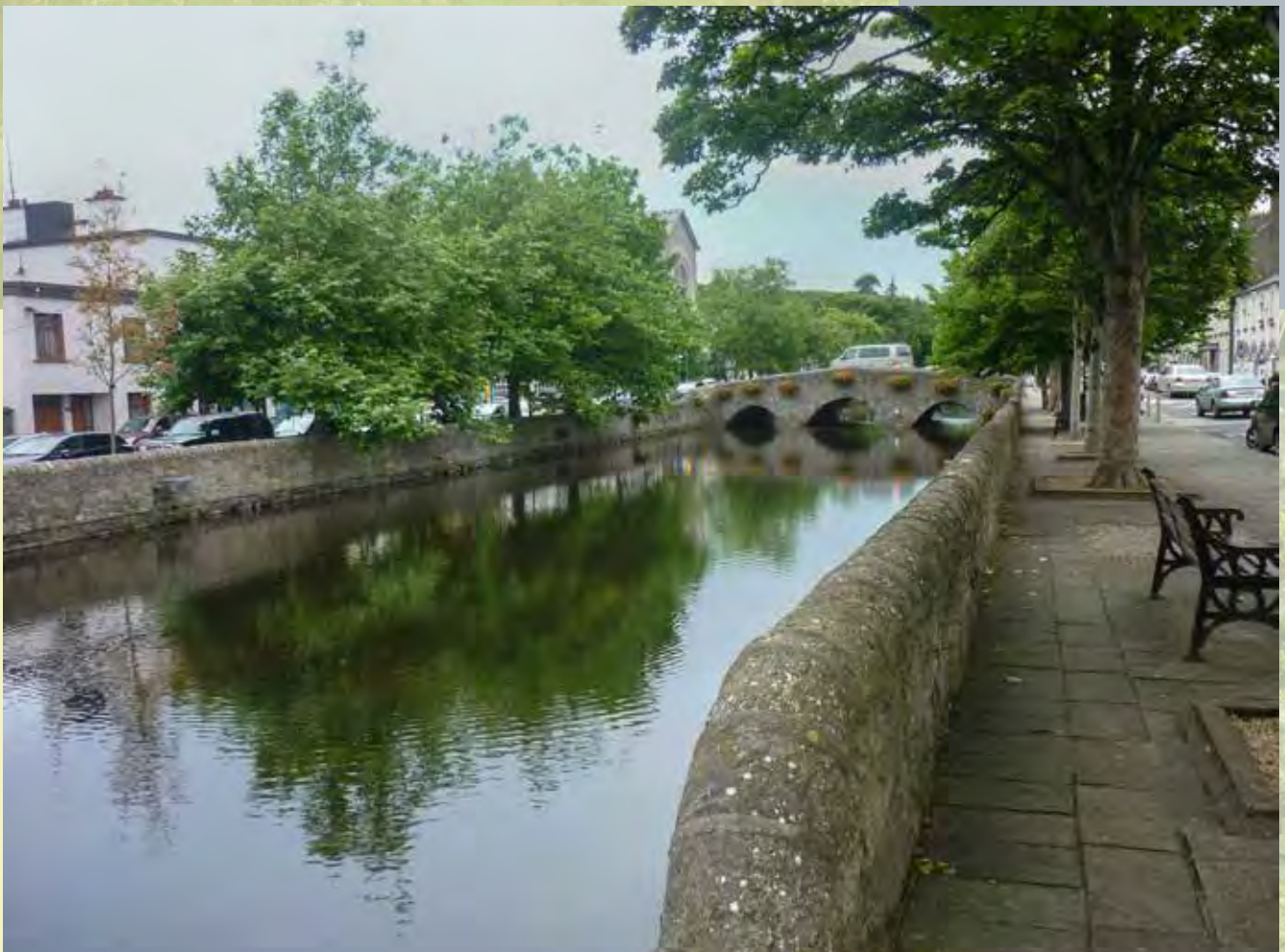


# WESTPORT BIODIVERSITY MANAGEMENT PLAN





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**MAYO TOWNS AND VILLAGES BIODIVERSITY  
MANAGEMENT PLAN SERIES: NO. 1 WESTPORT**



An Chomhairle Oidhreachta  
The Heritage Council



An action of the County Mayo Heritage Plan

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# CONTENTS

<b>Acknowledgements</b> .....	<b>4</b>
<b>Summary</b> .....	<b>5</b>
<b>1 Introduction</b> .....	<b>6</b>
1.1 Background .....	6
1.2 About this Plan .....	6
<b>2 Methods</b> .....	<b>7</b>
2.1 Desk Study and Consultations .....	7
2.2 Field Survey .....	8
2.3 Preparing the Management Plan.....	9
<b>3 Westport Habitats</b> .....	<b>10</b>
3.1 Overview .....	10
3.2 Local Biodiversity Areas .....	16
3.3 Ecological Corridors .....	21
3.4 Green Infrastructure .....	23
<b>4 Biodiversity Management</b> .....	<b>25</b>
4.1 Biodiversity Management Methods .....	25
4.2 Green Infrastructure and Ecological Corridors .....	30
4.3 Biodiversity Management Sites .....	31
<b>5 References</b> .....	<b>50</b>
<b>Appendices</b> .....	<b>51</b>
Appendix A: Scientific Names .....	51
Appendix B: GIS Database Structure .....	52

## LIST OF FIGURES

Figure 1. Habitat Map .....	14
Figure 2. Local Biodiversity Areas and Ecological Corridors .....	22
Figure 3. Green Infrastructure .....	24
Figures 4.1-4.4 Biodiversity Management Sites .....	47-49

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## SUMMARY

Baseline information on habitats and the Green Infrastructure they support is fundamentally important for biodiversity management and conservation and to inform planning and conservation policy in County Mayo. During the formulation of the Mayo Local Biodiversity Action Plan, the Mayo Biodiversity Working Group identified as a priority the need to identify areas of local biodiversity value and ecological corridors. This Biodiversity Management Plan identifies opportunities and recommends practical measures for biodiversity enhancement and conservation in Westport.

Improved agricultural grassland and buildings and gardens, which are usually relatively low in biodiversity value, are the most abundant habitat types in Westport. The most abundant semi-natural habitats in the study area are semi-natural grasslands, but Westport is particularly rich in woodlands for a primarily urban area. In addition, hedgerows and treelines in the study area totalled nearly 110 km. Other habitats present included scrub, freshwater rivers and lakes, small areas of heath and bracken, disturbed ground, and coastal habitats. Eight Local Biodiversity Areas were identified which comprise clusters of semi-natural habitats of high nature conservation value in a local context.

Ecological corridors and stepping stones facilitate movement of plants and animals between many Local Biodiversity Areas and within the wider landscape beyond Westport town. The Carrowbeg River is the most significant linear corridor in the town; smaller watercourses and hedgerow networks, as well as smaller patches of woodland and scrub, provide additional connectivity.

Green Infrastructure is the network of habitats where important ecosystem services are provided. Westport's recreation infrastructure includes publicly accessible greens, walkways, such as the Westport Greenway and the Great Western Greenway, and other amenity areas. The Carrowbeg River and other watercourses are important water resources, while wetlands and floodplains provide flood management services. Local Biodiversity Areas provide many ecosystem services, such as pollination, natural pest control, nutrient cycling and natural amenity. Woodland, scrub and heath reduce climate change impacts by taking up carbon, and farmland and forestry production ultimately depends on nature.

The biodiversity management plan includes advice on favouring native species, vegetation management, habitat creation, improving ecological connectivity and increasing biodiversity awareness. Specific objectives, actions, evaluation criteria and timelines are proposed for 16 biodiversity management sites and projects, and pointers are provided on where to go for further advice.

*This Biodiversity Management Plan identifies opportunities and recommends practical measures for biodiversity enhancement and conservation in Westport.*



# 1. INTRODUCTION

## 1.1 BACKGROUND

### 1.1.1 Context

Baseline information on the location, extent, distribution and condition of habitats is fundamentally important for habitat management and conservation and to inform future planning policy and conservation policies in relation to habitats in County Mayo. This information is also necessary to create awareness among landowners and local communities, and to engage with communities in the conservation and promotion of biodiversity at the local scale. The need to identify and collect information on areas of local biodiversity value and ecological corridors, and formulate recommendations for management has been identified as a priority by the Mayo Biodiversity Working Group during the formulation of the Mayo Heritage Plan and Mayo Local Biodiversity Action Plan. In addition, Mayo County Council Heritage Office has been working with a number of communities in the county to assist them in the preparation of Local Biodiversity Action Plans for their local areas.

### 1.1.2 Aims

This biodiversity management plan identifies opportunities for appropriate biodiversity enhancement and conservation and recommends practical measures aimed at conserving and enhancing the natural heritage of Westport.

The main aims of this plan are:

- To identify habitats, areas of local biodiversity importance and ecological corridors in the Westport study area
- To make detailed recommendations for habitat and biodiversity management and conservation priorities
- To make recommendations on land use planning and Green Infrastructure
- To explore opportunities for the development of educational and interpretive material for the towns

## 1.2 ABOUT THIS PLAN

- Section 2 – Methods: outlines the desk study and field survey methodology and the approach taken in preparing the management plan
- Section 3 – Westport Habitats: provides an overview of the main habitats in Westport, identifies Local Biodiversity Areas, and maps key Green Infrastructure in the town
- Section 4 – Biodiversity Management: recommends measures to improve Green Infrastructure and ecological corridors and management actions for specific biodiversity management sites
- Section 5 – References: lists the literature cited in the plan



## 2. METHODS

The plan was prepared in three stages:

- Conduct detailed desk and field based habitat surveys and consultations with community groups
- Assess areas of high biodiversity interest, including ecological corridors and other Green Infrastructure
- Develop specific proposals for managing and enhancing biodiversity and Green Infrastructure, recommend conservation priorities, and explore opportunities for developing interpretive material

### 2.1 DESK STUDY AND CONSULTATIONS

#### 2.1.1 Desk Study

The project began with a desktop review of existing information on habitats and Green Infrastructure in and around Westport. Special attention was paid to gathering information on habitats and also species of conservation importance at the international, national and county levels. Habitats and species of county-level importance included those considered to be rare or threatened in County Mayo, or those for which the county is a special stronghold.

Specific data sources reviewed included:

- Mayo Habitat Survey 2008 GIS data and report for Westport
- County Mayo Biodiversity Action Plan 2010-2015
- Westport Town & Environs Development Plan 2010-2016
- OSi vector mapping and aerial photography
- Historical 1<sup>st</sup> edition (1830s) and 2<sup>nd</sup> edition (late 1800s) 6-inch OS mapping
- National Parks and Wildlife Service (NPWS) designated area shapefiles, conservation objectives, management plans and other data for designated areas
- An Foras Forbatha report for Mayo (Goodwillie, 1979)
- NPWS data on habitats and species of conservation interest, obtained via formal data request
- National Biodiversity Data Centre records
- Environmental Protection Agency (EPA) and Water Framework Development water quality data

*Special attention was paid to gathering information on habitats and also species of conservation importance at the international, national and county levels.*

Organisations and individuals with information about local biodiversity were consulted, including Mayo County Council staff, the NPWS Local Conservation Rangers and the District Conservation Officer, Inland Fisheries Ireland, the local branch of BirdWatch Ireland, Bat Conservation Ireland and Coillte.

#### 2.1.2 Community Group Consultations

Consultation took place with the Heritage Officer to identify community groups active in Westport and the range of projects and activities that are on-going or planned. A leaflet explaining the biodiversity management plan project was produced for distribution via social media, the Mayo County Council website and general distribution to the public through public venues. The leaflet was also used to inform landowners about the project in the course of the field surveys.

A meeting with Mayo County Council staff and some Westport community groups with an interest in biodiversity took place on 26<sup>th</sup> September 2016. The objectives were to review biodiversity projects to date, ascertain capacity and identify biodiversity assets and Green Infrastructure available in Westport and also to gain some insight into the groups' interests and plans. The meeting extended to a visit of some project sites along the Westport Greenway. Opportunities for biodiversity conservation and enhancement and also the potential to raise awareness of biodiversity and incorporate biodiversity projects into other unrelated projects and activities were discussed. Potential stakeholders and other possible partners for collaboration on community projects were discussed.

## 2.2 FIELD SURVEY

As most of the habitats in the Westport study area had been mapped as part of the 2008 Mayo habitat survey (Smith *et al.*, 2008), field surveys in 2016 focused on updating this baseline and extending it to previously unsurveyed areas. Particular attention was paid to collecting information critical to biodiversity management planning at site and strategic (e.g. Green Infrastructure) levels, such as assessing current pressures and ecological connectivity.

Priority areas for field survey were:

1. Annex I habitats
2. Local biodiversity areas already being managed or with the potential to be managed by community groups
3. Public open spaces with potential for biodiversity enhancements or Green Infrastructure functionality, such as parks or the grounds of public buildings
4. Urban / peri-urban habitats of high biodiversity potential, e.g. old stone walls, old graveyards
5. Ecological corridors and stepping stones, especially:
  - Carrowbeg River
  - Other watercourses and riparian zones
  - Margins of Clew Bay
  - Hedgerows/treelines, prioritising townland boundary hedges
6. Other habitats of current or potential biodiversity interest or functional value as Green Infrastructure or ecological corridors, especially those not surveyed in the field in the 2008 baseline study.

Habitat survey methodology followed the Heritage Council's *Best Practice Guidance* (Smith *et al.*, 2011). Habitats within the study areas were mapped according to level 3 of the Heritage Council classification (Fossitt, 2000). Habitats were also classified and mapped according to the Habitats Directive Annex I habitat types (European Commission, 2013) where applicable. Where useful for biodiversity management, additional Irish vegetation classification systems were used, such as those for native woodlands (Cross *et al.*, 2010) or semi-natural grasslands (O'Neill *et al.*, 2013). Characteristic plant species in each habitat were noted to describe and provide context to the local habitat inventory.

Habitat mapping used the 2008 baseline survey as a starting point and amended and supplemented this as required. Hard copy baseline habitat maps and OSi vector mapping were annotated in the field. Aerial photography was also used in the field to provide context. GPS was used where required to aid in delineating habitat boundaries in the field and in recording the location of notable species or other ecological features. In addition to data on habitat location and identity, information was also recorded on:

- Current and potential conservation value
- Threats and pressures
- Potential for enhancement
- Ecological connectivity
- Green Infrastructure type and value

## 2.3 PREPARING THE MANAGEMENT PLAN

Information collected during desk and field surveys was assessed to identify suitable locations for biodiversity management and enhancement. The current conservation value of habitats was assessed in the context of surrounding habitats and landscape. Habitats or habitat complexes of particularly high biodiversity interest were identified as Local Biodiversity Areas to inform land use planning. The potential conservation value of habitats that could be achieved with appropriate biodiversity management was also assessed. This allows areas with high potential to be prioritised for management actions. Evaluations follow a geographic scale from International value to (Low) Local value, in line with best practice (Chartered Institute of Ecology and Environmental Management, 2016).

Existing and potential ecological corridors and stepping stones were also identified in the context of surrounding habitats and landscape. The most valuable or potentially valuable corridors were highlighted and, where required, prioritised for management actions. Features that would tend to make a corridor more valuable include:

- Greater size/width
- Usefulness for a range of species, e.g. combining open and wooded habitats or watercourses and riparian zones
- Value of connected habitats
- Resilience to or absence of disturbance

Green Infrastructure was mapped following local scale approaches outlined by Comhar (2010). The Green Infrastructure functionality of habitat areas was classified in one or more elements:

- Recreation & health
- Biodiversity (i.e. areas of High Local biodiversity value or greater)
- Water resources & flood management
- Climate change adaptation & mitigation
- Production (e.g. agriculture, forestry)

During the field surveys of the wider area and the walkover survey of the town with the community groups, existing interpretative material and facilities were reviewed and appraised. Opportunities for further interpretative material and/or facilitating biodiversity engagement were identified in other areas as appropriate and recommendations were made. These included interpretive signage, other interpretive or educational material or ideas for use in schools or for public events or a review of areas for their potential to be used as amenity or for educational purposes.



## 3. WESTPORT HABITATS

### 3.1 OVERVIEW

#### 3.1.1 Habitat Types

Habitats are mapped in Figure 1 according to level 3 of the Heritage Council (Fossitt, 2000) classification scheme. Table 1 provides a broad-level summary of the areas occupied by different groups of habitats, while Table 2 gives a detailed breakdown of habitat coverage according to level 3 of the Heritage Council (Fossitt, 2000) classification scheme.

The most abundant habitat type in the Westport study area is in fact improved agricultural grassland (habitat code GA1 according to the Heritage Council (Fossitt, 2000) classification scheme). It occupies more than a third of the study area (Table 1 and Table 2). This habitat type is of low value for biodiversity due to its relatively intense management.

*The most abundant habitat type in the Westport study area is improved agricultural grassland . . .*



*Amenity grassland, houses and gardens in Westport*

Buildings and gardens (BL3 and GA2) are the next most widespread group of habitats (Table 1). The category buildings and artificial surfaces (BL3) (Table 2) includes gardens and lawns outside houses and buildings for practical mapping reasons. The value of these areas for biodiversity varies greatly, but is generally low in comparison with more natural areas. In urban areas, however, gardens managed for nature conservation, can be particularly valuable. Notable animals that live or forage in the more developed areas of Westport include a rookery beside Westport Library, a pied wagtail roost near the Octagon, and five species of bats: brown long-eared bat, common and soprano pipistrelle, Daubenton's bat and Leisler's bat (D. McLoughlin and Bat Conservation Ireland, pers. comm.). Larger areas of amenity grassland (GA2), such as public green areas and sports pitches, were mapped separately and occupy 2.7% of the study area. As with agricultural grassland, these areas are of little conservation interest and, depending on their use, may be good candidates for biodiversity enhancement projects.

*In urban areas, gardens managed for nature conservation can be particularly valuable.*

Semi-natural grasslands (GS2 and GS4) are the most abundant semi-natural habitat type in the Westport study area (Table 1). Most of this is wet grassland (GS4), which is abundant on heavy, peaty soils in the north-eastern part of the study area (Table 2; Figure 1). Dry meadows and grassy verges (GS2) are most prominent on Roman Island and in unmanaged land in industrial estates. These habitats are generally of greater conservation value than the more intensively managed grasslands, but they are variable in quality. Many wet grasslands are rather species-poor and dominated by rushes, creeping buttercup and a few grasses. The dry, rank grasslands on Roman Island are potentially of much higher conservation interest (see Section 3.2).

**TABLE 1.** BROAD HABITAT GROUPS IN WESTPORT

Habitat Group	Area (ha)	Percentage
Improved agricultural grassland	400.1	37.4%
Buildings and gardens	341.9	31.9%
Semi-natural grassland	145.1	13.6%
Woodland	117.4	11.0%
Scrub and young woodland	28.5	2.7%
Freshwater	13.0	1.2%
Heath and bracken	11.0	1.0%
Disturbed ground	9.5	0.9%
Coastal	4.4	0.4%

*Broadleaved woodland at Westport House*

*Westport is particularly rich in woodlands especially for a mainly urban area . . .*

Westport is particularly rich in woodlands (WD and WN), especially for a mainly urban area (Table 1). Westport House, North Wood, Rampart Wood and Colonel's Wood are the main woodland areas (Figure 1). The first three are mainly mixed broadleaved woodland (WD1), while Colonel's Wood also includes a significant amount of mixed broadleaved / conifer woodland (WD2) and conventional conifer plantation (WD4). The little semi-natural woodland in the Westport area consists of a young stand of oak-birch-holly woodland (WN1) by Colonel's Wood and some pockets of wet willow-alder-ash woodland (WN6) (Table 2). Most of these woodland types were evaluated as being of moderate or high value for biodiversity, as the majority supported native woodland field layers.

The less abundant habitats in Westport include scrub and young woodland, which are widely distributed across the study area. Freshwater habitats mainly consist of Westport House Lough and the Carrowbeg River. (Most watercourses were mapped as linear features and thus did not count in area calculations.) Heath and bracken habitats include wet heath (HH3) in Carrownalurgan in the southern part of the study area and dense bracken (HD1) stands adjacent to Barrett's Wood (Figure 1; see also Section 3.2). Disturbed ground (ED2 and ED3) is by its nature a transient habitat type; it mainly consists of land under construction. Clew Bay is the most significant natural area in the vicinity of Westport and is designated as the Clew Bay Complex SAC (site code 1482). Most of Clew Bay is outside the study area, apart from a small area of upper saltmarsh (CM2) and mudflat (LS3) between Garvillau and Westport House Lough (Figure 1).

**TABLE 2. HABITAT TYPES IN WESTPORT**

Habitat Code	Habitat Name	Area (ha)	Percentage
BL3	Buildings and artificial surfaces	312.78	29.2%
CM2	Upper salt marsh	3.69	0.3%
CW1	Lagoons and saline lakes	0.57	0.1%
ED2	Spoil and bare ground	6.10	0.6%
ED3	Recolonising bare ground	3.42	0.3%
FL4	Mesotrophic lakes	7.69	0.7%
FS1	Reed and large sedge swamps	1.39	0.1%
FW1	Eroding / upland rivers	1.11	0.1%
FW2	Depositing / lowland rivers	2.80	0.3%
GA1	Improved agricultural grassland	400.11	37.4%
GA2	Amenity grassland	29.11	2.7%
GS2	Dry meadows and grassy verges	9.69	0.9%
GS4	Wet grassland	135.43	12.6%
HD1	Dense bracken	3.00	0.3%
HH3	Wet heath	8.02	0.7%
LS3	Muddy sand shores	0.12	0.01%
WD1	(Mixed) broadleaved woodland	68.22	6.4%
WD2	Mixed broadleaved/conifer woodland	13.92	1.3%
WD4	Conifer plantation	26.75	2.5%
WD5	Scattered trees and parkland	3.13	0.3%
WN1	Oak-birch-holly woodland	3.60	0.3%
WN6	Wet willow-alder-ash woodland	1.76	0.2%
WS1	Scrub	22.12	2.1%
WS2	Immature woodland	6.37	0.6%

### 3.1.2 Linear Habitats

There are almost 30 km of watercourses in the study area, including the Carrowbeg River, smaller streams and drainage ditches (Table 3). Most natural watercourses were mapped as depositing / lowland rivers (FW2), although fast-running stretches dominated by riffle were mapped as eroding / upland rivers (FW1) (Table 4). Drainage ditches (FW4) are frequent, especially in association with wet grassland (Figure 1; Table 4).

Linear stretches of woodland and scrub total nearly 110 km in the study area (Table 3). Of these, the vast majority are hedgerows (WL1) (Table 4). The length of non-native hedges (WS3) (e.g. garden privet, Leyland cypress, etc.) in the study area is certainly under-recorded, as most would be associated with private gardens and therefore difficult to survey and map. Those mapped in Figure 1 are mainly those associated with public green spaces.



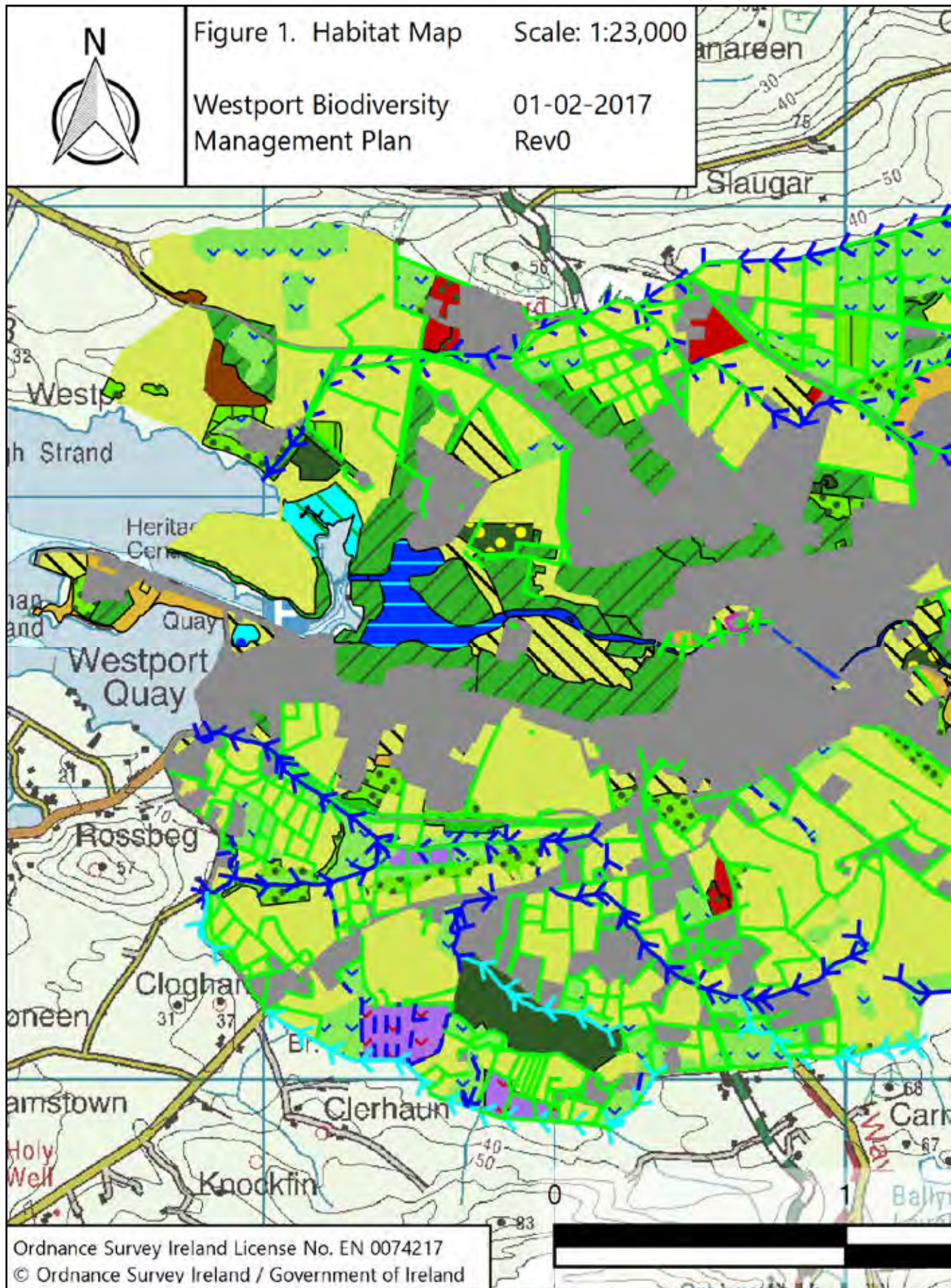
*Hedgerow bordering Westport Greenway*

**TABLE 3. BROAD LINEAR HABITAT GROUPS IN WESTPORT**

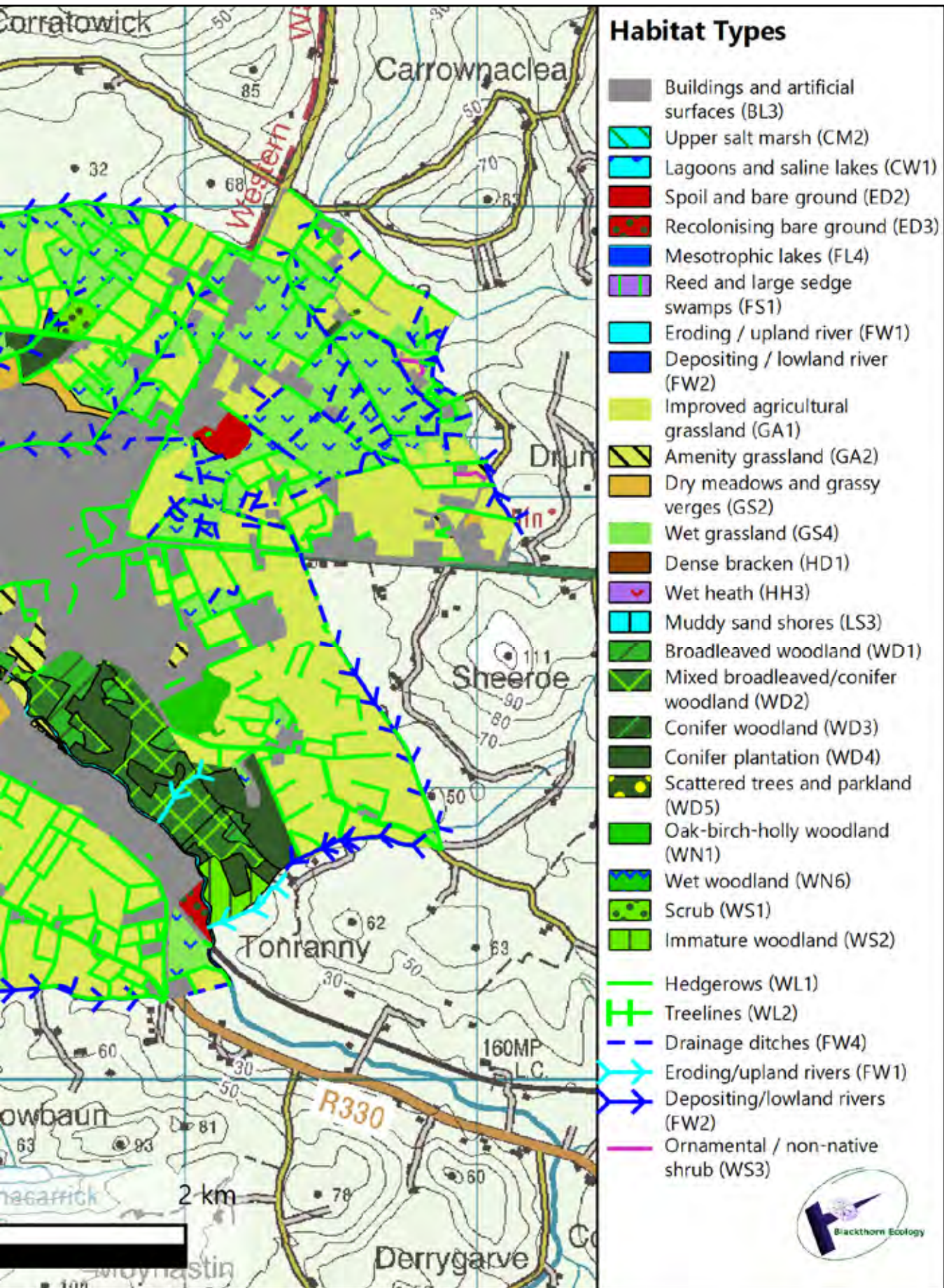
Habitat Group	Length (km)
Watercourses	29.9
Hedgerows and treelines	109.9

**TABLE 4. LINEAR HABITAT TYPES IN WESTPORT**

Habitat Code	Habitat Name	Length (km)
FW1	Eroding / upland rivers	3.6
FW2	Depositing / lowland rivers	13.4
FW4	Drainage ditches	9.6
WL1	Hedgerows	108.6
WL2	Treelines	0.9
WS3	Ornamental / non-native shrubs	0.4







### 3.2 LOCAL BIODIVERSITY AREAS

Eight areas in Westport have been identified as Local Biodiversity Areas. These are clusters of habitats that are of high conservation value in a local context. Also included are habitat areas that are themselves of lower biodiversity interest, but which play a buffering or supporting role with other habitats of value, or which diversify the mix of habitats present in the area. Local Biodiversity Areas are mapped in Figure 2.

*Controlling non-native exotic species is a priority management need.*

#### Attireesh and Gortaroe

This area consists of a mosaic of wet grassland (GS4) together with some scrub (WS1), immature woodland (WS2), broadleaved woodland (WD1), mixed broadleaved / conifer woodland (WD2) and wet willow-alder-ash woodland (WN6). None of the habitats are of high conservation value on their own; however, they form a locally valuable and diverse cluster of semi-natural habitats that connects with wet heath (HH3) and other wet grasslands (GS4) outside the study area.

The wet grasslands in the area range from semi-improved rushy fields to a more species-rich, peaty type with abundant purple moor-grass. Gorse scrub is encroaching on some of the less intensively managed fields. A significant area of bramble scrub, with occasional ash trees, occupies a damp slope where grey willow, nettles and the invasive red-osier dogwood are present. At the bottom of the slope is a stream and a pocket of native wet woodland. The wet woodland is gappy with abundant grey willow and eared willow with frequent downy birch. More open areas are occupied by purple moor-grass, heather and bramble with the invasive rhododendron frequent at gap edges. Young broadleaved plantations of ash and sycamore add to the habitat diversity in the area and will provide habitat for native woodland species in future years.

Maintaining unimproved grassland while expanding native woodland cover on more improved grassland sites would conserve and enhance the biodiversity in this area. Controlling non-native exotic species is a priority management need. The Great Western Greenway passes through this Local Biodiversity Area. Enhancements to native habitats and sensitive interpretation of features would also benefit recreational users.



### Carrownalurgan Meadows

In the 2008 habitat survey (Smith *et al.*, 2008), this Local Biodiversity Area was called “Clerhaun Meadows”. It has been renamed because the current study area boundaries do not include Clerhaun townland and the Local Biodiversity Area is entirely within Carrownalurgan.



This area consists of two patches of wet heath and wet grassland with a good diversity of plant species and are areas of high local ecological value. These habitats support abundant purple moor-grass, heather, bog myrtle, bog asphodel and orchid species. The wet heath corresponds to the EU Habitats Directive Annex I habitat ‘wet heath (4010)’. Wet heath is characterised by vegetation with at least 25% cover of dwarf shrubs (e.g. heather) on peaty soils and shallow wet peats where ground conditions are either too dry or too steep for deep peat accumulation. This Local Biodiversity Area is contiguous with a larger area of semi-natural wet grassland, wet heath, and blanket bog habitats to the south of Westport, which adds to its intrinsic value.

The semi-natural habitats in the area and their hydrology should be conserved. Improving connectivity between the two sections and with other

habitats in Westport would be beneficial. There may be opportunities for enhancing connectivity along the edges of the conifer plantation between the two sections of the Local Biodiversity Area.

### Cloonmonad Wetlands

Cloonmonad wetlands are mainly located just south of the Westport Greenway, but a pocket of wet woodland with some small areas of swamp and wet grassland also occurs on the north side of the walk.

Cloonmonad is valuable as a complex of wetland habitats including wet woodland, wet grassland and reed swamp. The wetland is particularly important due to the diversity of habitats present within the wider context of improved agricultural and developed land. These habitats are bordered by scrub, further increasing the habitat diversity of the area. The wetlands extend along a watercourse running east to west, parallel to the Greenway. This watercourse and tributaries from the south add to the ecological connectivity in the wider landscape.

The wetlands and their hydrology should be conserved and protected from agricultural improvement or development. Natural succession of scrub to native woodland will benefit biodiversity in the long term.



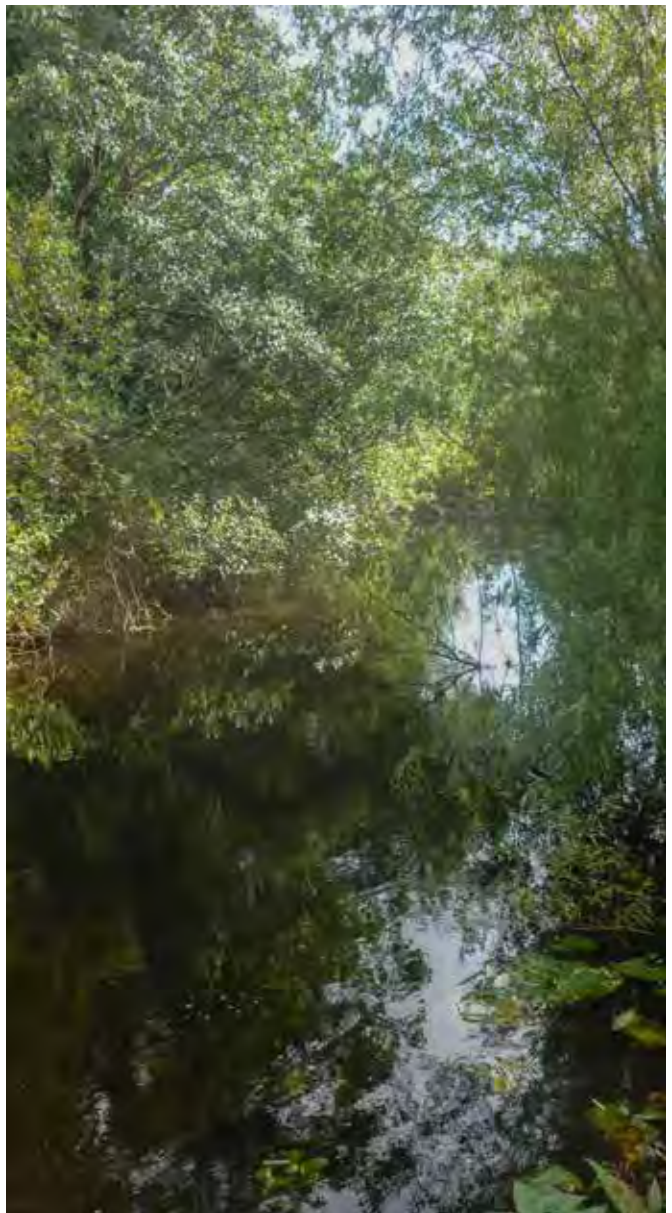
### Colonel's Wood

Colonel's Wood is a mature mixed forest of conifers and broadleaves bounded on the south-west by the Carrowbeg River. Conifers include Sitka spruce, Norway spruce, Japanese larch, Scots pine and western hemlock. Broadleaves include beech and sycamore along with native birch, ash and alder. The latter are more common in the south-western part of the woodland, which is wetter and subject to flooding when water levels in the Carrowbeg River are high. Holly, birch and rowan are frequent understorey species. The forest is an old woodland site, having been continuously forested since the 1830s.

*Since 2012, as stands mature, they have been felled in coupes of 5 ha or less and replanted with native species, including alder, oak and Scots pine.*

Adjacent areas of woodland are also included in the Local Biodiversity Area, particularly one birch-dominated patch with gorse, holly and some willows, classified as an early successional example of oak-birch-holly woodland. NPWS have records of pine marten and long-eared owl present in the site. An otter holt is on the Carrowbeg River bank a short distance upstream of the railway viaduct (D. McLoughlin, pers. comm.). A detailed survey in 2004 recorded a well-developed native woodland field layer in many places, including wood rush, false brome, wood sedge, hard fern, broad buckler fern and characteristic woodland mosses (Browne, 2005).

Colonel's Wood is managed as a Biodiversity Area by Coillte with the long-term objective of conversion to native woodland. Since 2012, as stands mature, they have been felled in coupes of 5 ha or less and replanted with native species, including alder, oak and Scots pine. More felling and replanting is planned for the 2017-2018 season (J. Finn, pers. comm.). There are a number of walking trails through the wood, mainly used by local people, which adds to the value of the forest.



## North Wood

North Wood is an area of old woodland, formerly part of the Westport Demesne, between the Pinewoods estate and the New Road. It is actively used as an amenity area for the public with the Westport Greenway providing a route to the town centre from neighbouring housing estates. There are also a number of informal walking trails within the woodland. The eastern part of the area is mature *broadleaved woodland* (WD1) with a mixed canopy of ash, sycamore, wych elm, Scots pine and oaks. There is a dense shrub layer with frequent hazel, holly, and saplings of beech, ash and sycamore. The woodland field layer is characterised by abundant ivy and bluebell and frequent broad buckler fern and bramble. The native flora is reasonably diverse and characteristic of woodlands on base-rich soils, including hart's tongue, wood sedge, barren strawberry, hay-scented buckler fern, primrose, wood avens, tutsan, enchanter's nightshade and false brome. The south-eastern part of the wood is damper and towards the edge, the trees are younger and more scrubby. Pendulous sedge and bramble are more abundant here.



The western part of the wood is much younger, with abundant grey willow, frequent alder, Scots pine and ash, and the occasional sweet chestnut. The field layer is poor, mainly a thicket of bramble, but with some typical base-rich native woodland species near the path. Uphill and towards the north, the woodland grades into scrub. At the northern end of the west part of the wood, between a section of the Westport Greenway and neighbouring housing estates, there is a south-facing bank of recently disturbed, largely bare soil. The sparse vegetation includes some scrub species, such as bramble, buddleja, grey willow and Italian alder saplings, the latter spreading from a line of trees adjoining the estate. A range of other grassland and opportunistic species are present, including wild carrot, heath St John's wort, heath speedwell, cat's-ear, creeping thistle, foxglove, common knapweed and red clover.

North Wood is an old woodland site that appears on the 1830s 1<sup>st</sup> edition Ordnance Survey maps. It has not necessarily been continuously wooded, as the western part has obviously been felled recently and allowed to regenerate. It is largely native with a moderately rich, typical woodland flora. More mature sections have a well-developed, layered structure that would favour a range of woodland and woodland edge birds and mammals. The bare soil bank may provide habitat for ground-nesting invertebrates, such as solitary bees, as it is open and south-facing. The area is a valuable natural amenity, especially as it is located so close to the town centre

The main threats to biodiversity here are invasive non-native species, such as Montbretia, pheasantberry and red-osier dogwood. Competitive native species, mainly bramble but also pendulous sedge, also dominate significant patches. Littering and tipping garden waste at the edges of the woodland are additional threats. Biodiversity management plans are presented in Section 4.3 for North Wood and also separately for the bare soil bee bank.

*North Wood is an old woodland site that appears on the 1830s 1st edition Ordnance Survey maps.*

### Rampart Wood



Rampart Wood is located in the north of Westport town. Golfcourse Road runs through the woodland. The woodland to the north of the road is fenced off preventing access by the public and so the habitat is undisturbed. The woodland to the south of the road although not fenced is also relatively undisturbed. The woodland is classified as mixed *broadleaved woodland* (WD1) due to the presence of non-native species in the canopy; however, the ground flora reflects native semi-natural oak-ash-hazel woodland habitat. The canopy species include the non-native sycamore, but ash and hazel are strong components also. The

understorey is composed of hawthorn and hazel. The ground flora is relatively undisturbed and includes frequent enchanter’s nightshade, ivy and wood dock with herb robert and pendulous sedge occurring occasionally. Dog violets and sanicle occur more rarely. Ferns are also frequent including male fern, lady fern, broad buckler fern and hart’s tongue fern. There are some small streams and wet flushed areas adding diversity with opposite-leaved golden saxifrage and wood sorrel occurring in these areas. Some garden waste tipping was noted with the consequential spread of some non-native garden species at the margins of the woodland.

*... the ground flora reflects native semi-natural oak-ash-hazel woodland habitat.*

The woodland area to the north of the road appears similar to that described above but is more overgrown with abundant bramble. Only a small section of this woodland was accessed for survey and further surveys would be beneficial to describe this larger part of the woodland in detail.

It would be of value to maintain this woodland as a biodiversity reserve as a relatively undisturbed wildlife habitat within the town. However natural regeneration may be restricted in the woodland due to the overgrowth of problematic species such as a bramble and it is recommended that further surveys be conducted to inform a targeted management plan

### Roman Island

Roman Island was an island in the early 19th century, but has been connected to the mainland by a quay and causeway. Although the northern side of the island is developed, an area of scrub and grassland on the south side is of high local biodiversity value. Apparently this site was formerly an orchid-rich grassland, and bee orchids still occur there from time to time. The area is currently not grazed and the habitat is reverting to rough grassland and scrub. Rank tussocks of red fescue are the dominant grass, accompanied by creeping bent and cock’s-foot with encroaching bramble and grey willow. Remnants of its former diversity can be detected in the grassland sward with less competitive calcareous grassland species such as yellow rattle, bird’s-foot trefoil and eyebright occurring where the vegetation was less overgrown and lightly trampled by walkers.

Its remnant diversity and potential for improvement make this site of high local conservation interest. Its coastal location adds additional ecological interest. This habitat could be restored with some minimal scrub clearance and annual grazing or mowing. Management prescriptions for Roman Island are outlined in Section 4.3 below.

*... an area of scrub and grassland on the south side is of high local biodiversity value.*



## Westport House

*... the woodlands are of local conservation value due to their extent, maturity and value as a wildlife habitat.*

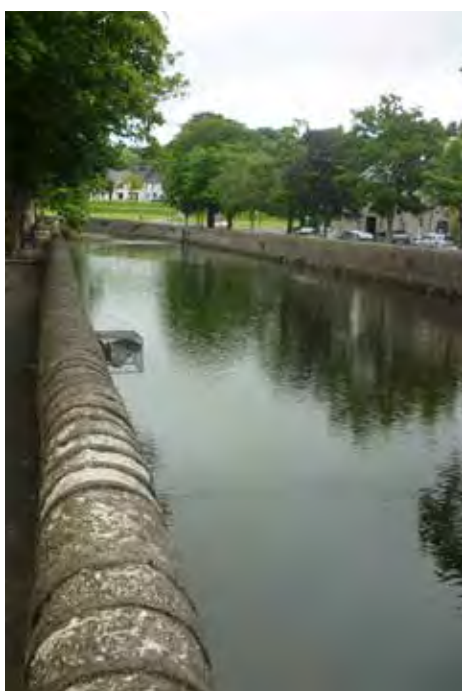


Westport house is a large local biodiversity area including the mature estate woodlands, a section of the Carrowbeg River running through the estate, Westport House Lough, adjacent saltmarsh and muddy tidal creeks. The saltmarsh supports Annex I saltmarsh habitats, 'Atlantic salt meadows (1330)' and/or 'Mediterranean salt meadows (1410)'. The tidal creeks are referable to Annex I 'mudflats (1140)' and are also part of Clew Bay Complex SAC.

The mixed deciduous woodlands comprise ash, sycamore, lime and horse-chestnut, and while there is a high proportion of non-native tree species present, the woodlands are of local conservation value due to their extent, maturity and value as a wildlife habitat. The only tree preservation order for the town is in Westport Desmesne. The margins of the lake support fringing reed swamp and wet woodland, and otter, a species listed on Annex II of the EU Habitat Directive, is known to be present along the river.

The Mayo Habitat Mapping 2008 report (Smith *et al.*, 2008) identified recreational use as a threat to the woodland due to excessive trampling of the field layer. It is reported that a woodland management plan has been drawn up, which should serve to address and minimise these threats. The Mayo Habitat Mapping 2008 report also found that the invasive exotic common cord grass has colonised lower parts of the saltmarsh.

### 3.3 ECOLOGICAL CORRIDORS



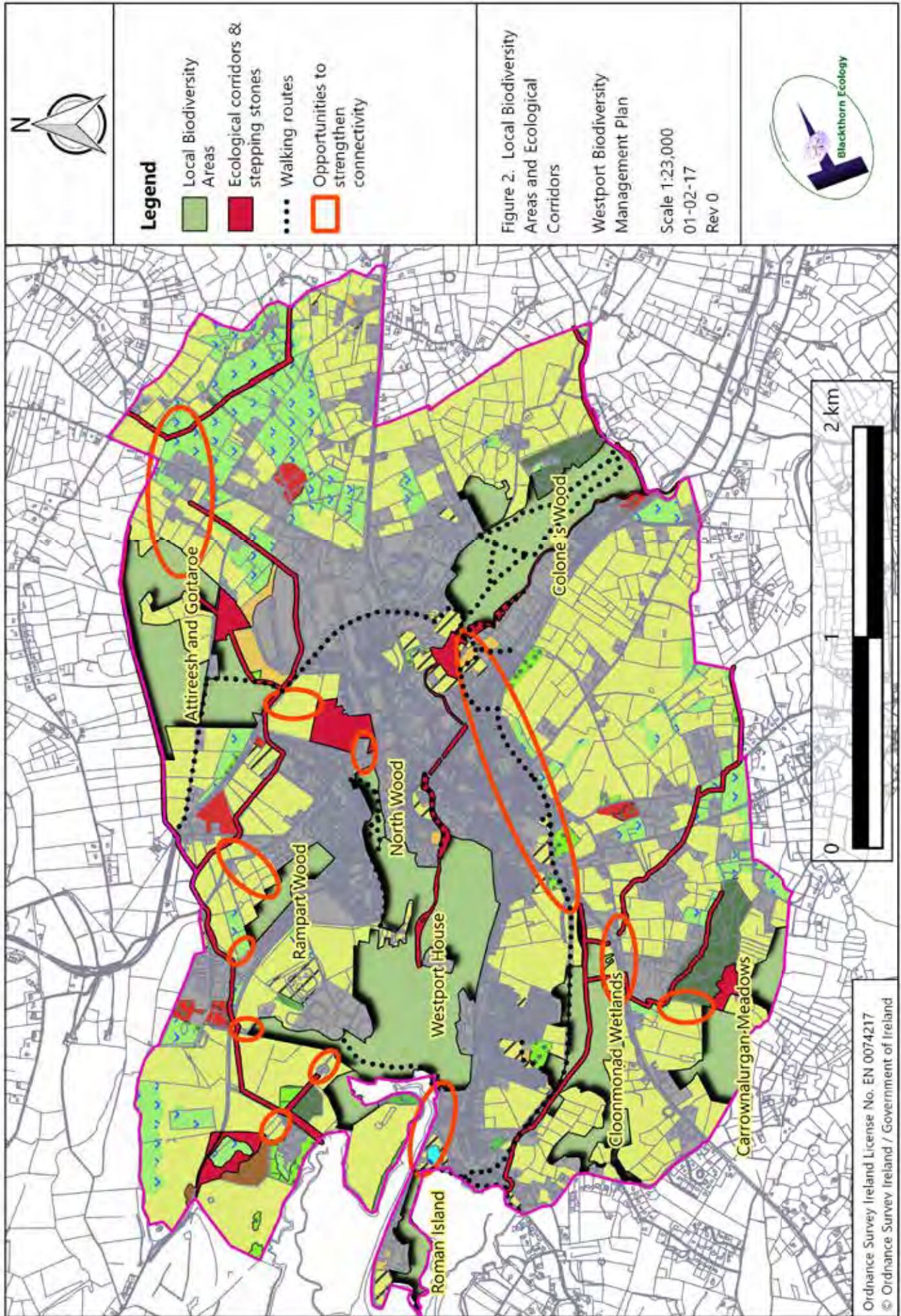
*Carrowbeg River along the Mall*

Figure 2 shows ecological corridors and stepping stones in Westport. These are areas that facilitate movement of plants and animals between Local Biodiversity Areas and within the wider landscape outside Westport town.

The Carrowbeg River is the most significant linear corridor, which provides connectivity through the centre of Westport for at least some freshwater species. Dipper, for example, regularly forages along the river, even at the Mall in the centre of town (D. McLoughlin, pers. comm.). The river and the trees lining it provide some linkage between Colonel's Wood and Westport House woodlands.

On the north side of Westport, another watercourse frequently bounded by hedgerows provides connectivity from Attireesh and Gortaroe westward towards Westport House and Clew Bay. A stepping stone of mixed woodland and scrub at Horkan's Hill helps bridge the gap to North Wood. Another woodland stepping stone in the north-west of the study area is Barrett's Wood, which helps connect Westport habitats with semi-natural habitats in the hinterland.

On the southern side of Westport, watercourses that run through the Cloonmond Wetlands provide connectivity with the hinterland to the south of town and also with Clew Bay. The two sections of Carrownalurgan Meadows are connected by a corridor of semi-improved wet grassland.





### 3.4 GREEN INFRASTRUCTURE

Westport's Green Infrastructure is mapped in Figure 3. Green Infrastructure is the network of habitats where important ecosystem services are provided. As the same area can have more than one function, areas where Green Infrastructure elements overlap are shown by overlapping patterns and colours in Figure 3.

*Green Infrastructure is the network of habitats where important ecosystem services are provided.*

Westport's recreation and health infrastructure includes publicly accessible greens, sports pitches, walkways and other amenity areas (Figure 3). The Westport Greenway, the Great Western Greenway and other walks, such as in the North Wood, are important components.

The Carrowbeg River, other watercourses and Westport House Lough are important water resources. Wetlands and floodplain areas provide water and flood management services. These include the tidal wetlands by Garvillan, floodplain woodland in Colonel's Wood, and wet woodlands and reedswamp dotted across the study area.

The Local Biodiversity Areas are highlighted as important Green Infrastructure. Biodiversity, as a component of Westport's natural capital, can provide many ecosystem services, such as pollination, natural pest control, nutrient cycling and natural amenity.

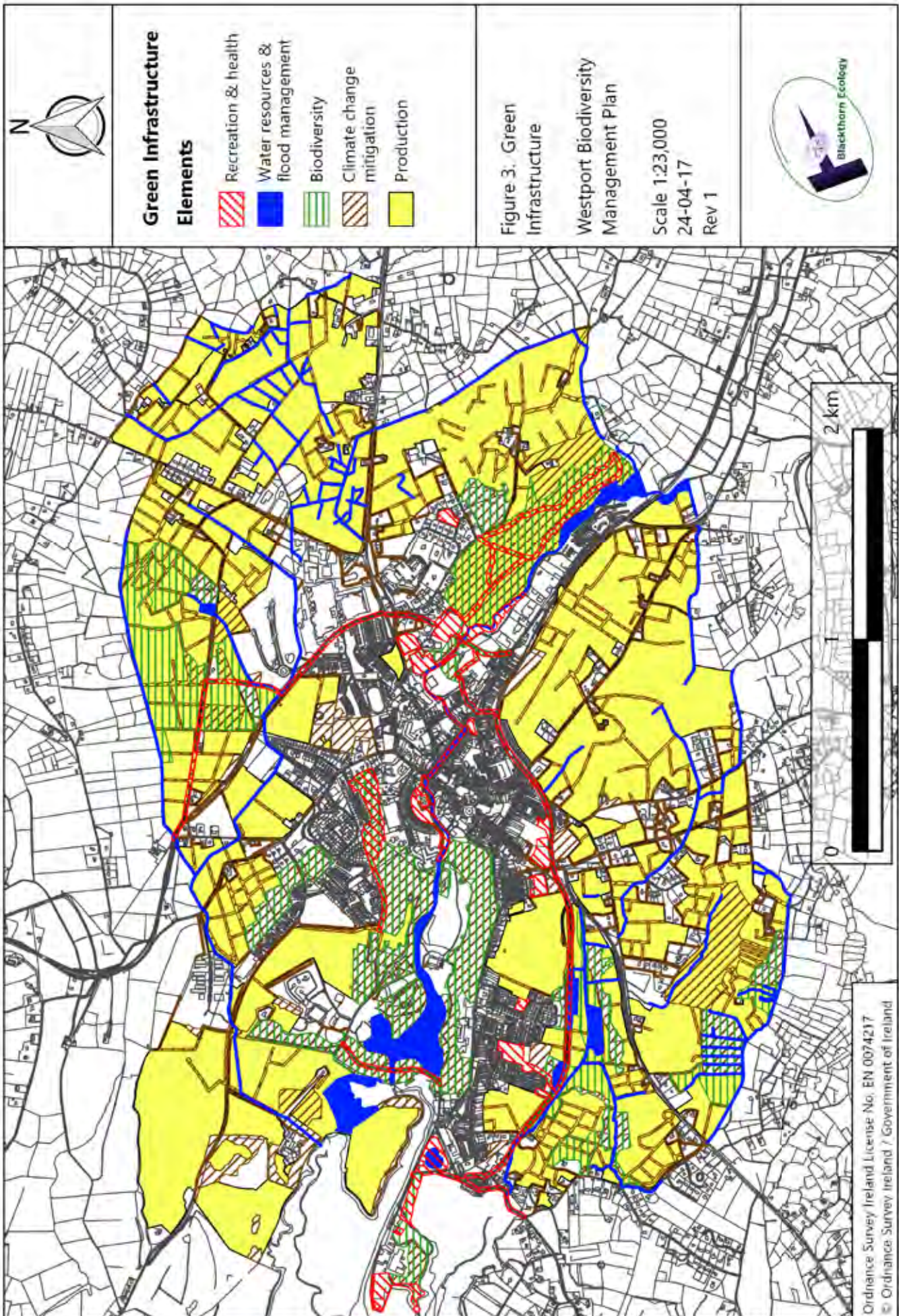
Wooded areas, including hedgerows and scrub, as well as the peat soils in wet heath habitats provide climate change mitigation in the form of carbon sequestration.

Areas of agricultural and forestry production are also considered Green Infrastructure, as their services ultimately depend on nature.

The most important pieces of Green Infrastructure in Westport include those with multiple functions. These include recreational areas in woodlands or forests or along rivers as well as watercourses or drains bounded by hedgerows.



*Public walkway in North Wood*



## 4. BIODIVERSITY MANAGEMENT

### 4.1 BIODIVERSITY MANAGEMENT METHODS

#### 4.1.1 Favouring Native Species

As a general rule, native plant and animal species are usually better for biodiversity than non-native species. For example, oak trees support a greater diversity of invertebrates than non-native beech trees. Management measures, such as tree planting, should therefore aim to encourage native species<sup>1</sup>. In a similar way, wildlife of local origin or provenance should be preferred over plants or animals from other places in Ireland. Plants and animals of local provenance may be better adapted to local environmental conditions or may have characteristics that are unusual elsewhere in Ireland.

Commercially available “wildflower” seed mixes should not be used. “Wildflower” seed mixes are really only suitable for gardening and not for creating wildlife habitats. Many so-called “wildflower” seed mixes contain species from Britain or continental Europe that are not native to Ireland. Even where the seed mix contains only native or long-naturalised plants, the seeds themselves may not be Irish. In addition, most seed mixes rely heavily on wildflowers of disturbed or arable ground for colour and are not appropriate for establishing new natural habitats, such as meadows. When creating wildlife habitats, seed or green hay should be collected from local sources. Diverse wildflower grasslands can also develop through natural recolonisation of disturbed ground, particularly on soils of low fertility (e.g. exposed subsoils, construction waste, etc.). These grasslands may be particularly valuable for invertebrates, as they tend to have more diverse vegetation structure (including areas of low vegetation and bare ground) compared to planted grasslands.

Finally, none of this is to say that non-native species should be ruthlessly exterminated (with the exception of invasive exotics such as Japanese knotweed) especially if a diverse native ecosystem has developed around them. In particular, many veteran trees are non-native species, such as beech, lime and horse-chestnut, but are very valuable for many specialised invertebrates and lichens.

Some exceptions to favouring natives would include situations where non-native species are especially important for cultural or other reasons. For example, if horse-chestnuts were always planted along a particular lane, then it would be appropriate to replace dead trees with horse-chestnut saplings. In

addition, where new or replacement planting is being considered for an ornamental landscaped area, non-native plants that provide good pollen or nectar supplies for insects would be appropriate. In urban areas, pollinator-friendly planting schemes are appropriate and can provide valuable nectar sources for pollinating insects such as bees, butterflies and hoverflies. Pollinator-friendly planting is one action recommended by the *All Ireland Pollinator Plan 2015-2020*<sup>2</sup>. The All Ireland Pollinator Plan is an initiative of the National Biodiversity Data Centre in response to the serious decline in pollinating insects in Ireland. The pollinator plan aims to address this decline and conserve pollination services that are crucial for the production of many of our crops and for the persistence of wildflowers in our landscape.

*“Wildflower” seed mixes are really only suitable for gardening and not for creating wildlife habitats. Many so-called “wildflower” seed mixes contain species from Britain or continental Europe that are not native to Ireland.*



*Native wildflowers colonising disturbed ground*

1 The Tree Council of Ireland website provides advice on Irish native trees and on selecting the right species for the site: <https://treecouncil.ie/tree-advice/>. The Forest Service provides grants for establishing new native woodlands (and other woodland establishment): <https://www.agriculture.gov.ie/forests-service/>.

2 Available at <http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/>.

## 4.1.2 Vegetation Management

### Hedge Trimming

Under the Wildlife Act 1976 as amended, it is illegal to cut hedges between 1<sup>st</sup> March and 31<sup>st</sup> August in order to protect nesting birds. Although there are some exemptions to the law for health and safety, it is still good practice to not cut hedges during this period if at all possible. Hedgerows should be trimmed in autumn every 2-3 years to keep them vigorous and stock-proof. Only part of any hedge should be trimmed at one time so that haws, sloes and other fruits are available for wildlife. Trimming hedgerows in late autumn, e.g. November or even December, is less disruptive to pollinators. Where possible, hedgerows should be let grow to at least 1.5m tall and trimmed to an A-shape with a bushy top. Additional advice on hedgerow management is given by the Heritage Council (2002)<sup>3</sup>, Teagasc (2009a, b)<sup>4</sup> and in *Mayo's Hedgerows* (Mayo Heritage Office, 2012)<sup>5</sup>.

### Stonework

Stone walls, bridges, headstones and other stonework can be valuable wildlife habitats, especially for smaller plants like ferns, mosses and lichens. Small animals, especially bats, can find safe places to nest or roost in crevices in the stonework, while bridges are important nesting sites for dippers. Stonework should not be routinely or needlessly cleaned of mosses, lichens and other plants. Not only is this practice damaging for biodiversity, but it destroys the old character that mossy stone walls and lichen-covered headstones have. Some cleaning methods are also very damaging to the stone itself.



*Biodiversity on a stone wall*

Most typical wall plants like ferns, ivy-leaved toadflax and pellitory-of-the-wall do not damage stonework. The exceptions are heavy growths of ivy or other plants with vigorous roots, such as red valerian. Dense growth of ivy benefits wildlife, however, providing habitat for roosting and nesting and also feeding opportunities in the form of berries and insects. The challenge when managing stonework is that a balance must be struck between conserving wildlife value and controlling damage to the structural integrity and built heritage value of stone structures from woody vegetation. Where vegetation clearance is necessary on modern walls, the stems of ivy plants should be severed at the ground and the leaves allowed to wither and fall off before dead plants are removed in order to protect animals living in the ivy. When clearing ivy from older walls, the Mayo Heritage Officer should be consulted first. September and early October are the best months for removing dead ivy or other damaging vegetation, as this period is outside the bird nesting season and the winter hibernation period for bats.

Where extensive repairs to stonework are needed, the Mayo County Council Heritage Officer should be consulted. In addition to the need to preserve built heritage, repairs can damage animals, such as bats, sheltering in crevices and can lead to the loss of important bat roosts and bird nesting sites.

3 Available at [http://www.heritagecouncil.ie/content/files/conserving\\_hedgerows\\_2mb.pdf](http://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf)

4 Available at <https://www.teagasc.ie/environment/biodiversity--countryside/farmland-habitats/hedgerows/>

5 Available from the Mayo Heritage Office or from [https://www.mayobooks.ie/Hedgerows\\_Mayo\\_County\\_Council](https://www.mayobooks.ie/Hedgerows_Mayo_County_Council).

*Hedgerows should be trimmed in autumn every 2-3 years to keep them vigorous and stock-proof.*

*The challenge when managing stonework is that a balance must be struck between conserving wildlife value and controlling damage to the structural integrity and built heritage value of stone structures from woody vegetation.*

## Chemical Free

*Where possible, the use of herbicides and pesticides should be avoided and other methods of pest control should be used.*

Herbicides and pesticides can have unintended consequences by directly harming non-target species or by affecting plants or animals that interact with the target species. Using slug-killer, for example, might result in fewer thrushes, hedgehogs and other slug-eating wildlife. Where possible, the use of herbicides and pesticides should be avoided and other methods of pest control should be used. In some cases, such as control of invasive exotic species, careful use of herbicides or pesticides may be necessary<sup>6</sup>. Such chemicals should not be used in or near watercourses without consulting with Inland Fisheries Ireland, as only certain pesticides are approved for use near freshwater habitats and are generally applied only to control or eradicate invasive species. The application of herbicides near waterways should only be undertaken on a case by case basis, as plants respond differently to different herbicide applications and some habitats may be particularly sensitive.

As a general rule, chemical fertilisers should not be used in wildlife habitats, as this may encourage more vigorous plants to take over and crowd out less competitive species. Fertilisers are generally unnecessary, and infertile habitats are often some of the most species-rich. When planting new trees and shrubs, manure, bone meal or a similar slow-release fertiliser can be incorporated into the soil.

## Grassland Management

*If grasslands are mown too often or too short, the plants will not have a chance to flower . . .*

Managing grasslands for biodiversity is a matter of timing and frequency. If grasslands are mown too often or too short, the plants will not have a chance to flower and only the most stress-tolerant will survive for long. In addition, invertebrates will not have the nectar and pollen sources or the complex vegetation structures they need. If grasslands are mown too seldom or not at all, vigorous, competitive plants like tussock-forming grasses will take over. The diversity of wildflowers and their dependent invertebrates will decline. Eventually, the grassland will revert to scrub and then woodland (which may not necessarily be undesirable).

As a general rule, dry grasslands on infertile, often lime-rich soils that are rich in spring-flowering plants should not be mown until mid- to late July, after seed set. After that, the grassland can be mown occasionally to keep the sward about 5-10 cm tall. A cut first thing in the spring may also be needed to take off any late winter growth.

As a general rule, meadow grasslands, especially on damper soils, that are rich in tall, summer-flowering plants should not be mown until September. The sward should then not be cut shorter than 10 cm.

*If grasslands are mown too seldom or not at all, vigorous, competitive plants like tussock-forming grasses will take over.*

In mown grasslands, it is necessary to remove the cuttings so that they do not smother smaller plants or enrich the soil. Cuttings should be left for a few days so that any seeds left in pods or in seed-heads have a chance to fall out. It is important to always leave some areas entirely uncut to provide food and habitat for invertebrates and winter birds.

Mowing is usually a second-best option to grazing, especially by cattle. Where feasible, introducing grazing should be investigated; an obvious exception would be riverbanks where introduction of livestock could reduce water quality. Poaching by cattle hooves in moderation breaks up a competitive grass sward and creates bare patches suitable for seed germination. In general, grasslands should be grazed at low intensity during autumn and spring months removing the livestock in April or reducing the stocking density for the summer months to allow the wildflowers to flower and set seed. NUI Galway have produced guidance on maintaining semi-natural grasslands and other habitats.<sup>7</sup>



<sup>6</sup> Advice on control of invasive plant species is provided on the Invasive Species Ireland website at <http://invasivespeciesireland.com/toolkit/invasive-plant-management/>.

<sup>7</sup> NUI Farmland Habitats Guide: [http://www.nuigalway.ie/applied\\_ecology\\_unit/farmlandhabitatsguide.html](http://www.nuigalway.ie/applied_ecology_unit/farmlandhabitatsguide.html)

### 4.1.3 Habitat Creation

Habitat creation can be a valuable method of increasing local habitat diversity and enhancing biodiversity. Examples of small-scale habitat creation that may be suitable in and around settlements, for example on green areas in residential estates, include creating ponds, developing wildflower meadows or wildflower lawns and planting small areas of woodland and scrub. Specific habitat creation measures are included in the management plans for the biodiversity management sites detailed below, but there are some general guidelines that should be followed for any habitat creation project.



*Well-developed artificial pond*

*... habitat creation tends to be more expensive than management of existing habitats.*

Usually, habitat creation should be complementary to the existing biodiversity. For example, creating a pond in an area without any standing water habitat is much more valuable than planting a small area of woodland in an area with a lot of existing woodland. It is also important to make sure that the areas selected for habitat creation do not already have significant biodiversity value. The relative return from habitat creation compared to other forms of management should also be considered, as habitat creation tends to be more expensive than management of existing habitats. If habitat creation is merely replicating existing habitats, it may be more cost-effective to focus on managing and enhancing the wildlife value of existing habitats. The general principles, discussed above, of favouring native species and allowing natural recolonisation should also be borne in mind.

When creating species-rich grasslands using local seed sources, wildflower seed can be collected by hand (e.g. as a school project) and sown into sites that have been prepared by harrowing, grazing and poaching, or similar methods<sup>8</sup>. Where the soil is very fertile and/or full of weeds, the topsoil may need to be stripped to expose the less fertile subsoil.

Another alternative is the use of green hay. In this method, a suitable species-rich donor grassland is chosen and cut when the desired flowers have set seed. The cuttings are collected while still green and strewn lightly over the receptor site. The receptor site will have to be prepared by cutting it short and harrowing or stripping as above. The grassland will generally need to be kept short for a year or so afterwards to allow the smaller, less competitive species to establish. To be successful, it is important that the donor site and receptor site have similar soil and environmental conditions<sup>9</sup>.

<sup>8</sup> See the NBDC How-to-Guide on collecting and using pollinator friendly wildflower seed for tips: [http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-2\\_ALT\\_FINAL.pdf](http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-2_ALT_FINAL.pdf).

<sup>9</sup> Additional guidance on using green hay is available in Natural England's Technical Information Note TIN063 (<http://publications.naturalengland.org.uk/file/93010>).

#### 4.1.4 Biodiversity Awareness and Citizen Science

Raising awareness of biodiversity and encouraging or facilitating people to engage with and appreciate wildlife is an important tool in biodiversity conservation. Providing opportunities for people to experience and understand more about wildlife in their local area can instil respect, remind them of how they value nature and lead to effective conservation. The Westport Swift Nest Box Project is an excellent example of this.

Where appropriate, interpretative signage highlighting the biodiversity present in an area or promoting a particular biodiversity project can be useful to draw peoples' attention. Even more effective, however, is increasing the amount of time people spend outdoors connecting with nature. Furthermore, the health benefit of spending time with nature is widely recognised with known benefits for both physical and mental well-being.

Raising awareness of biodiversity can be facilitated by organising wildlife-themed walks, bat walks, wildflower walks and birdwatching or competitions, such as best wildlife-friendly estate, best garden for wildlife or a wildlife photography competition. Better still is providing opportunities for people to volunteer on a project, such as invasive plant species removal, tree planting or encouraging people to get involved in citizen science projects. It is often the social benefits of such events that will attract people to get involved.

Citizen science engages the public to participate in recording wildlife. Keeping records of wildlife species and submitting these records to the National Biodiversity Data Centre ([www.biodiversityireland.ie](http://www.biodiversityireland.ie)) or other dedicated recording scheme is a great way to get people involved in biodiversity conservation, improve skills in wildlife identification and foster a personal appreciation of nature. All records are valuable even of common species seen every day. Such data is very important and is used in research, policy formation and contributes greatly to our knowledge of biodiversity and its conservation.



##### Westport Swift Nest Box Project

Swifts are summer migrants to Ireland every year. Overwintering in Africa they come to Ireland each summer to breed. They nest in old buildings and return to the same traditional nest sites each year. When not nesting, swifts spend their entire lives on the wing. They eat, drink, sleep, preen and mate while flying. The swift is a bird of conservation concern in Ireland (Amber listed; Colhoun and Cummins, 2013) and Europe. The population has declined by over 40% in the past 15 years. When old buildings are demolished or repaired, the traditional nest sites for swifts can be lost. The swift nest box project aims to address this concern. Swift nest projects have been implemented in Westport under the advice and guidance of Lynda Huxley of Swift Conservation Ireland.

Holy Trinity NS has erected 6 nest boxes and nest boxes have been installed in the Westport Town Hall. They are built into the wall and can be seen from the car park. There are also natural nest sites located at Blouser's Pub. The largest colony of swifts in Westport is in the old convent. These nest box projects are a good way to support the conservation of swifts and raise public awareness. The presence of swifts breeding in the town of Westport adds a very special wildlife interest to the town. A number of events have been run by Swift Conservation Ireland in the town providing people with an opportunity to learn more about swifts and raising awareness about the vulnerability of these very special birds.

The National Biodiversity Data Centre collate records of all species recorded in addition to running a number of targeted recording schemes such as the butterfly and bumblebee recording schemes. Anyone can get involved and they are keen to recruit new recorders. There are also a number of conservation organisations running citizen science recording projects. Birdwatch Ireland ([www.birdwatchireland.ie](http://www.birdwatchireland.ie)) run the Garden Bird Survey and other more specialised recording schemes such as the Countryside Bird Survey and the Irish Wetlands Bird surveys (I-WeBS). The Irish Wildlife Trust ([www.iwt.ie](http://www.iwt.ie)) and Bat Conservation Ireland ([www.batconservationireland.org](http://www.batconservationireland.org)) also run targeted recording schemes. The Botanical Society of Britain and Ireland (BSBI) run several outings a year and are very encouraging to new and emerging botanists and members. Details of field meetings and contact with the BSBI Officer for Ireland can be made through the BSBI FaceBook page or the website <http://www.bsbi.org.uk/ireland.html>.

## 4.2 GREEN INFRASTRUCTURE AND ECOLOGICAL CORRIDORS

As a general rule, Westport’s Green Infrastructure (Figure 3) should be conserved and enhanced. Areas that provide multi-functional Green Infrastructure can be considered to be of higher priority. Likewise, certain habitat types are more often multi-functional by their nature. These include native woodlands, which can provide climate change mitigation as well as biodiversity and timber productivity, if managed sustainably. Similarly, wetlands can serve flood management and water resource (treatment) functions as well as supporting biodiversity. Creating new multi-functional habitats would strengthen Westport’s Green Infrastructure on several fronts. Similarly, allowing for a recreational or educational use would add value to habitat creation projects.



*Recreational Green Infrastructure – Great Western Greenway*

As with Green Infrastructure, ecological corridors and stepping stones should be conserved and enhanced where possible (Figure 2). Where existing corridors are limited to narrow watercourses, habitat creation, such as planting bordering hedgerows or treelines or even creating additional habitats, would be of benefit. In addition, there are several areas where connectivity is quite weak or non-existent and there are opportunities for strengthening it (Figure 2). For example, connectivity between Rampart Wood and the watercourse to the north could be strengthened by planting more native woodland in key locations. Similarly, the Westport Demesne woodlands could be better connected to Barrett’s Wood to the north-west. The Westport Greenway provides an opportunity to improve ecological connectivity by maintaining or creating hedgerows, treelines or other marginal habitats along the route.

Specific recommendations on creating or enhancing Green Infrastructure and ecological corridors are provided in the following section.

*Creating new multi-functional habitats would strengthen Westport’s Green Infrastructure on several fronts. Similarly, allowing for a recreational or educational use would add value to habitat creation projects.*



### 4.3 BIODIVERSITY MANAGEMENT SITES

The following pages provide a description of ideas and recommendations for the management of a number of sites in Westport. Many of these management techniques could be used on other similar sites or in gardens. These projects aim to conserve, enhance and raise awareness of biodiversity in Westport. The locations of these projects are shown in Figures 4.1-4.4.



#### North Wood Management and Enhancement

<b>Objective</b>	To enhance the woodland habitat by tree planting and control of the spread of non-native plants.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Native tree planting in area adjacent to the woodland entrance from Lidl.</li> <li>• Plant a grove of native pedunculate oak with native bluebells on amenity grassland at entrance from Lidl.</li> <li>• Plant trees on linear strip of meadow grassland near the pedestrian entrance from Fairways estate. Plant pedunculate oak, hazel and hawthorn.</li> <li>• Carry out an invasive and non-native plant survey of the woodland ground flora and remove non-native plants such as Montbretia and other garden escapes from the woodland. Monitor the regrowth of the plants annually and remove.</li> <li>• Run an awareness campaign on garden waste tipping and clean up garden waste tipping at the northern boundary of the woodland with the Pinewoods estate.</li> <li>• Erect bat boxes in woodland</li> <li>• Promote the project through a guided walk and/or signage highlighting the value of the native tree species and native woodland flora present and the effect of introducing non-native plants to the woodland.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor tree survival.</li> <li>• Monitor success of invasive/non-native plants control.</li> <li>• Monitor success of garden waste tipping prevention</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Plant trees autumn / early spring 2018-2021.</li> <li>• Control invasive species annually in spring (before seed set).</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• Guidance on making and erecting bat boxes is available from Bat Conservation Ireland <a href="http://www.batconservationireland.org/wp-content/uploads/2015/05/BCIrelandGuidelines_TidyTowns.pdf">http://www.batconservationireland.org/wp-content/uploads/2015/05/BCIrelandGuidelines_TidyTowns.pdf</a>.</li> </ul>



### Pinewoods Wildflower and Bee Bank

<b>Objective</b>	To manage a sloped bank of recolonizing bare ground to promote wildflowers and bee nesting habitat.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Remove non-native tree saplings e.g. Italian Alder and other woody species (e.g willow saplings) from the slope to control encroachment and shading of woody species on the wildflower bank</li> <li>• Cut the vegetation on the bank once a year in late September. Leave the cuttings in place for a few days to allow seeds to drop and then remove all the cuttings.</li> <li>• Lightly scarify the soil by drawing a rake over the soil to loosen the soil and assist seed spread.</li> <li>• As the vegetation develops on the bank over the years, maintain some bare ground habitat for mining bees by manually scraping back small areas to bare soil annually in late autumn.</li> <li>• Promote the project with simple signage highlighting the benefits to pollinators.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record wildflower, butterfly and bee diversity during summer months.</li> <li>• Observe whether there is an increase in the number of different wildflowers growing there.</li> <li>• Monitor growth of woody species and cut back or remove if necessary.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Remove woody plants in autumn.</li> <li>• Record plant and insect diversity from April through October.</li> <li>• Cut wildflower vegetation in late September annually and remove cuttings</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NBDC How-to-Guide. Creating wild pollinator nesting habitat <a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-1-ALT_FINAL.pdf">http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-1-ALT_FINAL.pdf</a></li> </ul>



## Roman Island Grassland Management

<b>Objective</b>	To promote wildflower and insect diversity in the grassland and maintain the orchid habitat.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Try and find out how the grassland was managed historically when there were many wildflowers and orchids present e.g. Was the area grazed by cattle or sheep in the past? Was the area mown?</li> <li>• Carry out a detailed botanical survey during the summer months to record the abundance and diversity of wildflowers.</li> <li>• Cut back scrub species such as bramble that are growing in the grassland in autumn or spring avoiding the bird nesting season (March 1<sup>st</sup>-August 31<sup>st</sup>)</li> <li>• Collaborate with local farmer to graze the area with cattle or sheep at a low stocking density during autumn and/or spring. Remove livestock in summer to allow wildflowers to bloom and set seed.</li> <li>• Avoid applying fertilisers or herbicides in the grassland area</li> <li>• Avoid supplemental feeding to livestock in the grassland area</li> <li>• It is recommended that if a walkway is to be promoted that it should not be surfaced but only managed as a natural trail as the extent of the grassland of conservation interest is very small and a surfaced trail may interfere with the grassland and would detract from the natural surroundings.</li> <li>• Erect simple signage drawing attention to the wildflowers present and their sensitivity to trampling.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record the abundance and diversity of wildflowers and insects such as butterflies and bees annually to monitor the success of the grazing regime.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Detailed botanical survey summer 2018</li> <li>• Graze in autumn and/or spring annually</li> <li>• Monitor wildflower diversity annually in summer 2019-2022</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NUI Farmland Habitats Guide <a href="http://www.nuigalway.ie/applied_ecology_unit/farmlandhabitatsguide.html">http://www.nuigalway.ie/applied_ecology_unit/farmlandhabitatsguide.html</a></li> </ul>



### Rampart Wood Biodiversity Reserve

<b>Objective</b>	To retain and promote the woodland as a biodiversity reserve.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Commission an ecological survey of the woodland north and south of Golfcourse Road to inform a management plan particularly to ensure adequate natural regeneration in the woodland.</li> <li>• Run an awareness campaign on garden waste tipping and clean up garden waste tipping at the boundary of the woodland with housing estates. Control and remove non-native garden plants that are growing in the woodland.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor garden waste tipping and spread of non-native plants in the woodland.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Ecological survey carried out in summer months.</li> <li>• Removal of garden plants in spring.</li> <li>• Monitor regrowth of garden plants annually during summer and remove.</li> <li>• Monitor garden waste tipping annually in summer.</li> </ul>

### Barrett’s Wood Conservation and Expansion Project

<b>Objective</b>	To promote natural regeneration and expansion of Barrett’s Wood.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Fence off the woodland from livestock.</li> <li>• Consider native woodland planting for the area of dense bracken adjacent to the western boundary of the woodland. Funding may be available under the Native Woodland Scheme.</li> <li>• Expand existing tree planting in the adjacent WWTP property to further expand the woodland habitat in the area.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor natural regeneration of the tree species in the existing woodland.</li> <li>• Monitor tree survival if woodland planting undertaken in adjacent areas.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Fence the woodland.</li> <li>• Plant trees November to March.</li> <li>• Monitor natural regeneration annually in summer months.</li> <li>• Monitor tree survival annually in summer months.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• Woodland planting is grant aided by the Forest Service under the Native Woodland Scheme <a href="https://www.agriculture.gov.ie/forests-service/">https://www.agriculture.gov.ie/forests-service/</a>.</li> </ul>



### Quay Pond Parkland

<b>Objective</b>	To enhance the biodiversity and amenity value of the Quay Pond Park.
<b>Action</b>	<ul style="list-style-type: none"> <li>Plant small groves of native hawthorn trees in the parkland area and once the trees are established, allow an area of long meadow grass to grow around the tree groves to provide an opportunity for wildflowers to grow providing forage and shelter for insects. This will also help to create a more natural look to the area in keeping with the natural coastline landscape. The meadow grassland areas should be mown once a year in late August/September and the cuttings removed and composted.</li> <li>Allow a 1-2 metre wide strip of grasses and wildflowers to grow round the pond area. Cut this vegetation in late August or September. Collect the cuttings and compost. If growth is vigorous cut one more in February/ March and collect cuttings. Some short mown paths to the pond edge can be maintained if desired</li> <li>Place some picnic tables and/or benches in the parkland.</li> <li>Erect some interpretative signage highlighting the Clew Bay Complex SAC and Clare Island SPA and the local wildlife to be seen in the area.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>Monitor the growth of the hawthorn trees and replace any that fail.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>Plant trees autumn/early spring 2018-2020.</li> <li>Mow meadow areas around trees and pond annually in August/September and once again in February/ March if growth is vigorous. Remove and compost cuttings.</li> </ul>



### St Mary’s Crescent Pollinator Oasis

<b>Objective</b>	To create a pollinator oasis in the centre of Westport.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Incorporate some pollinator-friendly perennial plants into existing beds and borders.</li> <li>• Reduce mowing at river edge to allow long grass to grow adjacent to the river. Cut to approximately 10 cm once a year in late August/September. Remove the cuttings and compost. Leave some small areas unmown to provide hibernation sites for insects during the winter.</li> <li>• Reduce mowing frequency to create areas of wildflower meadows and/or wildflower lawns in the parkland. For meadows cut once a year in autumn as above. For wildflower lawns cut once every 6 weeks to allow low-growing flowers such as clovers, dandelions, daisies and selfheal to flower. Delay the first cut till April to allow dandelions to flower. Dandelions are an important spring nectar source for bees.</li> <li>• Replace non-native hedgerow by the HSE building with native hedgerow or pollinator-friendly shrubs.</li> <li>• Remove Japanese knotweed from the river edge.</li> <li>• Create blocks of meadow grassland by allowing grassland to grow long and/or plant native woodland ground flora species (e.g. bluebells, primrose) under the sycamore trees. Ensure to source native Irish bluebells of local provenance.</li> <li>• Erect simple signage highlighting the actions for pollinators.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record the diversity of wildflowers growing and record sightings of butterflies and bees.</li> <li>• Monitor the success of Japanese Knotweed removal.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Pollinator friendly planting spring/ summer.</li> <li>• Plant woodland ground flora (e.g. bluebell bulbs autumn 2018)</li> <li>• Cut meadow grass annually in late August/September</li> <li>• Cut wildflower lawn areas during April to October every 6 weeks.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NBDC Gardens. Actions to help pollinators NBDC Series No.9 <a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf">http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf</a></li> </ul>

## Walkway to The Elms Biodiversity Enhancement

<b>Objective</b>	To enhance amenity grassland area for biodiversity and the public.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Plant a grove of native trees or an orchard.</li> <li>• Allow some areas of the grassland to grow as wildflower lawn by reducing the frequency of cutting to every 6 weeks or so allowing clover, buttercups and daisies to flower. Remove the cuttings and compost. Delay the first cut till April allowing dandelions to flower. Cut short mown paths though the wildflower lawn for access if desired or cut edge to existing pathway short to create neat and managed appearance.</li> <li>• Allow marginal areas at the edge to grow long as meadow grassland cutting annually in late August/September. Remove and compost cuttings.</li> <li>• Erect simple signage highlighting the benefits of native trees and reduced mowing regime to pollinators and other wildlife.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor tree survival.</li> <li>• Monitor the diversity of wildflowers.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Plant trees from November to March.</li> <li>• Cut meadow grass annually in late August/September.</li> <li>• Cut wildflower lawn areas during April to October every 6 weeks.</li> <li>• Monitor tree survival and diversity of wildflowers during summer months.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NBDC Gardens Actions to help pollinators NBDC Series No.9 <a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf">http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf</a></li> <li>• The Edible Landscape Project <a href="http://ediblelandscape.ie/">http://ediblelandscape.ie/</a></li> <li>• Fruit and Nut, The Sustainability Institute, Ballinrobe Road, Westport. <a href="http://www.fruitandnut.ie/">http://www.fruitandnut.ie/</a></li> </ul>





### Carrowbeg River Walk Biodiversity Management

<b>Objective</b>	To conserve and raise awareness of biodiversity and control invasive plant species.
<b>Action</b>	<ul style="list-style-type: none"> <li>• To minimise disturbance to wildlife during river maintenance works refer to the best practice guidelines for dredging of rivers during river flood relief/maintenance works (OPW 2011, <i>Arterial Drainage Maintenance Environmental Management Protocols &amp; Standard Operating Procedures</i>).</li> <li>• Survey and map invasive plant species including Japanese knotweed and Himalayan balsam along the river. Devise an invasive plant species management plan. Japanese knotweed control should be implemented by a suitably qualified person. Consider running a volunteer project for the control of Himalayan balsam. Review feasibility regarding access to the areas where Himalayan balsam is growing and health and safety considerations for a volunteer project. If feasible, organise a volunteer day to uproot Himalayan balsam by hand picking in May or June before seed pods are visible. Pile the pulled plants at a suitable distance from the river and cover with jute allowing the plants to decompose.</li> <li>• Remove red osier dogwood from the planting scheme adjacent to the apartment block. Red osier dogwood can be invasive especially in wetland habitats and may pose a threat to the river habitats. Removal of the dogwood will enhance the view of the river from apartments. If replacement planting is desired, plant native species such as hawthorn or wild cherry.</li> <li>• Erect some signage highlighting the local wildlife associated with the river.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor the success of invasive species removal.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Survey and map invasive plant species in April-September as this is when the plants are most easily identified and most visible.</li> <li>• Remove Himalayan balsam by hand picking in May/June.</li> <li>• Monitor regrowth annually in April and hand pick any regrowth in May/June as above.</li> </ul>
<b>Further Guidance</b>	Guidance on management of invasive plant species at river sites is provided in: <a href="http://mulkearlife.com/wp-content/uploads/2015/05/MulkearlIFE_BP_RIPARIAN-FINAL.pdf">http://mulkearlife.com/wp-content/uploads/2015/05/MulkearlIFE_BP_RIPARIAN-FINAL.pdf</a>





### Ocean View Estate Woodland Planting

<b>Objective</b>	To enhance an amenity area for biodiversity.
<b>Action</b>	<ul style="list-style-type: none"> <li>Plant a woodland on amenity grassland area adjacent to the walkway from the estate to the Railway Walk. Consider applying for funding under the Native Woodland Scheme with the help of an approved forester (minimum area must be 0.1 ha).</li> <li>Plant common alder, grey willow and hawthorn bare root trees.</li> <li>Organise a volunteer day to plant the woodland.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>Monitor tree survival</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>Woodland planting may be done from November through March but it is best to plant in November/December.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>Woodland planting is grant aided by the Forest Service under the Native Woodland Scheme <a href="https://www.agriculture.gov.ie/forests-service/">https://www.agriculture.gov.ie/forests-service/</a></li> </ul>

### Westport College of Further Education Habitat Creation

<b>Objective</b>	To increase semi-natural habitats in the college grounds.
<b>Action</b>	<ul style="list-style-type: none"> <li>Plant a native hedgerow. Appropriate species include hawthorn, blackthorn, holly, gorse, elder, rowan and on wetter soils native willow species and alder. Plant a minimum of 4 species per 30 metre length for a species rich hedge*.</li> <li>Create a pond in the college grounds and stock with native pond weeds and native marginal planting.</li> <li>Organise a public open day to demonstrate how to create a wildlife pond.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>Monitor tree growth and survival.</li> <li>Record insect diversity in the pond.</li> <li>Monitor insect diversity in the pond as the pond matures.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>Plant native hedgerow from November through to March.</li> <li>Create pond in autumn/spring months.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>Hedgerow management advice is available at: <a href="http://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf">http://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf</a></li> <li><i>Mayo's Hedgerows</i> is available from the Heritage Office of Mayo County Council.</li> <li>Guidance for creating and maintaining ponds is available at <a href="http://freshwaterhabitats.org.uk/habitats/pond/create-pond/">http://freshwaterhabitats.org.uk/habitats/pond/create-pond/</a></li> </ul>

\* Due to the spread of ash dieback disease, ash should not be planted at this time.



### Westport Road Verges Biodiversity Management

<b>Objective</b>	To increase the diversity of wildflowers and insects along Westport roads.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Reduce the frequency of mowing of roadside verges. Leave wide grassy verges to grow long and cut in late August or September. Remove the cuttings. A 0.5-1 metre wide strip can be mown regularly at the roadside edge to give a neat appearance and to maintain visibility.</li> <li>• Leave long grassy verges to grow beneath roadside hedgerows and treelines. Cut the grassy verge when hedgerows are being cut. Remove grass cuttings.</li> <li>• Consider simple signage to highlight the project using a caption such as “Don’t Mow Let It Grow”. Can you think of a new one for Westport road verges?</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record wildflower, butterfly and bee diversity.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Hedgerows should not be cut between 1st March and the 31st August to avoid the bird nesting season. Cutting hedgerows between November and January is less likely to be disruptive to pollinating insects.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• Guidance on maintaining hedgerows is available at: <a href="http://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf">http://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf</a></li> </ul>

## Edible Landscape Project

<b>Objective</b>	To expand the Forest Garden concept to residential estates around Westport.
<b>Action</b>	<ul style="list-style-type: none"> <li>Plant apple or other fruit trees along with a range of beneficial companion plants which help suppress weeds, attract pollinating insects and help to fertilise the soil to create a self-sustaining fruit garden system. These orchard guilds will be planted in residential estates throughout Westport.</li> <li>Run workshops and volunteer days to help with the planting.</li> <li>Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>Monitor tree growth and success of companion planting technique.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>Plant fruit trees November to March 2018-2022</li> <li>Plant companion planting in spring/summer months 2018-2022</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>The Edible Landscape Project <a href="http://ediblelandscape.ie/">http://ediblelandscape.ie/</a></li> <li>Fruit and Nut, The Sustainability Institute, Ballinrobe Road, Westport. <a href="http://www.fruitandnut.ie/">http://www.fruitandnut.ie/</a></li> </ul>





## Greening the Fair Green

<b>Objective</b>	To create a town centre demonstration wildlife garden.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Design a demonstration wildlife garden featuring a range of wildlife friendly features. This could include, for example, dwarf fruit tree varieties, beds and borders with a range of tall grasses and pollinator friendly planting, a small pond, neat log piles, small stone wall features, paths and bird boxes and feeders.</li> <li>• Consider re-sowing some of the grassland area with a clover mix and maintaining as a flowering clover lawn.</li> <li>• Erect signage with information on the wildlife friendly features of the garden.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record birds, butterflies and bees visiting the garden.</li> <li>• Monitor people's usage and opinions of the garden.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Plant fruit trees November to March</li> <li>• Pollinator friendly planting spring/ summer.</li> <li>• Seed clover in spring or summer.</li> <li>• Cut clover lawn areas during April to October every 6-8 weeks or only as needed.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• In addition to other guidance listed in this plan, you could look at: <a href="http://www.rspb.org.uk/get-involved/community-and-advice/garden-advice/wildlife-friendly_garden.aspx">www.rspb.org.uk/get-involved/community-and-advice/garden-advice/wildlife-friendly_garden.aspx</a></li> </ul>



### Enhancing Amenity Grassland for Biodiversity Throughout Westport

<b>Objective</b>	To enhance underused areas of green areas in estates for biodiversity.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Run a "Best for Biodiversity" estates competition</li> <li>• Identify underused green spaces currently under species-poor amenity grassland. Where appropriate establish wildflower meadows, wildflower lawns, groves of native trees, mini-woodlands or hedgerows. Wildlife gardens or pollinator planting may be appropriate too.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor successful establishment of biodiversity areas.</li> <li>• Survey peoples' opinions, reactions and enjoyment of the new biodiversity areas</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Plant trees November to March 2018-2022</li> <li>• Cut wildflower meadows yearly in autumn. Cut wildflower lawns every 6-8 weeks.</li> <li>• Plant pollinator friendly plants in spring and autumn</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• The National Biodiversity Centre website has lots of resources on how to promote biodiversity. <a href="http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/">http://www.biodiversityireland.ie/projects/irish-pollinator-initiative/all-ireland-pollinator-plan/</a></li> </ul>



### Wildflowers at High Street

<b>Objective</b>	To encourage the growth of local native wildflowers at the High Street Greenway bridge using green hay. Green hay is grasses and wildflowers harvested when they are shedding seed and still 'green'.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Allow the grassy bank to grow in summer as long meadow grassland.</li> <li>• Cut the grass to approximately 10 cm once a year in August/September after the flowers have set seed. Remove all the cuttings and compost.</li> <li>• Collect 'green hay' from freshly cut roadside verges or grassy verges along the Greenway that have plenty of wildflowers. The cuttings should be collected and spread the same day as they are cut if possible.</li> <li>• Before spreading the green hay prepare the ground. Scarify the soil with a rake or create areas of bare ground by stripping off some of the vegetation.</li> <li>• Spread the green hay over the area and trample in to ensure seeds make contact with soil.</li> <li>• Alternatively or in addition, seed can also be collected from wildflowers in July, August and September and grown on in pots and planted into the grassland.</li> <li>• Areas of bare ground may be susceptible to the growth of problem plants such as docks, nettles and thistles. These should be controlled by hand pulling.</li> <li>• If growth is strong in autumn, cut the grass again to reduce competition from coarse grasses and remove all the cuttings.</li> <li>• Register your action for pollinators on the NBDC website <a href="https://pollinators.biodiversityireland.ie/">https://pollinators.biodiversityireland.ie/</a></li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record the diversity of wildflowers growing and record sightings of butterflies and bees.</li> <li>• Monitor the number of different types of wildflowers. Repeat the green hay procedure the following year if required. Note some grassland wildflowers are perennial. Seeds germinating in the first year may only form a rosette of leaves and not flower. These plants will bloom from the second year onwards.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Cut meadow grass annually in late July/August/September when seed has set.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NBDC How-to-guide: Collecting and using wildflower seed: <a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-2_ALT_FINAL.pdf">http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-2_ALT_FINAL.pdf</a></li> </ul>

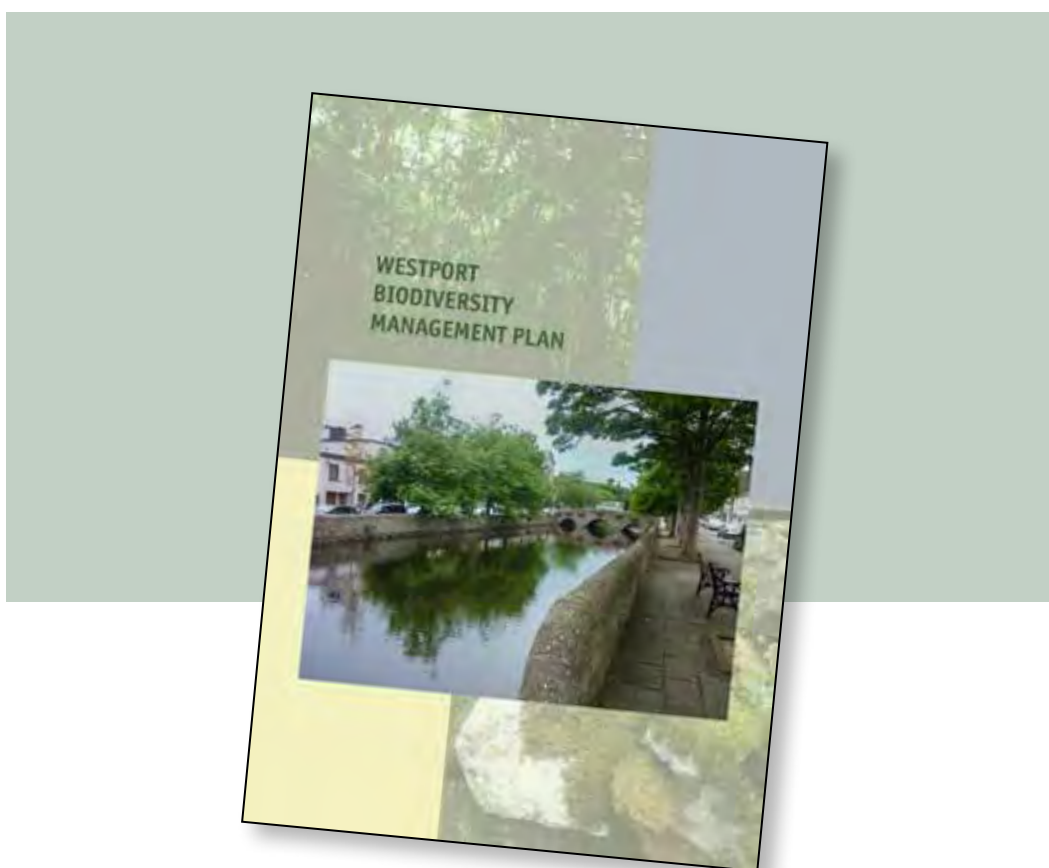


### Pollinator Planting at Leisure Park

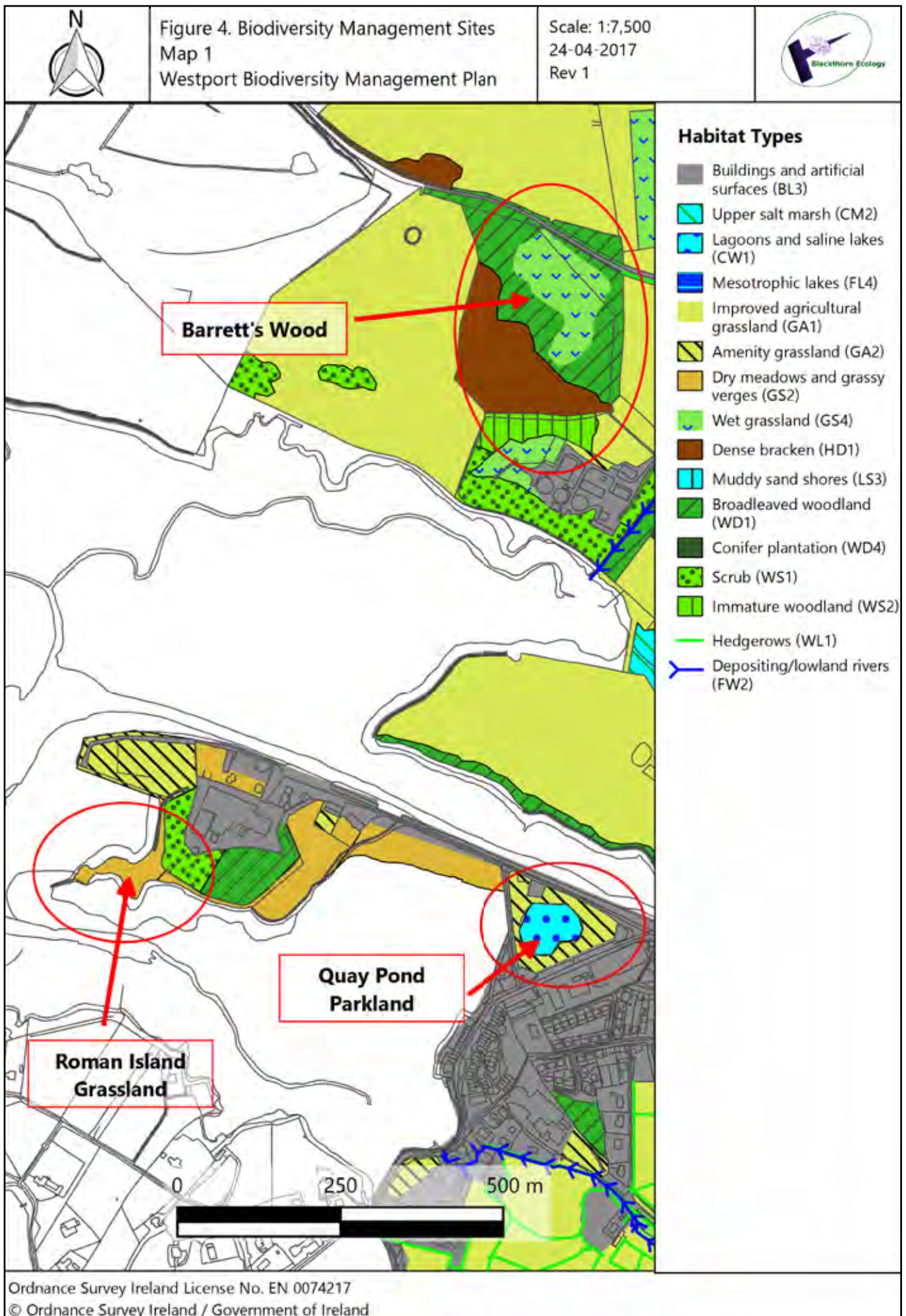
<b>Objective</b>	To create a pollinator friendly planting scheme in the centre of Westport.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Plant pollinator friendly perennial plants in the border of the car park at Leisure Park.</li> <li>• Chose a variety of plants which will bloom throughout the spring, summer and autumn to provide a continuous nectar supply for pollinators.</li> <li>• Erect simple signage highlighting the actions for pollinators.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Record sightings of butterflies and bees.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Pollinator friendly planting spring/summer/autumn.</li> </ul>
<b>Further Guidance</b>	<ul style="list-style-type: none"> <li>• NBDC Gardens. Actions to help pollinators NBDC Series No.9 <a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf">http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Gardens_actions-to-help-pollinators-July-2016.pdf</a></li> <li>• RHS Pollinator friendly plants list: <a href="https://www.rhs.org.uk/science/pdf/conservation-and-biodiversity/wildlife/rhs_pollinators_plantlist">https://www.rhs.org.uk/science/pdf/conservation-and-biodiversity/wildlife/rhs_pollinators_plantlist</a></li> </ul>

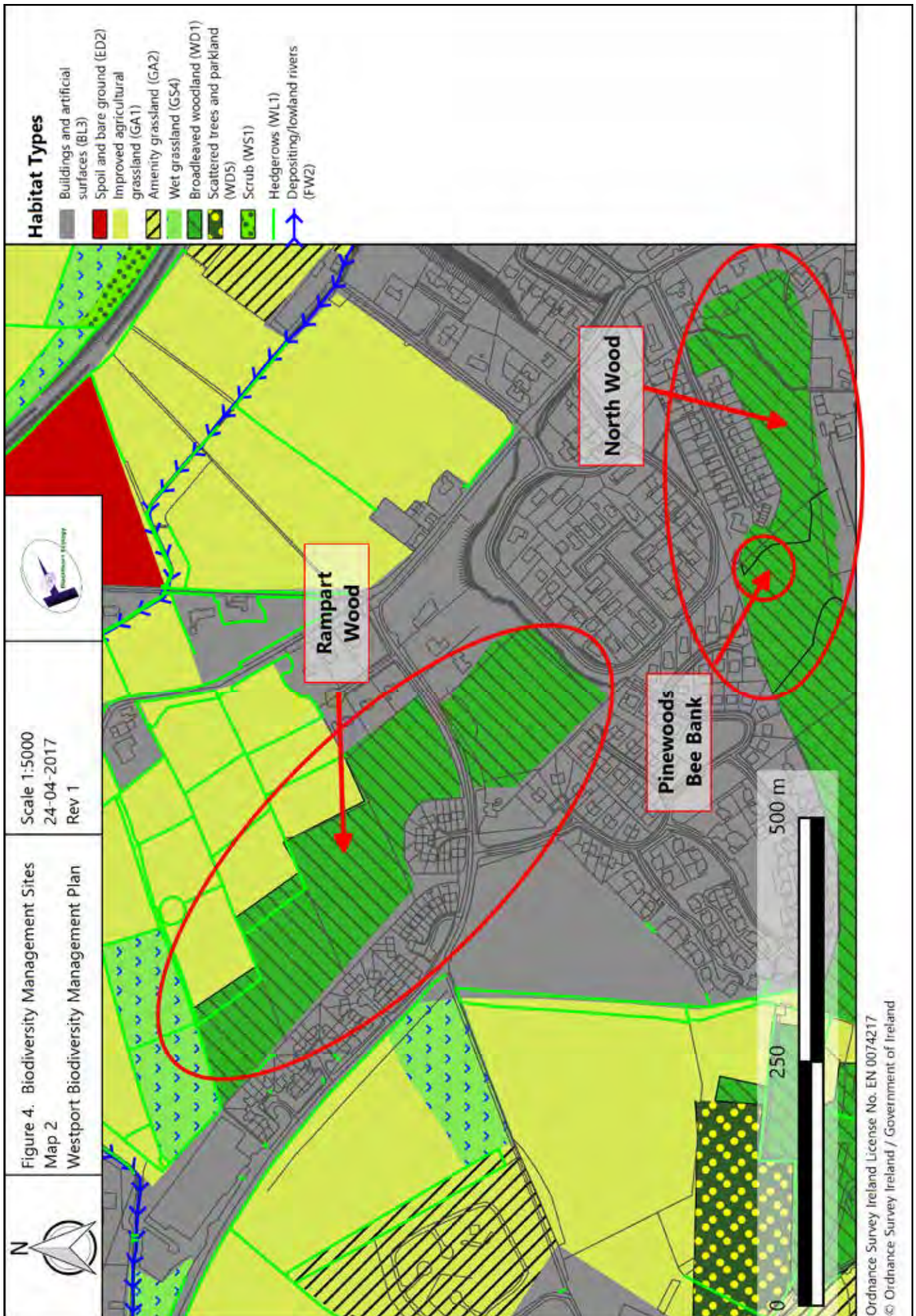
## Promotion of the Westport Biodiversity Plan

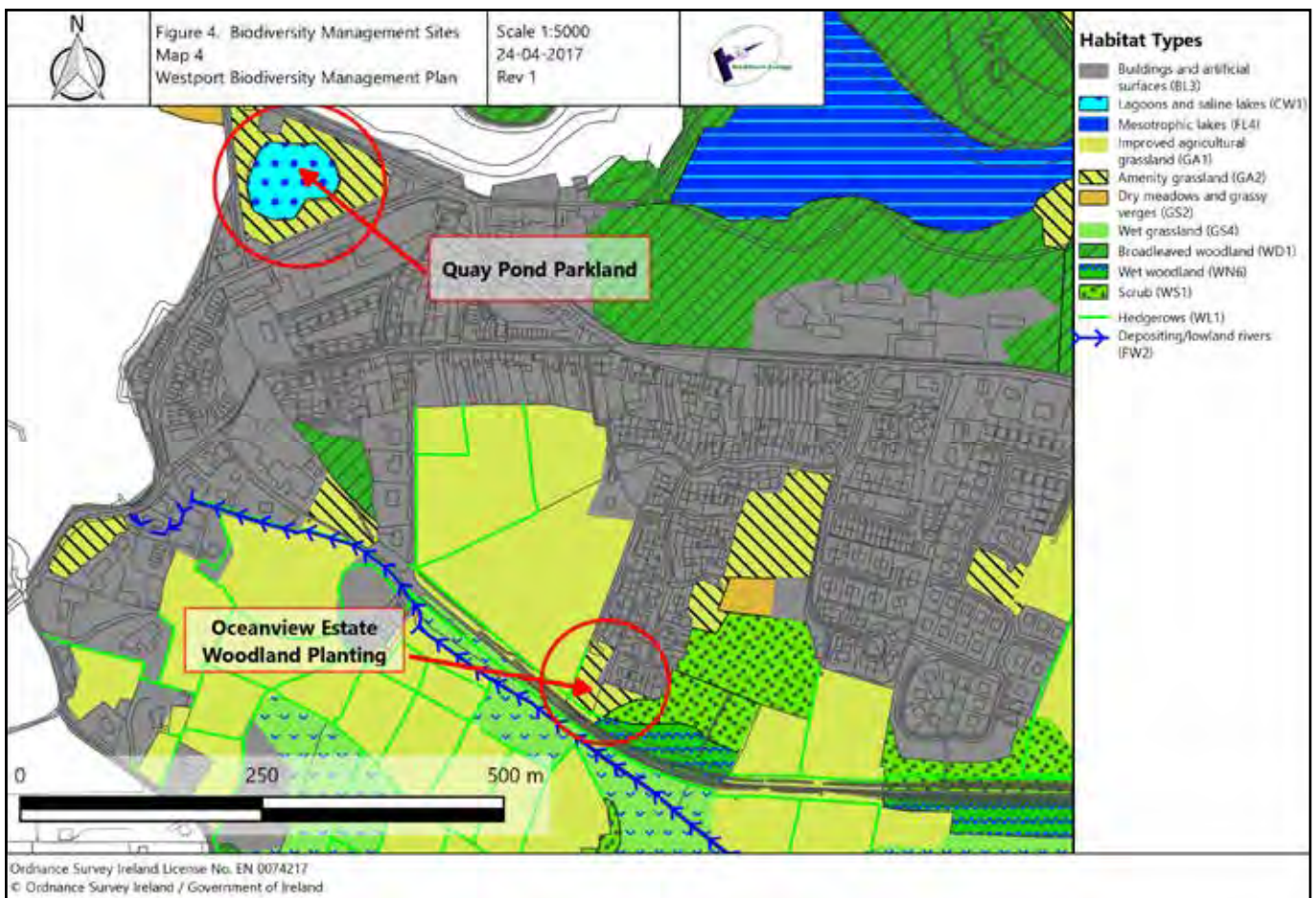
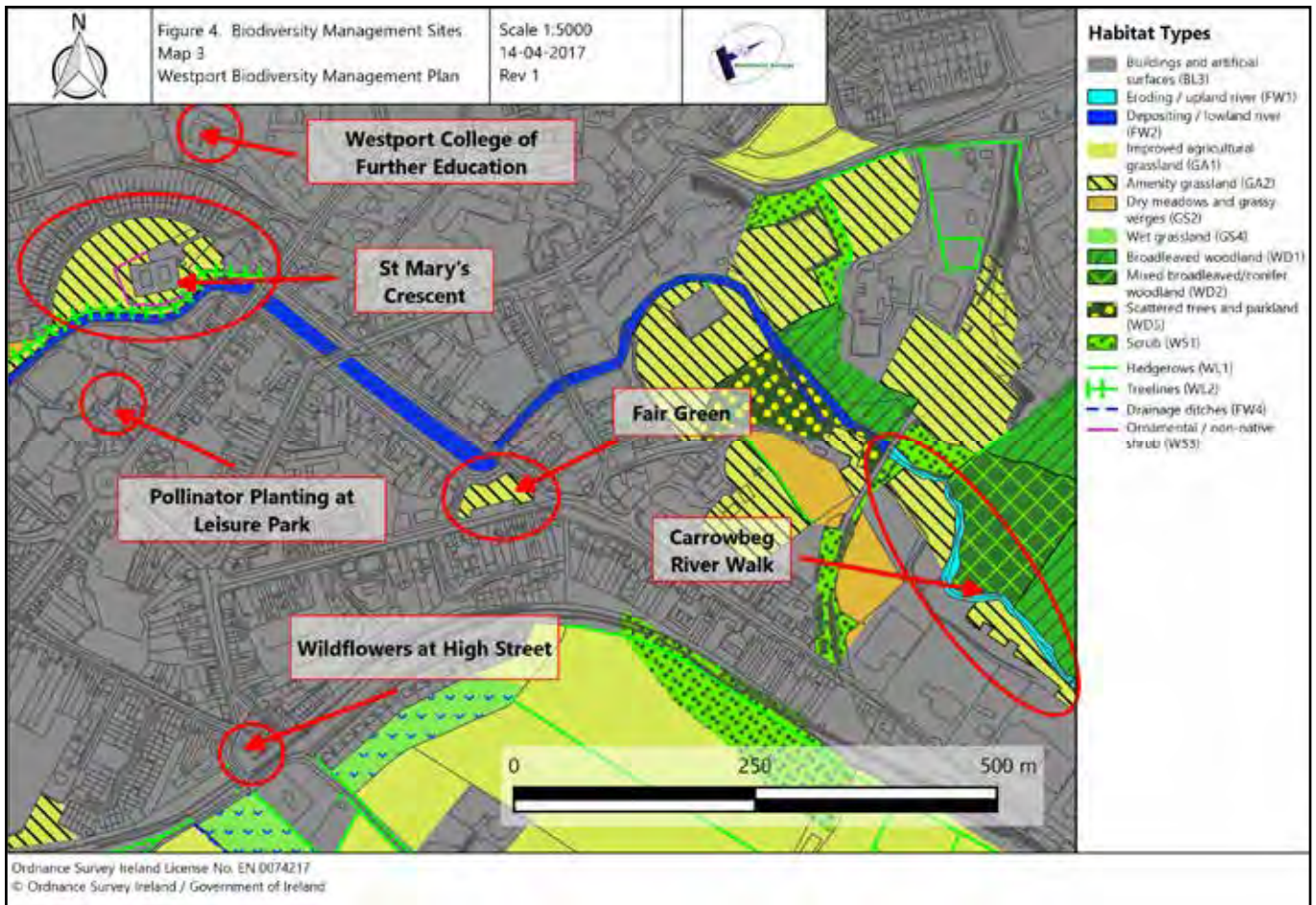
<b>Objective</b>	To raise awareness of, and interest in, the Biodiversity Plan.
<b>Action</b>	<ul style="list-style-type: none"> <li>• Launch the Biodiversity Plan with the production of a leaflet guide with a map showing the biodiversity project sites.</li> <li>• Organise a guided tour of some of the biodiversity project sites in the town to recruit volunteer participation.</li> </ul>
<b>Evaluation</b>	<ul style="list-style-type: none"> <li>• Monitor the interest received in the biodiversity projects.</li> <li>• Take account of the positive and negative (if any) outcomes of the projects for both people and wildlife.</li> <li>• Survey peoples’ opinions and reactions to the projects.</li> <li>• Record any problems that arise e.g. vandalism.</li> </ul>
<b>Schedule</b>	<ul style="list-style-type: none"> <li>• Launch the biodiversity plan in spring 2018.</li> <li>• Organise a guided tour of project sites in spring /summer 2018.</li> <li>• Consider an annual guided tour to evaluate the success of the projects and monitor progress.</li> </ul>











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## APPENDIX A: SCIENTIFIC NAMES

Scientific names of species named in text are listed below. Nomenclature for vascular plants follows Stace (2010). Nomenclature for animals follows the appropriate Red List (Marnell et al., 2009, King et al., 2011, Colhoun and Cummins, 2013).

Common Name	Scientific Name
<b>PLANTS</b>	
alder	<i>Alnus glutinosa</i>
ash	<i>Fraxinus excelsior</i>
barren strawberry	<i>Potentilla sterilis</i>
bee orchid	<i>Ophrys apifera</i>
beech	<i>Fagus sylvatica</i>
bird's-foot trefoil	<i>Lotus corniculatus</i>
bluebell	<i>Hyacinthoides non-scripta</i>
bog asphodel	<i>Narthecium ossifragum</i>
bog myrtle	<i>Myrica gale</i>
bramble	<i>Rubus fruticosus</i> agg.
broad buckler fern	<i>Dryopteris dilatata</i>
buddlja	<i>Buddlja davidii</i>
cat's-ear	<i>Hypochaeris radicata</i>
cock's-foot	<i>Dactylis glomerata</i>
common cord-grass	<i>Spartina anglica</i>
common knapweed	<i>Centaurea nigra</i>
creeping bent	<i>Agrostis stolonifera</i>
creeping buttercup	<i>Ranunculus repens</i>
creeping thistle	<i>Cirsium arvense</i>
dog violets	<i>Viola</i> species
downy birch	<i>Betula pubescens</i>
eared willow	<i>Salix aurita</i>
enchanter's nightshade	<i>Circaea lutetiana</i>
eyebright	<i>Euphrasia</i> species
false brome	<i>Brachypodium sylvaticum</i>
foxglove	<i>Digitalis purpurea</i>
garden privet	<i>Ligustrum ovalifolium</i>
gorse	<i>Ulex europaeus</i>
grey willow	<i>Salix cinerea</i>
hard fern	<i>Blechnum spicant</i>
hart's tongue	<i>Asplenium scolopendrium</i>
hawthorn	<i>Crataegus monogyna</i>
hay-scented buckler fern	<i>Dryopteris aemula</i>
hazel	<i>Corylus avellana</i>
heath speedwell	<i>Veronica officinalis</i>
heath St John's wort	<i>Hypericum pulchrum</i>
heather	<i>Calluna vulgaris</i>
herb robert	<i>Geranium robertianum</i>
holly	<i>Ilex aquifolium</i>
horse-chestnut	<i>Aesculus hippocastanum</i>
Italian alder	<i>Alnus cordata</i>
ivy	<i>Hedera hibernica</i>
Japanese larch	<i>Larix kaemferi</i>

Common Name	Scientific Name
lady fern	<i>Athyrium filix-femina</i>
Leyland cypress	<i>x Cuprocypris leylandii</i>
lime	<i>Tilia</i> species
male fern	<i>Dryopteris filix-mas</i>
Montbretia	<i>Crocsmia x crocosmiiflora</i>
nettles	<i>Urtica dioica</i>
Norway spruce	<i>Picea abies</i>
oak	<i>Quercus</i> species
opposite-leaved golden saxifrage	<i>Chrysosplenium oppositifolium</i>
pendulous sedge	<i>Carex pendula</i>
pheasantberry	<i>Leycesteria formosa</i>
primrose	<i>Primula vulgaris</i>
purple moor-grass	<i>Molinia caerulea</i>
red clover	<i>Trifolium pratense</i>
red fescue	<i>Festuca rubra</i>
red-osier dogwood	<i>Cornus sericea</i>
rhododendron	<i>Rhododendron ponticum</i>
rowan	<i>Sorbus aucuparia</i>
sanicle	<i>Sanicula europaea</i>
Scots pine	<i>Pinus sylvestris</i>
Sitka spruce	<i>Picea sitchensis</i>
sweet chestnut	<i>Castanea sativa</i>
sycamore	<i>Acer pseudoplatanus</i>
tutsan	<i>Hypericum androsaemum</i>
western hemlock	<i>Tsuga heterophylla</i>
wild carrot	<i>Daucus carota</i>
wood avens	<i>Geum urbanum</i>
wood dock	<i>Rumex sanguineus</i>
wood rush	<i>Luzula sylvatica</i>
wood sedge	<i>Carex sylvatica</i>
wood sorrel	<i>Oxalis acetosella</i>
wych elm	<i>Ulmus glabra</i>
yellow rattle	<i>Rhinanthus minor</i>
<b>ANIMALS</b>	
brown long-eared bat	<i>Plecotus auritus</i>
common pipistrelle	<i>Pipistrellus pipistrellus</i>
Daubenton's bat	<i>Myotis daubentonii</i>
Leisler's bat	<i>Nyctalus leisleri</i>
long-eared owl	<i>Asio otus</i>
otter	<i>Lutra lutra</i>
pied wagtail	<i>Motacilla alba</i>
pine marten	<i>Martes martes</i>
soprano pipistrelle	<i>Pipistrellus pygmaeus</i>

## APPENDIX B: GIS DATABASE STRUCTURE

The habitat database is maintained as a Geographical Information System (GIS) in ESRI shapefile format. The GIS was compiled using QGIS (QGIS Development Team, 2017). The data attributes and notes on the values they take are outlined below.

Attribute	Values						
TOWN	WESTPORT						
<b>ID</b>	Unique numeric identification number for each feature						
<b>Easting</b>	Easting or X-coordinate of the feature centroid in Irish Grid						
<b>Northing</b>	Northing or Y-coordinate of the feature centroid in Irish Grid						
<b>Fossitt_Co</b>	Alphanumeric habitat code according to level 3 of Fossitt (2000)						
<b>Habitat_Na</b>	Habitat name according to level 3 of Fossitt (2000)						
<b>Area_m</b> (polygon features)	Feature area in square metres						
<b>Length_m</b> (linear features)	Feature length in metres						
<b>Curr_Cons</b>	Current conservation value according to a spatial scale: I = international; N = national; C = county; HL = high local; ML = moderate local; LL = low local						
<b>Pot_Cons</b>	Potential conservation value if conservation management is undertaken. Follows same spatial scale as <b>Curr_Cons</b>						
<b>Annex_hab</b>	Feature corresponds to a habitat listed on Annex I of the Habitats Directive: Y = yes; N = no. Annex I habitat type is given under <b>Comments</b>						
<b>SAC</b>	Feature is within an SAC: Y = yes; N = no						
<b>SPA</b>	Feature is within an SPA: Y = yes; N = no						
<b>NHA</b>	Feature is within a NHA or pNHA: Y = yes; N = no						
<b>Annex_Spp</b>	Feature supports species listed on Annex II of the Habitats Directive: Y = yes; N = no. Annex II species are given under <b>Comments</b>						
<b>RDB_Spp</b>	Feature supports species listed on an Irish Red List: Y = yes; N = no. Annex II species are given under <b>Comments</b>						
<b>Photo_ID</b>	File name of photo of the feature, if applicable						
<b>Date_Surve</b>	Date on which field survey was undertaken. N/S = not surveyed in the field						
<b>LBA</b>	Feature is in a Local Biodiversity Area: Y = yes; N = no.						
<b>LBA_Name</b>	Name of Local Biodiversity Area if applicable						
<b>Corridor</b>	Feature is part of an ecological corridor or stepping stone						
<b>Comments</b>	Any other notes on the feature						
<b>GI_Rec</b>	Feature is recreational Green Infrastructure: 1 = yes; 0 = no						
<b>GI_Bio</b>	Feature is biodiversity Green Infrastructure: 1 = yes; 0 = no						
<b>GI_Water</b>	Feature is water Green Infrastructure: 1 = yes; 0 = no						
<b>GI_Climate</b>	Feature is climate change Green Infrastructure: 1 = yes; 0 = no						
<b>GI_Prod</b>	Feature is productivity Green Infrastructure: 1 = yes; 0 = no						
<b>Data_Qual</b>	Data quality – source of habitat attribution and other data: S = surveyed in the field; V = simple validation in the field; DA = recent, good quality desktop data; DB = older desktop data; DC = aerial photo interpretation supported by other desktop data; DD = aerial photo interpretation						
	Threats to biodiversity. Up to 3 threats listed. Threat codes:						
<b>Threat_1</b>	<table border="0"> <tr> <td><b>AIS</b> Alien Invasive Species</td> <td><b>F</b> Fragmentation</td> </tr> <tr> <td><b>NIS</b> Native Invasive Species</td> <td><b>U</b> Undergrazing</td> </tr> <tr> <td><b>T</b> Trampling</td> <td><b>AI</b> Agricultural intensification</td> </tr> </table>	<b>AIS</b> Alien Invasive Species	<b>F</b> Fragmentation	<b>NIS</b> Native Invasive Species	<b>U</b> Undergrazing	<b>T</b> Trampling	<b>AI</b> Agricultural intensification
<b>AIS</b> Alien Invasive Species	<b>F</b> Fragmentation						
<b>NIS</b> Native Invasive Species	<b>U</b> Undergrazing						
<b>T</b> Trampling	<b>AI</b> Agricultural intensification						
<b>Threat_2</b>	<table border="0"> <tr> <td><b>Dr</b> Drainage</td> <td><b>Af</b> Afforestation</td> </tr> <tr> <td><b>Tu</b> Turf cutting</td> <td><b>OG</b> Overgrazing</td> </tr> </table>	<b>Dr</b> Drainage	<b>Af</b> Afforestation	<b>Tu</b> Turf cutting	<b>OG</b> Overgrazing		
<b>Dr</b> Drainage	<b>Af</b> Afforestation						
<b>Tu</b> Turf cutting	<b>OG</b> Overgrazing						
<b>Threat_3</b>	<table border="0"> <tr> <td><b>P</b> Pollution (water)</td> <td><b>Q</b> Quarrying</td> </tr> <tr> <td><b>L</b> Littering</td> <td><b>M</b> Intensive management</td> </tr> </table>	<b>P</b> Pollution (water)	<b>Q</b> Quarrying	<b>L</b> Littering	<b>M</b> Intensive management		
<b>P</b> Pollution (water)	<b>Q</b> Quarrying						
<b>L</b> Littering	<b>M</b> Intensive management						



## MAYO TOWNS AND VILLAGES BIODIVERSITY MANAGEMENT PLAN SERIES: NO. 1 WESTPORT



An action of the County Mayo Heritage Plan