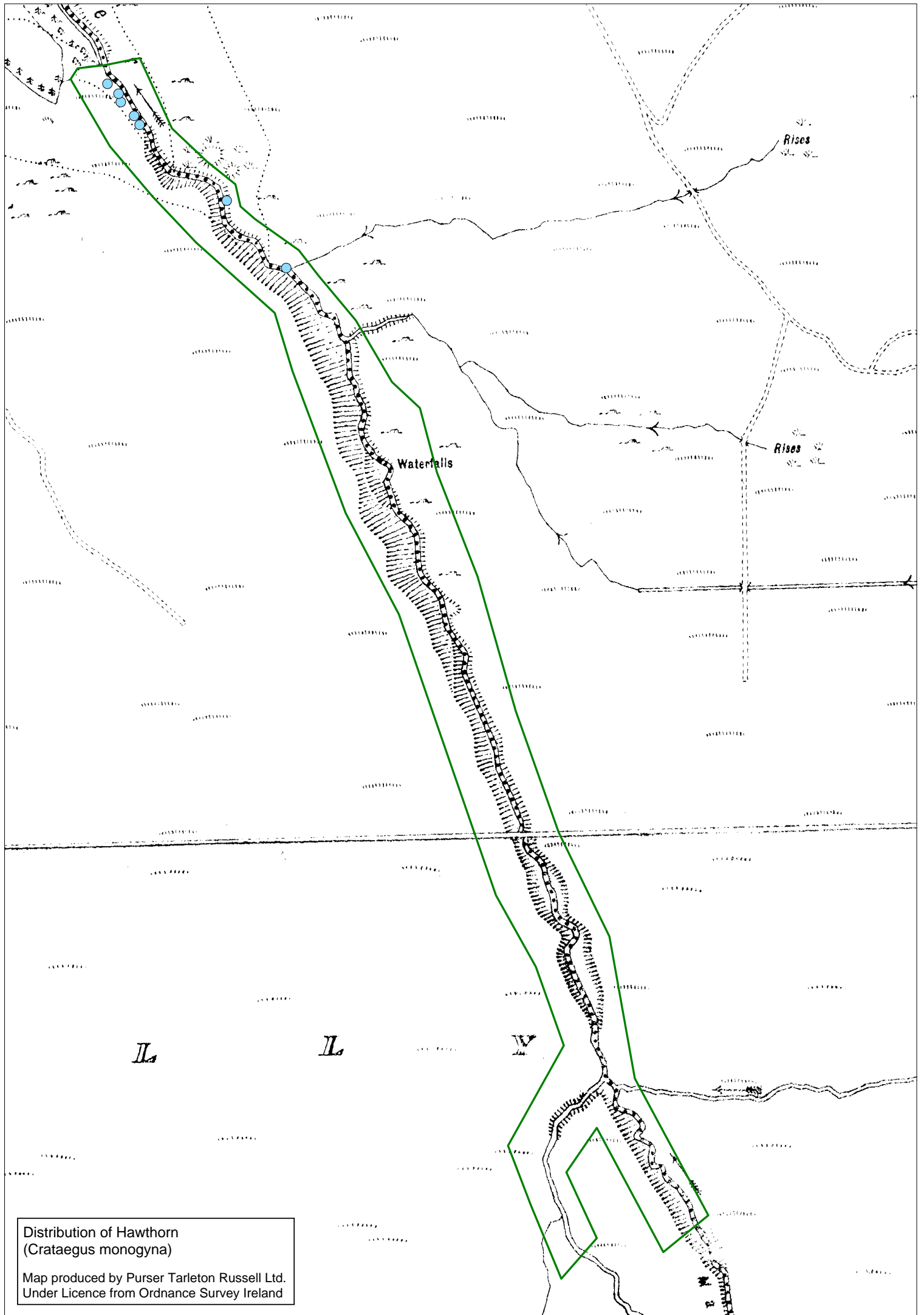
Distribution of Hazel (*Corylus avellana*)

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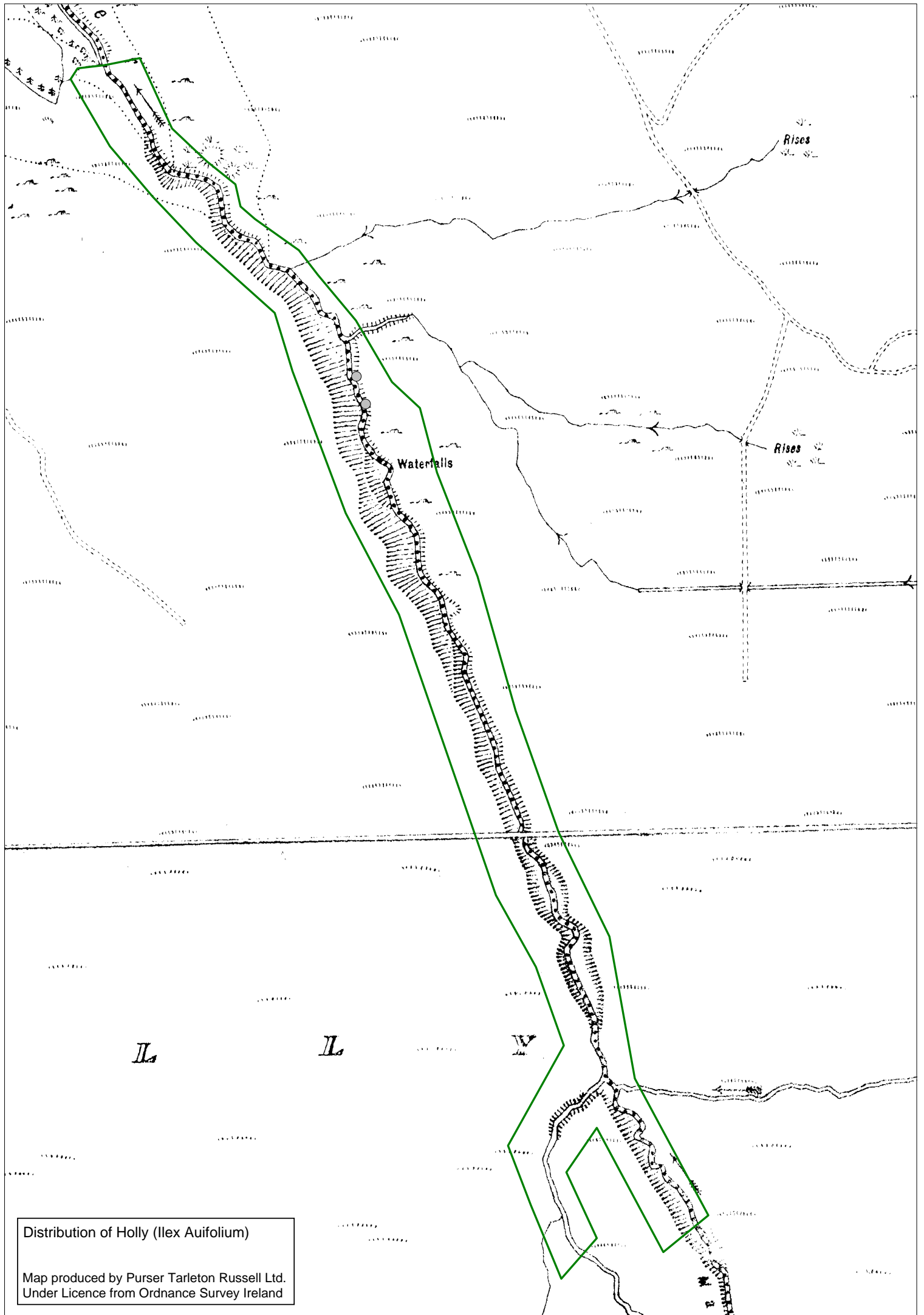
Distribution of Oak (*Quercus robur*)

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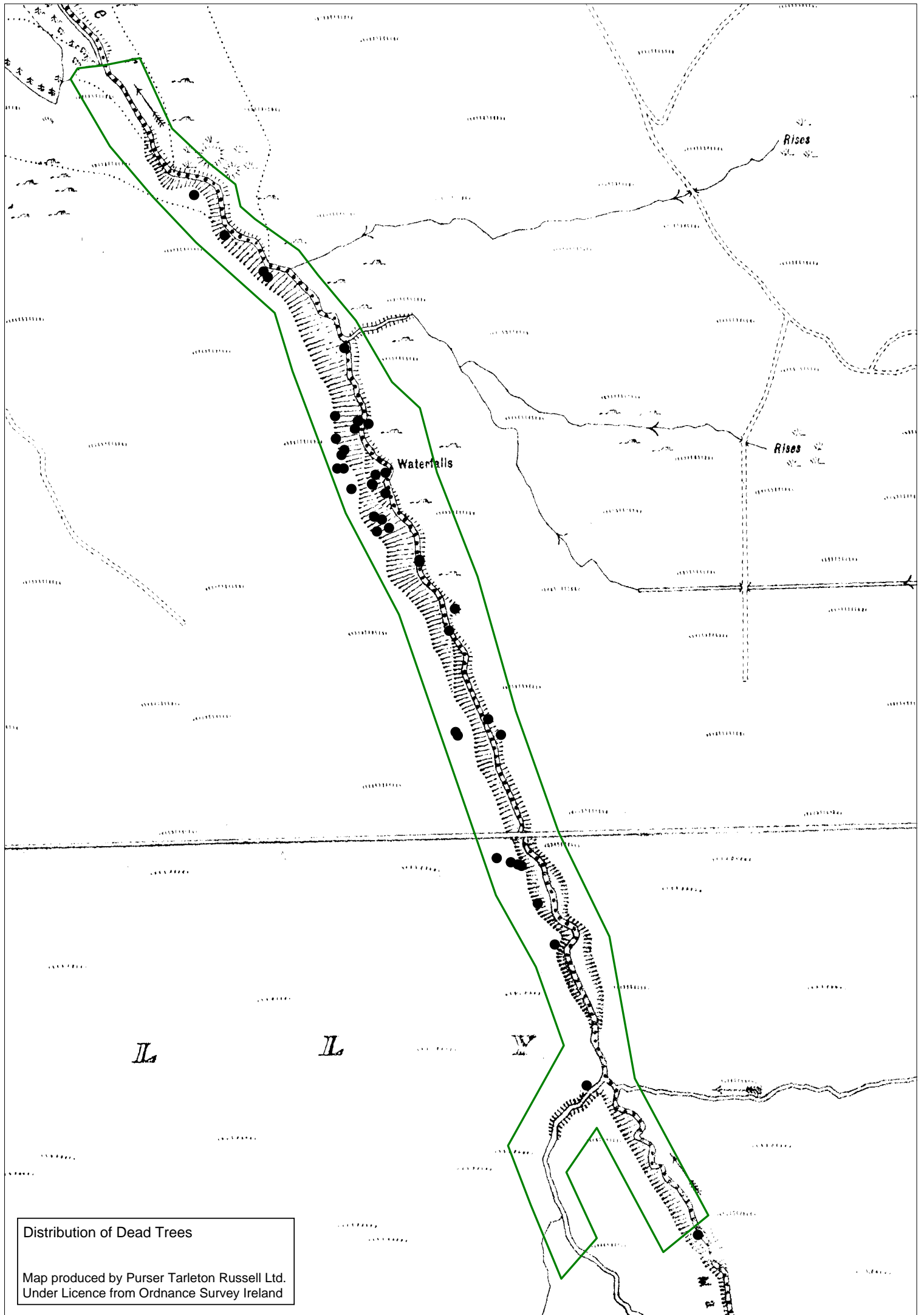
Distribution of Hawthorn
(*Crataegus monogyna*)

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Distribution of Holly (*Ilex Auifolium*)

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Distribution of Dead Trees

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APPENDIX D: PHOTOS

