Restoring the Annan Water

River Annan (Adamsholm)

Survey of Vegetation

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for the general public

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Report Title: River Annan (Adamsholm) National Vegetation Classification Survey

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Key to National Vegetation Classification (NVC) plant communities found here. These are groups of plants which, under natural conditions are found together.

W7 Alder (*Alnus glutinosa*- **Ash** *(Fraxinus excelsior)*-**Yellow Pimpernel** *(Lysimachia nemorum*) Flood plain woodland

W9 Ash (*Fraxinus excelsior)*-**Rowan or Mountain Ash***(Sorbus aucuparia)*

Dogs Mercury *(Mercurialis)* Upland mixed broadleaved woodland with dog's mercury)

W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland

(Upland oak-birch woodland with bluebell/wild hyacinth)

Syn. Bluebell oak woodland; Oak-hazel woodland.

Introduction

The aim of this survey was to look at the vegetation of a semi natural stretch of the River Annan which had been fenced back from the river, keeping out stock, for many years.
The RAW group thought that this demonstrated what could be done to restore the natural vegetation, by simply excluding farm animals and letting nature take its course. Plant communities, that is individual plants which normally live together were observed immediately upstream of Adamsholm from NT07657 06954 to NT07564 07180. The work will be part of the Restoring the River Annan (RAW) project. It will show what "leave alone" naturalisation can look like after decades of stock exclusion. It may inform what possibilities there are with any intended planting and the extent of non-native species present. This stretch of the Annan is considered to be one of the most biodiverse in the river catchment

Method

It is impossible to count and identify every single plant when surveying, so sampling areas are chosen as best examples of the woodlands. Squares of 10m x 10m were used to sample the trees and shrubs and squares of 4m x 4m were used to sample the small plants at the field level. The sample data for each quadrat was collected using the Domin Scale (see below). The estimated plant cover of each species is on a 10 point scale

Key to Domin Scale

Domin (cover) **Values**

10 = 91-100%
9 = 76-75%
8 = 51-75%
7 = 34-50%
6 = 26-33%
5 = 11-25%
4 = 4-10%
3 = < 4% (many individuals)
2 = < 4% (several individuals)
1 = < 4% (few individuals
+1 = outside of sample but part of community

Community Descriptions

Summary Site Description

The study area is situated on the upper River Annan immediately upstream of the footbridge at Adamsholm (NT07657 06954 to NT07564 07180) at an altitude of circa 130m *a.s.l.* A large island accounts for the bulk of the study area.
Riparian or burnside woodland, semi-natural broadleaved woodland with tall, high forest structure dominates the area. The woodland consists of two different types – floodplain ash-alder woodland on level ground over sandy, gravel deposits and oak-birch woodland on steeper banks over freely draining brown earths.

The woodland is mainly native with ash, alder, wych elm, birch, oak, rowan, hawthorn, hazel, bird cherry and willows all well represented. The non-native but naturalised sycamore is common in the ash-alder woodland. Beech is occasional throughout and there is a scattering of spruces. Gooseberry makes the occasional appearance in the shrub layer.

Ground plants are important in any wooded areas. Species such as dog's mercury and enchanter's nightshade carpet the forest floor under the mixed canopy of ash and alder while wood sorrel, wavy hair-grass and mosses dominate the scene beneath the open canopy of birch and oak.

The woodland is in good condition with a well-developed shrub layer and both vertical and horizontal layering providing mixed shade regimes under the high canopy. There is much in the way of large fallen trees and woody debris on the forest floor, this will be helpful in encouraging invertebrates in the burn such as stone fly and freshwater shrimps.

The river channel is largely intact with only one small area of serious erosion situated at the upstream limit of the study area (NT07564 07180). Minor and braiding related to periodic flooding occurs occasionally within the main channel. An oxbow lake is forming on the east bank of the large island[1] as the flow to latter is gradually reduced through the build-up of flood derived debris. Winter flooding is likely to maintain the backwater channel/oxbow lake. SEPA says that the water volume during recent floods has increased by 15% flooding frequency has also increased. Severe winter flooding has produced many fallen trees, fresh alluvial deposits and woody and other debris[2] tangled round trees and dumped in narrow necks and sluggish backwaters. Flow rates vary from fairly brisk shallow riffles over gravels and small cobbles on straight sections through to deeper sluggish pools over more silty deposits on bends and near-still backwaters. Small rapids and eddies are seen occasionally in the narrow neck of pools. Large woody debris is fairly common within the channel, adding welcome

[1] Note: it is not clear to the author whether the island originated through in-channel braiding and dumping or as a result of natural meandering and the shifting channel cutting off the original channel. Whatever the origin, both phenomena are clearly at play now.
[2] Note: mainly general agricultural detritus.

diversity. Vegetation on the banks is well developed and rich. In-channel aquatic vegetation is less common.

Ash-alder woodland

W9 *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodland[3]

a) Typical sub-community

[**W7** *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland][4]

This is the most widespread community occurring within the study area, dominating the island and anywhere that more base-rich substrates are encountered.

The community consists of a high forest canopy co-dominated by *Fraxinus excelsior, Acer pseudoplatanus* and *Alnus glutinosa* over an under-tier of *Ulmus glabra, Betula pubescens, Sorbus aucuparia, Prunus padus, Corylus avellana* and *Crataegus monogyna. Salix cinerea* and *S. myrsinifolia/phylicifolia* are scattered throughout. *Sambacus nigra* is occasional. Within the higher canopy *F. excelsior* and *A. pseudoplatanus* are the most common species. *A. glutinosa* is less common but contributes some of the oldest, most mature trees with tall multi-stemmed specimens consistent throughout.

The field layer[5] consists of typical ash-elm associates such as *Mercurialis perennis, Dryopteris filix-mas, Stachys sylvatica, Geum urbanum* and *Circaea lutetiana.* Species such as *Silene dioica, Deschampsia cespitosa, D. dilatata* and *Lapsana communis* are more occasional. The periodically inundated nature of the ground is reflected by species such as *Chrysosplenium oppositifolium, Angelica sylvestris, Juncus effusus* and *Geum rivale.* It is in the latter situation that the community comes closest to *Alnus-Fraxinus-Lysimachia* woodland. *Rubus fruticosus* and the non-native *Ribes uva-crispa*

[3] Note: the sample data for this community is located immediately below.

[4] Note: community titles in [brackets] indicate that there are small areas conforming to this community within the overall stand.

[5] Note: ideally, woodlands should be surveyed in spring when the full complement of vernal flora is in evidence.

provide a woody element to the field layer. The latter can become abundant in places (e.g. NT07604 07001).

Among the ground layer *Thuidium tammeriscinum, Eurhychium praelongum, Mnium hornum, Plagiomnium undulatum* and *P. affine* dominate the flora. *Hypnum cupressiforme* and *Brachythecium rutabulum* are common on trees and logs.

W9 *Fraxinus excelsior-Sorbus aucuparia-Mercurialis* woodland

a) Typical sub-community

Plot: 01 (Island)

Grid ref: NT 07657 06954

Species	**Cover**
Acer pseudoplatanus	7
Fraxinus excelsior	6
Alnus glutinosa	5
Ulmus glabra	4
Prunus padus	4
Crataegus monogyna	1
	3
Hazel -Corylus avellana	+1
Salix cinerea	+1
Sambacus nigra	+1
Dryopteris filix-mas	7
Mercurialis perennis	7
Stachys sylvatica	7
Hypnum cupressiforme	7
Chrysosplenium oppositifolium	6
Luzula sylvatica	5
Geum urbanum	4
Rubus fruticosus	4
Aegopodium podagraria	4
Thuidium tammeriscinum	4
Mnium hornum	4
Montia sibirica	4
Circaea lutetiana	4
Plagiomnium undulatum	3
Brachythecium rutabulum	3
Geranium robertianum	3
Plagiomnium affine	3
Eurhychium praelongum	2
Arrhenatherum elatius	2
Urtica dioica	2
Silene dioica	2
Cardamine pratensis	+4
Geum rivale	+4
Deschampsia cespitosa	+2
Dryopteris dilatata	+2
Lapsana communis	+1
Angelica sylvestris	+1

Oak-birch woodland

W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland[6]

c) *Anemone nemerosa* sub-community

This community is far less widespread than the latter. It is found occurring on short, steep banks on the west bank of the river (e.g. NT07576 07115). The community is also more modified than the latter with much disturbance and both planted and invasive non-native species in evidence.

The open canopy is dominated by *Betula pubescens* and *Sorbus aucuparia*. *Quercus petraea* is more occasional.[7] The occasional *Fagus sylvatica* and *Picea* spp. are scattered here and there. There is no under-tier or shrub layer to speak of just a scattering of *Corylus avellana.*

The field layer is open and grassy with abundant *Deschampsia flexuosa* and *Agrostis capillaris* sharing the ground with *Oxalis acetosella* and various mosses such as *Rhytidiadelphus loreus, R. triquetrus* and *Thuidium tammeriscinum. Luzula sylvatica* and *Dryopteris dilatata* are occasional. *D. filix-mas* is less common.

[6] Note: the sample data for this community is located immediately below.

[7] Note: a little further upstream beyond the study area, more developed oak woodland dominates the west bank. In the latter situation *Q. petraea* is the dominant species over an under-tier of abundant *C. avellana.*

W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland

c) *Anemone nemerosa* sub-community

Plot: 02 (steep west bank)

Grid ref: NT 07576 07115

Species	**Cover**
Betula pubescens	8
Sorbus aucuparia	6
Quercus petraea	4
Corylus avellana	2
Picea sp.	1
Fagus sylvatica	1
Deschampsia flexuosa	8
Oxalis acetosella	7
Agrostis capillaris	6
Rhytidiadelphus loreus	6
Rhytidiadelphus triquetrus	6
Thuidium tammeriscinum	5
Dryopteris dilatata	3
Luzula sylvatica	3
Quercus petraea seedlings	2
Sorbus aucuparia seedlings	1
Polytrichum commune	+3
Potentilla erecta	+3
Anthoxanthum odoratum	+3
Dryopteris filix-mas	+3
Rubus fruticosus	+1

Other communities

The marginal flora is rich and well developed with species such as *Filipendula ulmaria, Angelica sylvestris, Silene dioica, Ranunculus repens, Geum rivale, G. urbanum, Juncus effusus, Phalaris arundinacea, Dactylus glomerata, Arrhenatherum elatius, Plantago lanceolotta, Myosotis* spp., *Rumex obtusifolius, Stachys palustris, Prunella vulgaris, Ajuga reptans* and *Tussilago farfara* among others. Occasional clumps of *Ulex europaeus* occur on open gravels and sandy soils.

Assessment

The habitat within the study area although too small to be considered of national or regional importance is nevertheless of great local importance. Semi-natural broadleaved woodland is scarce in the area – good quality largely native semi-natural woodland with well-developed canopy and stand dynamics, structural diversity and associated field layer is scarcer yet. Although likely secondary in origin, the ash-alder woodland occurring on the island, bears many of the characteristics of wildwood with good mixed age-structure from tall, mature veterans through to wispy saplings; much vertical and horizontal layering and chaotic and contorted growth; mixed shade regimes and both standing and prone dead and dying wood. The latter features combined with the lack of management and regular damage wrought by catastrophic winter flooding provide multiple niches for both flora and fauna to exploit. Natural regeneration of seedlings and saplings is occurring, indicating the presence of healthy seed parents. Much of this new growth is hard browsed by deer (e.g. NT07604 07001) but there is enough younger, pole-stage stems throughout the stand to exploit any gaps that may open in the canopy. Even in the nightmare scenario of losing all the big ash trees to ash die-back, continued canopy cover should be ensured by species such as alder, sycamore, birch and rowan.

Invasive non-native species are not, as yet, a threat. Beech is probably the biggest threat and, ideally, should be controlled.[8] Sycamore, although not native is long naturalised and has no negative impacts on ash-elm and ash-alder woods. Indeed, in the light of both ash die-back and Dutch elm disease, it may well prove a godsend as it helps fill the niche opened up by the loss of ash and elm to these diseases. There are some other non-natives throughout the stand including the garden escapees gooseberry and pink purslane. The former could prove a problem and is best cleared; the latter may look unsightly but is unlikely to have any detrimental impacts on the native flora.

Channel erosion, a phenomenon so typical of so much of our watercourses throughout the country, is not a serious issue within the study area. There is one eroded bank on a bend of the river immediately at the upstream limit of the study area (NT07564 07180)

On the whole then, the habitat within the study area can be considered to be of high local conservation value and provided stock continue to be excluded and both deer pressure and non-native plant species are kept in check then the future of the habitat looks secure. Although very small in extent, parts of the island provide a type example of more natural and dynamic habitats that were once much more widespread but have now been largely lost to land improvement. The area contrasts sharply with the open, denuded and eroded burns so typical of so much of the country, especially in the uplands, and provides an example of what can be achieved when river systems are allowed the space to breathe a little and not be constricted by the encroachment of agriculture, forestry and other land uses. The value of the wider study area is also locally high as part of a network providing habitat connectivity within the River Annan corridor.

[8] Note: bigger specimens can be ring-barked instead of felling. As well as controlling the spread of the beech, ring barking would also provide valuable dead standing wood.

Photographs

W9 *Fraxinus-Sorbus-Mercurialis* woodland. Showing the diverse vertical and horizontal layering beneath the high forest canopy with dappled light and mixed shade regimes that characterise the main stand situated on the island. Photograph taken from high up on the opposite bank.

W9 *Fraxinus-Sorbus-Mercurialis* woodland. Left, carpets of dog's mercury cover the forest floor. Right, large multi-stemmed alder which are a feature of the stand. In places the community grades to **W7** *Alnus-Fraxinus-Lysimachia* woodland.

W9 *Fraxinus-Sorbus-Mercurialis* woodland. Showing the high forest canopy and dappled light created by ash and alder. Should ash die-back do for the ash then sycamore and to some extent, alder[9] are well placed to fill the niche. One can only hope that this is not the case as there are some fine ash trees in the stand and moreover, in terms of natural plant associations, we have already lost the influence of wych elm on the high canopy light/shade regime, the loss of ash too, would render a long established native woodland type replete with all of its own characteristics, bereft of its two key dominant species. In small parts of the island, as here in the photograph, it is pleasing to look up and see a canopy made-up almost exclusively[10] from native trees in their natural setting.

[9] Note: birch and rowan would also likely contribute. Beech may also feature and should, ideally, be monitored and controlled if it becomes invasive.

[10] Note: the tree in the top right hand corner is sycamore but other than that the canopy in this little spot consists of ash with occasional alder.

W9 *Fraxinus-Sorbus-Mercurialis* woodland. Showing the structural diversity and dynamic substrate regime on the forest floor. The regular damage and consequent irregular regrowth caused by flood events creates multiple niches for both flora and fauna. This is further enhanced by the constantly changing substrate condition as the cycle of dumping and lifting of alluvial material after each flood creates new conditions for plants and animals to exploit. The latter is very much a feature of more natural floodplains and is scarce in the region.

Channel features. Looking upstream from the west bank showing the well vegetated margins and the intact channel. This is good quality habitat and the type of habitat that is so badly missing from so many of our burns and rivers. Unrestricted access by farm stock and the lack of wide enough uncultivated margins has led to the loss of such habitat up and down the country. Fortunately it can be remedied provided enough land is set aside within river corridors to allow functioning natural habitat such as this to get firmly and permanently established.[11]

[11] Note: this is without getting into the many known positive benefits of such a policy re. flood prevention and related issues.

Channel features. Natural ephemeral and partial blockages in narrow necks such as this are a key feature of natural river systems. Such features are now very rare within our upland rivers and are often actually cleared in the name of fishery (primarily salmon) management.[12] Such intervention goes directly against the principles of ecological restoration whereby the aim is to encourage natural, dynamic ecosystems governed principally by natural processes. Under natural conditions, long gone species such as European beaver would've played a key role in creating such diverse flow systems, complete with small ponds, backwaters and shifting channels. Both fish and beaver co-existed happily for millennia and this is perhaps well worth remembering when we consider management options in regard to natural, short-lived and partial blockages such as large woody debris brought downstream by flood events.[13]

[12] Note: unnatural, permanent and near complete barriers such as weirs, caulds etc should, of course, be either removed completely (the ideal option) or modified to accommodate wildlife and allow more natural flow and temperature regimes etc to develop.

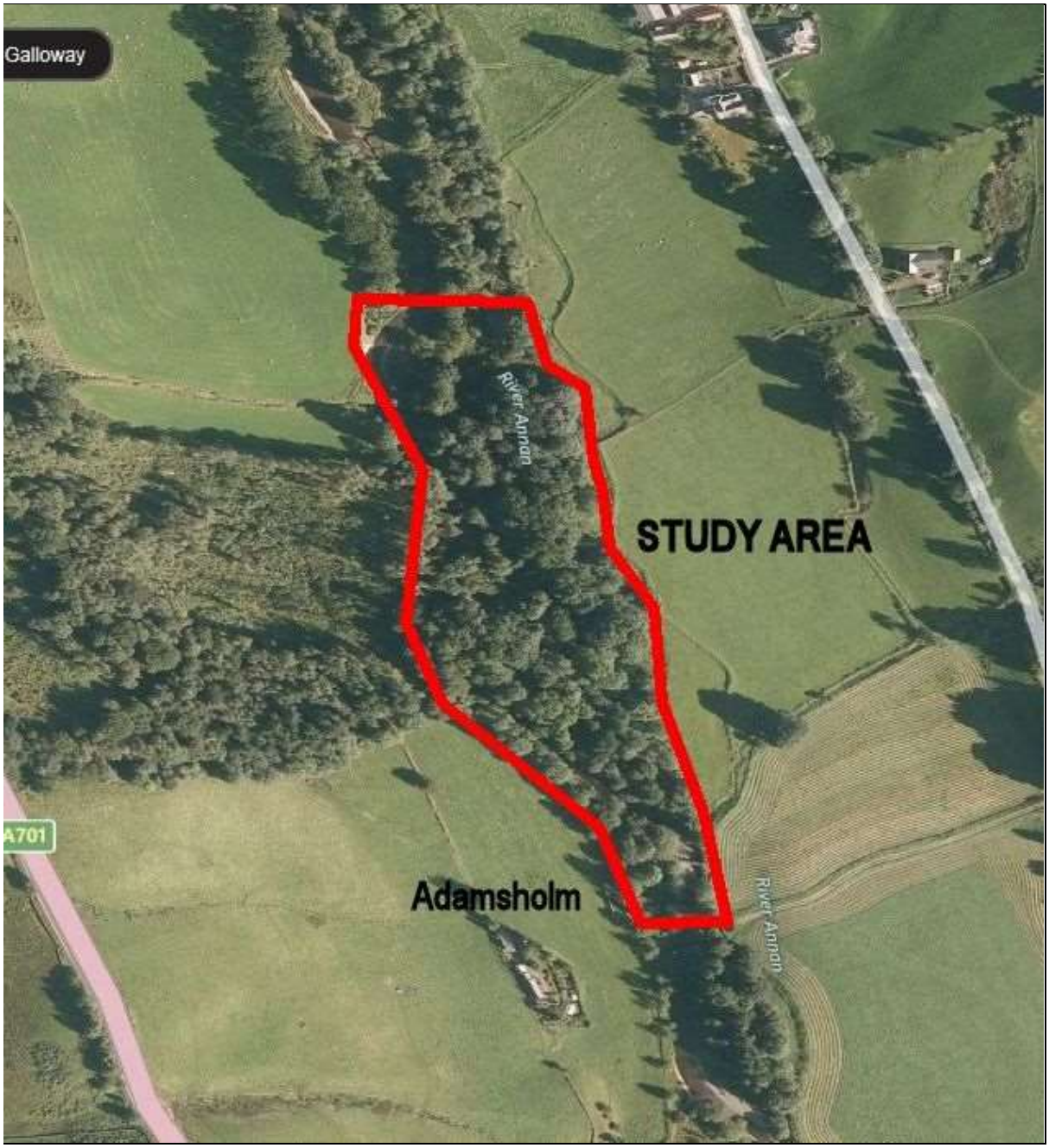
As witnessed in the photograph, such features can gather unsightly litter and general agricultural and forestry detritus but this speaks more of us and our behaviour than of natural processes.

[13] As an aside, the author is a keen angler (and can testify to the quality of the fishing on the Annan) and prefers wild, unkempt rivers to the pristine banks of so many of our well known rivers. In this respect, the upper Annan is better off than either the upper Tweed or upper Clyde.

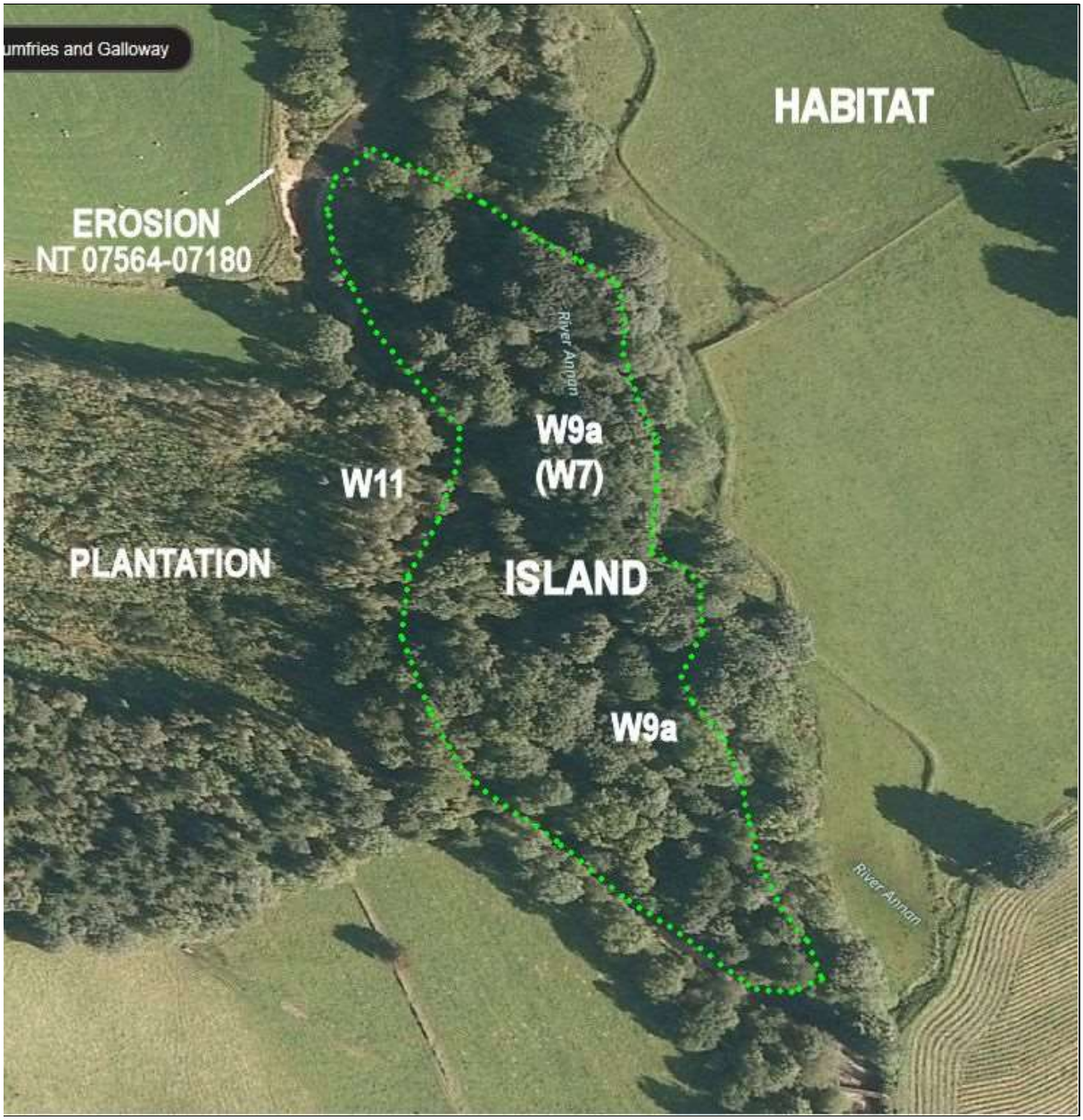
Channel features. Left, fallen trees directly in channel. Right, backwater channel/oxbow lake on east bank of the island. Both are typical features of more natural and undisturbed river systems and are an example of the quality of the habitat on this stretch of the river.

Erosion. Erosion on the west bank of the river at NT07564 07180 at the upper limit of the study area. Left, looking upstream, right, looking downstream. Note how close the fence is to the top of the eroded cliff and the lack of marginal woodland. Although erosion is one of the key (and welcome) natural processes governing river systems, accelerated erosion related to anthropogenic land use such as witnessed here is very damaging. Although remedial construction work such as netting or revetment can remedy the problem in the short-term, the longer-term solution is to allow a wider riparian corridor from which land exploitation is excluded[14] and natural processes allowed to run their course. In such situations, even when serious erosion events do occur, the impacts are less catastrophic and the recovery much quicker.

[14] Note: allowing for drinking access for stock and other such limited activities.



Study Area. Showing the study area (within the red boundary) for this report (aerial image taken from Bing).



Habitat. Showing NVC communities, estimated outline of the island (in green) and erosion event (aerial image taken from Bing).

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