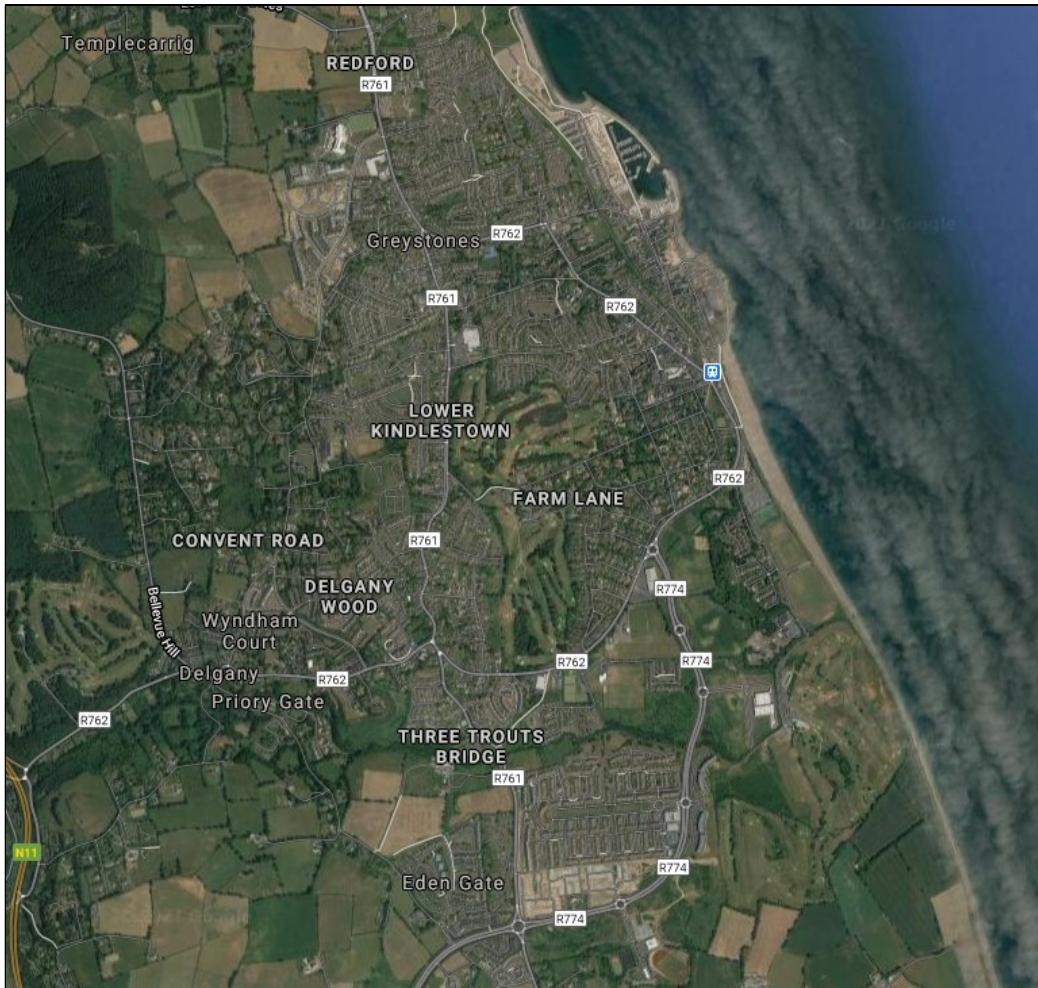


# BIODIVERSITY ACTION PLAN FOR GREYSTONES



24<sup>th</sup> May 2021

FINAL REPORT

Report prepared by

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## BIODIVERSITY ACTION PLAN FOR GREYSTONES

### EXECUTIVE SUMMARY

The biodiversity loss in the environs of Greystones in the last twenty years has been an ongoing and relentless one and is documented in this report.

This study was commissioned by Greystones Tidy Towns and was funded by a grant from the Environment and Nature Fund 2019 from the Community Foundation Ireland. This report has reviewed the ongoing development of Greystones Town and despite the identification of Local Biodiversity Areas in the Local Area Plan for in 2006 biodiversity losses have continued.

These losses have occurred principally through rezoning of lands for development, encroachment into areas designated as being of importance for biodiversity, amenitisation and sanitisation of natural habitats, inappropriate management of grasslands, inappropriate ornamental planting, garden escapes becoming invasive in natural areas and a lack of protection for areas of scrub, which form critical habitat for our invertebrates and birdlife.

**Wicklow County Council has become the first local authority in Ireland to declare “a biodiversity and climate-change emergency”, recognising the need to respond more urgently to the threat of climate breakdown and the global decline of species.**

**So what needs to be done and can be done for the biodiversity in Greystones by its residents, politicians and local authority?**

The most significant biodiversity losses occur when lands are rezoned in an area through either Local Area Plans or the County Development Plan – this drives development, land prices, development pressures, urbanisation and land use change. **Nature Needs Your Voice at the Planning Stage.**

A number of recommendations are presented below in order of importance and are the most immediate and critical ways in which Greystones can respond to both the extreme biodiversity loss and the climate change crisis.

They can be summarized into 8 categories:

1. Planning Control and Citizen Engagement – these include zoning the extant areas of lands in Greystones with biodiversity still intact as lands with **biodiversity as the core objective for the lands**, which has been done in other local authorities such as Fingal County Council.
2. Implement the Actions for the Biodiversity Areas Identified in 2006
3. Implement the Actions for the Biodiversity Areas Identified in 2020/2021
4. Implementation of Grassland Management Measures which are favourable to biodiversity
5. Protect the Coastal Areas in light of climate change
6. Restore a Sense of the Wild Back to Greystones
7. Tackle Invasive Species within Greystones
8. Implement individual and garden measures for biodiversity

**An overriding theme running through all of these is that of the need for education and improving awareness of biodiversity and understanding the forces driving losses of same.**

**We need to protect areas for biodiversity and adjust our thinking, our perceptions and our understanding and tolerate a little more wildness, scruffiness and unkemptness in the environs of our towns and villages if we want biodiversity loss to be halted and reduced. This gift is in our hands.**

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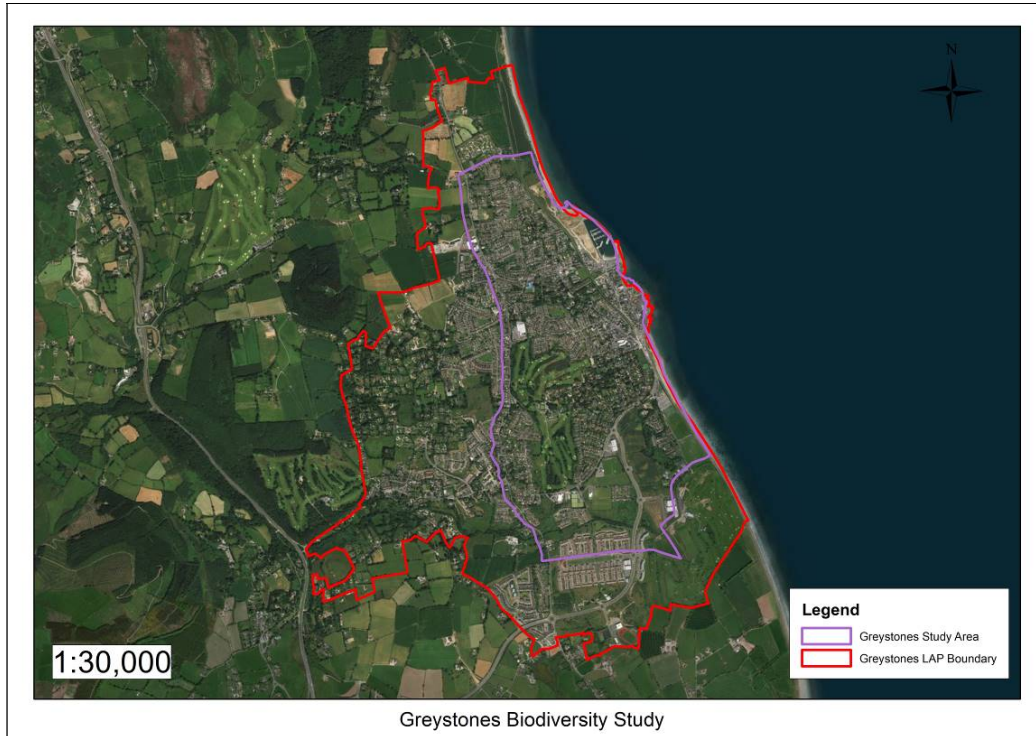
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## BIODIVERSITY ACTION PLAN FOR GREYSTONES

### 1. GENERAL OVERVIEW

A baseline survey of the biodiversity of Greystones town, Co. Wicklow commenced in March 2020 and completion of same was delayed by the global Covid19 pandemic. Greystones Tidy Towns successfully received funding for the study from the Community Foundation Ireland under Strand 1 of the Environment and Nature Fund 2019. The survey was conducted by Faith Wilson (ecological consultant) on behalf of the group. The study area is located within the environs of Greystones Town as shown on **Figure 1** below.



**Figure 1. Greystones Biodiversity Plan Study Area shown in purple.**

#### 1.1 What is Biodiversity?

Biodiversity is the shortened form of two words "biological" and "diversity".

It refers to all the variety of life that can be found on Earth (plants, animals, fungi and micro-organisms) as well as to the communities that they form and the habitats in which they live. The biodiversity we see today is the result of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. Biodiversity provides the functioning ecosystems that supply oxygen, clean air and water, pollination of plants, pest control, wastewater treatment and many ecosystem services which underpin our existence as a species.

**Biodiversity** forms the web of life of which we are an integral part and upon which we so fully depend.

## 2. METHODOLOGY

### 2.1 Desktop Research

A desk study was carried out to collate the available information on the ecological environment in which Greystones Town is located. The National Parks and Wildlife Service (NPWS) of the Department of Housing Local Government and Heritage (DHLGH) database of designated conservation areas and NPWS records of rare and protected plant species were checked. Information on protected species of fauna and flora listed for protection under Annex II of the EU Habitats Directive (92/43/EEC), Annex I of the Birds Directive (79/409/EEC) and the Wildlife (Amendment) Act (2000) was also sought from NPWS, the National Biodiversity Data Centre and published sources. Recent, high resolution, colour aerial photographs were also used to identify and map habitats. Various ecological surveys conducted within the environs of Greystones as part of other developments and projects were also reviewed.

In addition to the identified designated Natura 2000 sites and pNHAs consideration was also given to other flora and fauna as defined under the following legislative instruments and red data books:

- species protected under the **Wildlife Act (1976 (amended 2000))**, such as bats, badger, pine marten and common frog,
- plant species listed under the **Flora Protection Order (2015)**,
- vascular plant species listed in the **Irish Red List for Vascular Plants**<sup>1</sup>.
- bird species listed under the '**Birds of Conservation Concern in Ireland**' document<sup>2</sup>,
- mammals listed in the **Irish Red List for Terrestrial Mammals**<sup>3</sup>,
- amphibians and reptiles listed in the **Irish Red List for Amphibians, Reptiles & Freshwater Fish** <sup>4</sup>,
- invasive species listed under Schedule 3 of the 'Birds and Natural Habitats Regulations 2011' and the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014<sup>5</sup>).

### 2.2 Field Surveys

A number of locations within the town were initially selected for focus during the study. These were:

- 1) Three Trout Stream
- 2) Coastal area from Charlesland to the Bray to Greystones cliff walk
- 3) St Crispin's
- 4) General environs within the town

A number of field surveys were conducted during the summer of 2020 and spring/summer 2021 to investigate the habitats and species present and previously recorded in Greystones using standard ecological methodologies and reference guides<sup>6,7,8,9,10,11</sup>.

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<sup>1</sup> Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

<sup>2</sup> Colhoun, K. and S. Cummins (2013). Birds of Conservation Concern in Ireland 2014–2019. Irish Birds 9: 523-544.

<sup>3</sup> Marnell, F., Looney, D. & Lawton, C. (2019). Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

<sup>4</sup> King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011). Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

<sup>5</sup> S.I. No. 477 of 2011. The European Communities (Birds and Natural Habitats) Regulations 2011. Irish Government, Government Publications Office, Molesworth Street, Dublin 2.

<sup>6</sup> Fossitt, J. (2000). A Guide to Habitats in Ireland. The Heritage Council, Ireland.

<sup>7</sup> Scannell, M. and D. Synnott (1987). Census Catalogue of the Flora of Ireland - Clár de Phlandaí na hÉireann. Stationery Office Dublin, Dublin.

## 2.3 Relevant Legislation

### 2.3.1 Nature Conservation Designations

#### *International Conservation Designations*

Special Areas of Conservation (SACs) are habitats of international significance that have been identified by NPWS and submitted for designation to the EU. SAC is a statutory designation, which has a legal basis under the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997, which were amended in 1998, 2005 and 2011. The European Communities (Birds and Natural Habitats) Regulations 2011 consolidate the European Communities (Natural Habitats) Regulations 1997 to 2005 and the European Communities (Birds and Natural Habitats)(Control of Recreational Activities) Regulations 2010, as well as addressing transposition failures identified in the Court of Justice of the European Union (CJEU) judgements.

A Special Protection Area (SPA) is a statutory designation, which has a legal basis under the EU Birds Directive (79/409/EEC). The primary objective of SPAs is to maintain or enhance the favourable conservation status of the birds for which the SPAs have been designated.

#### *National Conservation Designations*

Proposed NHAs are habitats or sites of interest to wildlife that have been identified by NPWS. These sites become NHAs once they have been formally advertised and land owners have been notified of their designation. NHAs are protected under the Wildlife (Amendment) Act, 2000, from the date they are formally proposed. NHA is a statutory designation according to the Wildlife (Amendment) Act, 2000.

### 2.3.2 Bats

Eleven species of bats occur in Ireland and all are protected under both national and international law. Nine species are resident and have confirmed breeding populations while two species are deemed to be vagrants as set out in **Table 2.3.2** below.

**Table 2.3.2. Legal protection and status of the Irish bat fauna.**

Common and scientific name	Wildlife Act 1976 & Wildlife (Amendment) Acts 2000 & 2010	Irish Red List status	Habitats Directive	Bern & Bonn Conventions
Common pipistrelle <i>Pipistrellus pipistrellus</i>	Yes	Least Concern	Annex IV	Appendix II
Soprano pipistrelle <i>P. pygmaeus</i>	Yes	Least Concern	Annex IV	Appendix II
Nathusius' pipistrelle <i>P. nathusii</i>	Yes	Not referenced	Annex IV	Appendix II
Leisler's bat <i>Nyctalus leisleri</i>	Yes	Near Threatened	Annex IV	Appendix II
Brown long-eared bat <i>Plecotus auritus</i>	Yes	Least Concern	Annex IV	Appendix II
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Yes	Least Concern	Annex II Annex IV	Appendix II
Greater horseshoe bat <i>Rhinolophus ferruginous</i>		Data Deficient	Annex II Annex IV	Appendix II

<sup>8</sup> Parnell, J. and Curtis, T. (2012). An Irish flora (8th edn). Cork University Press.

<sup>9</sup> Mullarney, K., Svensson, L., Zetterstrom, D. and P. Grant (2011). Collins Bird Guide - The Most Complete Guide to the Birds of Britain and Europe. Harper Collins.

<sup>10</sup> JNCC. (2010) Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit. Joint Nature Conservation Committee, Peterborough.

<sup>11</sup> Smith, G. F., O' Donoghue, P., O'Hara, K. and E. Delaney (2011). Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Common and scientific name	Wildlife Act 1976 & Wildlife (Amendment) Acts 2000 & 2010	Irish Red List status	Habitats Directive	Bern & Bonn Conventions
Daubenton's bat <i>Myotis daubentonii</i>	Yes	Least Concern	Annex IV	Appendix II
Natterer's bat <i>M. nattereri</i>	Yes	Least Concern	Annex IV	Appendix II
Whiskered bat <i>M. mystacinus</i>	Yes	Least Concern	Annex IV	Appendix II
Brandt's bat <i>M. brandtii</i>	Yes	Data Deficient	Annex IV	Appendix II

#### Wildlife Act 1976

In the Republic, under Schedule 5 of the Wildlife Act 1976, all bats and their roosts are protected by law. It is unlawful to disturb either without the appropriate licence. The Act was amended in 2000.

#### Bern and Bonn Convention

Ireland has also ratified two international conventions, which afford protection to bats amongst other fauna. These are known as the 'Bern' and 'Bonn' Conventions. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), exists to conserve all species and their habitats, including bats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries, which covers certain species of bat.

#### EU Habitats Directive

All bat species are given strict protection under Annex IV of the EU Habitats Directive, whilst the lesser horseshoe bat (*Rhinolophus hipposideros*) and greater horseshoe bat (*Rhinolophus ferrumequinum*) are given further protection under Annex II of the EU Habitats Directive. Both are listed as a species of community interest that is in need of strict protection and for which E.U. nations must designate Special Areas of Conservation (SACs). The latter is only known from a single site and no breeding populations have been recorded to date. The former are a species of the western seaboard of Ireland and have not yet been recorded on the east coast.

#### Eurobats

This is a Europe-wide (and neighbouring jurisdictions including North Africa and the Middle East) agreement that originates from efforts to apply the Bonn Convention to the protection of bats within areas to which they may migrate from their European summer or winter sites. There are 33 parties (including Ireland) that have entered into a UN forum to protect the 52 species of bat (based on current knowledge) of Europe.

#### **Threats to Irish bats:**

The principal pressures on Irish bat species have been identified as follows:

- urbanized areas (e.g. light pollution);
- bridge/viaduct repairs;
- pesticides usage;
- removal of hedges, scrub, forestry;
- water pollution;
- other pollution and human impacts (e.g. renovation of dwellings with roosts);
- infillings of ditches, dykes, ponds, pools and marshes;
- management of aquatic and bank vegetation for drainage purposes;
- abandonment of pastoral systems;
- speleology and vandalism;
- communication routes: roads; and
- inappropriate forestry management.



### 2.3.3 Badgers

Badgers (*Meles meles*) are common and widespread in Ireland, and are found in all lowland habitats where the soil is dry and not subject to flooding (Hayden and Harrington, 2000). Badgers are social animals that live in complex underground tunnel systems called setts. Badger territories may vary in size from about 60-200 ha (Smal, 1995). Badgers and their setts legally are protected under the provisions of the Wildlife Act, 1976, and the Wildlife Amendment Act, 2000. It is an offence to intentionally kill or injure a protected species or to wilfully interfere with or destroy the breeding site or resting place of a protected wild animal.

### 2.3.4 Otter

The otter (*Lutra lutra*) is a legally protected species under the EU Habitats Directive (where it is listed under Annex II) and is found throughout Ireland (Hayden and Harrington, 2000). The otter is listed as internationally important in the Irish Red Data book (Whilde, 1993), is classified as 'near threatened' in Ireland (Marnell, et al. 2009), on a European scale (Temple & Terry, 2007) and on a global scale by the IUCN (2009). It is listed as a strictly protected species under Appendix II of the Bern convention (Council of Europe, 1979). Because it is listed in Appendix 1 of CITES (1979), trade in otter specimens is permitted only in exceptional circumstances.

Annexes II and IV of the E.U. Habitats Directive (92/43/EEC) list the otter as a species of community interest that is in need of strict protection and for which E.U. nations must designate Special Areas of Conservation (SACs). The E.U. Habitats Directive was transposed into Irish law in the European Union (Natural Habitats) Regulations, (SI 94/1997) and 40 candidate SACs have been designated for the otter in Ireland (NPWS (2008)<sup>12</sup>). A Species Action Plan and a Threat Response Plan has been prepared for the otter by NPWS (2008 & 2009)<sup>13</sup>.

Otters tend to occupy linear territories along watercourses and are rarely found far away from water. There have been a number of national surveys of otters in Ireland<sup>1415</sup> which have been conducted for National Parks and Wildlife Service. None of these have specifically surveyed the Three Trout Stream.

(Bailey (2006)) surveyed 35 sites within the Eastern River Basin District, of which 22 (62.9%) recorded the presence of otter, the lowest rate in the country.

A more recent survey conducted in 2010 (Reid *et al.* (2013)) surveyed 65 sites within the Eastern River Basin District, of which 34 (52.3%) recorded the presence of otter.

Delgany Tidy Towns commissioned Alan Lauder to conduct a survey of the Three Trout Stream in 2018 - the study area extended from the northern end of the stream at Glen of The Downs downstream to the Three Trout Stream bridge at the Greystones - Kilcoole Road<sup>16</sup>. This study also recorded signs and evidence of otters.

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<sup>12</sup> NPWS (2008). The status of EU protected species and habitat in Ireland. NPWS, Dublin.

<sup>13</sup> NPWS (2009). Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

<sup>14</sup> Bailey, M & Rochford, J., (2006). Otter survey of Ireland 2004/2005. Irish Wildlife Manual, No 23. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin.

<sup>15</sup> Reid, N., Hayden, B., Lundy, M.G., Pietravallo, S., McDonald, R.A. & Montgomery, W.I. (2013). National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

<sup>16</sup> Lauder, A. (2019). Preliminary Biodiversity Appraisal Of Three Trouts Stream, Delgany Including recommendations for future enhancement & survey. Report to Delgany Tidy Towns.

### 2.3.5 Kingfisher

The kingfisher (*Alcedo atthis*) is a species listed under Annex I of the EU Birds Directive for which EU nations must designate Special Protection Areas (for birds) (SPAs). Kingfisher was considered in the study of the Three Trout Stream commissioned by Delgany Tidy Towns.

### 2.3.6 Invasive Species

Until recently there has been no legal framework for the control or eradication of non-native invasive species in the Republic of Ireland. The Birds and Habitats Regulations (2011) which were signed on 21st September 2011 by the then Minister for Arts, Heritage and the Gaeltacht Jimmy Deenihan, included new legislation on invasive and non-native species in Sections 49 and 50. Since then the EU Regulation on Invasive Alien Species (EU Regulation 1143/2014) also came into force on the 3<sup>rd</sup> August 2016.

*The plant and animal species to which the Birds and Habitats Regulations (2011) apply are presented in Schedule Three. Part 1 details the plants species, while Part 3 outlines those animal or plant vector materials and are presented below.*

**Species Recorded in Greystones are highlighted in Yellow.**

#### Third Schedule: Part 1 Plants

Non-native species subject to restrictions under Regulations 49 and 50.

First column	Second column	Third column
Common name	Scientific name	Geographical application
American skunk-cabbage	<i>Lysichiton americanus</i>	Throughout the State
A red alga	<i>Grateloupia doryphora</i>	Throughout the State
Brazilian giant-rhubarb	<i>Gunnera manicata</i>	Throughout the State
Broad-leaved rush	<i>Juncus planifolius</i>	Throughout the State
Cape pondweed	<i>Aponogeton distachyos</i>	Throughout the State
Cord-grasses	<i>Spartina</i> (all species and hybrids)	Throughout the State
Curly waterweed	<i>Lagarosiphon major</i>	Throughout the State
Dwarf eel-grass	<i>Zostera japonica</i>	Throughout the State
Fanwort	<i>Cabomba caroliniana</i>	Throughout the State
Floating pennywort	<i>Hydrocotyle ranunculoides</i>	Throughout the State
Fringed water-lily	<i>Nymphoides peltata</i>	Throughout the State
Giant hogweed	<i>Heracleum mantegazzianum</i>	Throughout the State
Giant knotweed	<i>Fallopia sachalinensis</i>	Throughout the State
Giant-rhubarb	<i>Gunnera tinctoria</i>	Throughout the State
Giant salvinia	<i>Salvinia molesta</i>	Throughout the State
Himalayan balsam	<i>Impatiens glandulifera</i>	Throughout the State
Himalayan knotweed	<i>Persicaria wallichii</i>	Throughout the State
Hottentot-fig	<i>Carpobrotus edulis</i>	Throughout the State
Japanese knotweed	<i>Fallopia japonica</i>	Throughout the State
Large-flowered waterweed	<i>Egeria densa</i>	Throughout the State
Mile-a-minute weed	<i>Persicaria perfoliata</i>	Throughout the State
New Zealand pigmyweed	<i>Crassula helmsii</i>	Throughout the State
Parrot's feather	<i>Myriophyllum aquaticum</i>	Throughout the State
Rhododendron	<i>Rhododendron ponticum</i>	Throughout the State
Salmonberry	<i>Rubus spectabilis</i>	Throughout the State
Sea-buckthorn	<i>Hippophae rhamnoides</i>	Throughout the State

First column	Second column	Third column
Common name	Scientific name	Geographical application
Spanish bluebell	<i>Hyacinthoides hispanica</i>	Throughout the State
Three-cornered leek	<i>Allium triquetrum</i>	Throughout the State
Wakame	<i>Undaria pinnatifida</i>	Throughout the State
Water chestnut	<i>Trapa natans</i>	Throughout the State
Water fern	<i>Azolla filiculoides</i>	Throughout the State
Water lettuce	<i>Pistia stratiotes</i>	Throughout the State
Water-primrose	<i>Ludwigia</i> (all species)	Throughout the State
Waterweeds	<i>Elodea</i> (all species)	Throughout the State
Wireweed	<i>Sargassum muticum</i>	Throughout the State

### EU Regulation 1143/2014 on Invasive Alien Species

On 14 July 2016 the European Commission published Commission Implementing Regulation 2016/1141 which set out an initial list of 37 species to which the EU Invasive Alien Species Regulation 1143/2014 applies. The associated restrictions and obligations came into force on 3rd August 2016.

Three distinct types of measures are envisaged under the Directive, which follow an internationally agreed hierarchical approach to combatting IAS:

- Prevention: a number of robust measures aimed at preventing IAS of Union concern from entering the EU, either intentionally or unintentionally.
- Early detection and rapid eradication: Member States must put in place a surveillance system to detect the presence of IAS of Union concern as early as possible and take rapid eradication measures to prevent them from establishing.
- Management: some IAS of Union concern are already well-established in certain Member States and concerted management action is needed so that they do not spread any further and to minimize the harm they cause.

**Plant species** listed on the directive include:

- American skunk cabbage *Lysichiton americanus*
- Asiatic tearthumb *Persicaria perfoliata* (*Polygonum perfoliatum*)
- Curly waterweed *Lagarosiphon major*
- Eastern Baccharis *Baccharis halimifolia*
- Floating pennywort *Hydrocotyle ranunculoides*
- Floating primrose willow *Ludwigia peploides*
- Green cabomba *Cabomba caroliniana*
- Kudzu vine *Pueraria lobata*
- Parrot's feather *Myriophyllum aquaticum*
- Persian hogweed *Heracleum persicum*
- Sosnowski's hogweed *Heracleum sosnowskyi*
- Water hyacinth *Eichhornia crassipes*
- Water primrose *Ludwigia grandiflora*
- Whitetop weed *Parthenium hysterophorus*

**Animal species** listed on the directive include:

- Amur sleeper *Perccottus glenii*
- Asian hornet *Vespa velutina*
- Chinese mitten crab *Eriocheir sinensis*
- Coypu *Myocastor coypus*
- Fox squirrel *Sciurus niger*
- Grey squirrel *Sciurus carolinensis*

- Indian house crow *Corvus splendens*
- Marbled crayfish *Procambarus* spp.
- Muntjac deer *Muntiacus reevesii*
- North american bullfrog *Lithobates (Rana) catesbeianus*
- Pallas's squirrel *Callosciurus erythraeus*
- Raccoon *Procyon lotor*
- Red swamp crayfish *Procambarus clarkii*
- Red-eared terrapin/slider *Trachemys scripta elegans*
- Ruddy duck *Oxyura jamaicensis*
- Sacred ibis *Threskiornis aethiopicus*
- Siberian chipmunk *Tamias sibiricus*
- Signal crayfish *Pacifastacus leniusculus*
- Small Asian mongoose *Herpestes javanicus*
- South American coati *Nasua nasua*
- Spiny-cheek crayfish *Orconectes limosus*
- Topmouth gudgeon *Pseudorasbora parva*
- Virile crayfish *Orconectes virilis*

On 13 July 2017 the European Commission published Commission Implementing Regulation 2017/1263 which added a further 12 species to the current list of 37 species regulated under the EU Invasive Alien Species Regulation (1143/2014).

These are:

#### **Plant species**

- Alligator weed (*Alternanthera philoxeroides*)
- Milkweed (*Asclepias syriaca*)
- Nuttall's waterweed (*Elodea nuttallii*)
- Chilean rhubarb (*Gunnera tinctoria*)
- Giant hogweed (*Heracleum mantegazzianum*)
- Himalayan balsam (*Impatiens glandulifera*)
- Japanese stiltgrass (*Microstegium vimineum*)
- Broadleaf watermilfoil (*Myriophyllum heterophyllum*)
- Crimson fountaingrass (*Pennisetum setaceum*)

#### **Animal species**

- Egyptian goose (*Alopochen aegyptiacus*)
- Raccoon dog (*Nyctereutes procyonoides*)
- Muskrat (*Ondatra zibethicus*)

The associated restrictions and obligations came into force from 2 August 2017 for all these species apart from the Raccoon dog, which came into force on 2 February 2019.

#### *Other Invasive Species*

The main guidance document that has been prepared dealing with invasive species/noxious weeds on sites is the NRA 'Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' which was published in 2010. This document details other non-native species of note which threaten biodiversity. Observations of these species were also made during the field surveys.

### 3. RESULTS

#### 3.1 Geology & Soils

As befits its name an understanding of the geology of Greystones is a good starting point for any ecological study as geology and geological processes shape the landscape, sense of place, history, habitats and biodiversity we enjoy today.

Greystones is underlain by Cambrian rocks consisting of greywacke, slate and quartzite as can be seen on **Figure 2** and **Figure 3** below<sup>17</sup>.

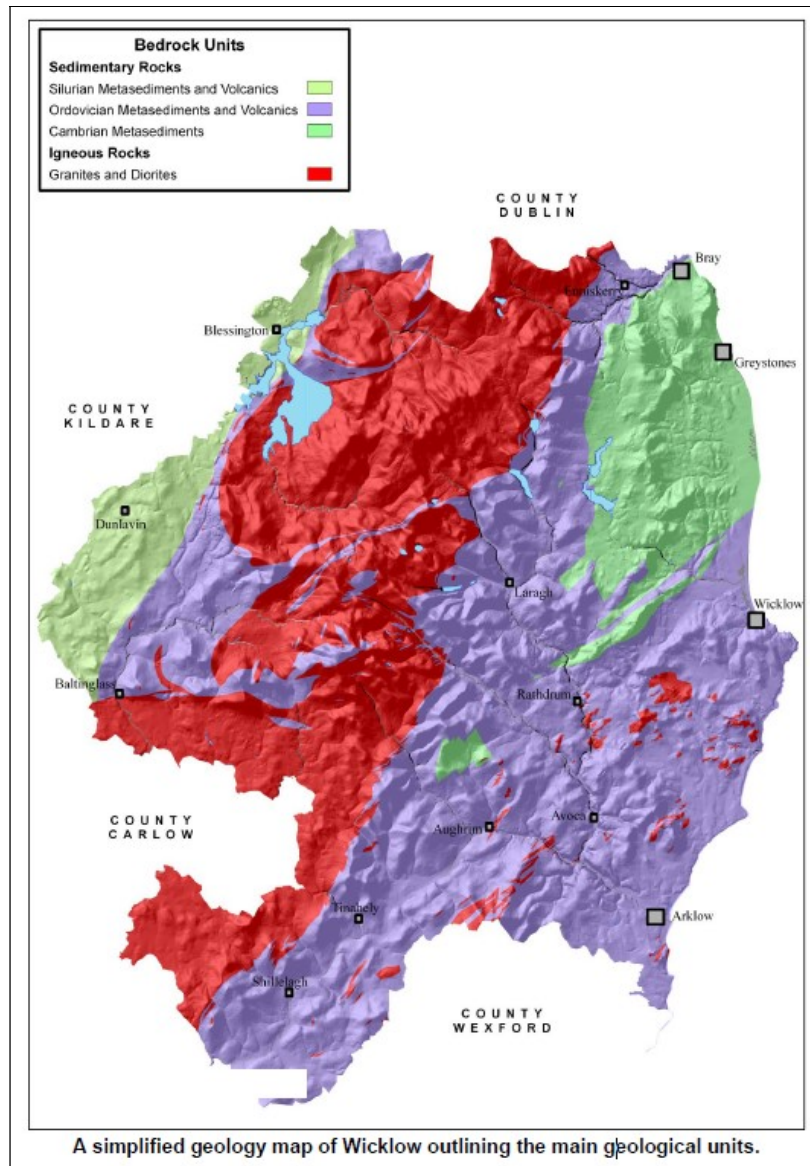


Figure 2. Geology of County Wicklow (Source: Meehan et al. (2014)).

<sup>17</sup> The Geological Heritage of Wicklow. An audit of County Geological Sites in Wicklow by Robert Meehan, Matthew Parkes, Vincent Gallagher, Ronan Hennessy and Sarah Gately. 2014. An action of the County Wicklow Heritage Plan 2009 - 2014.

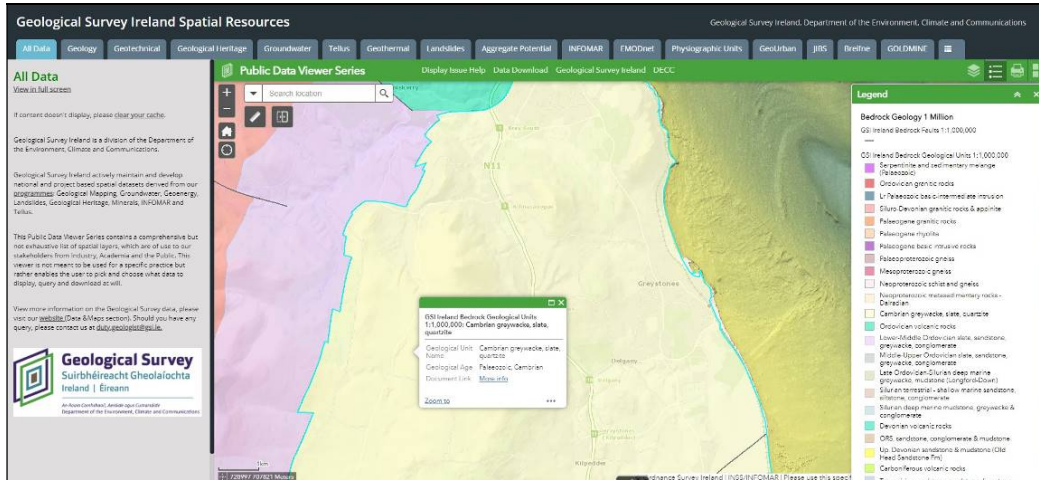


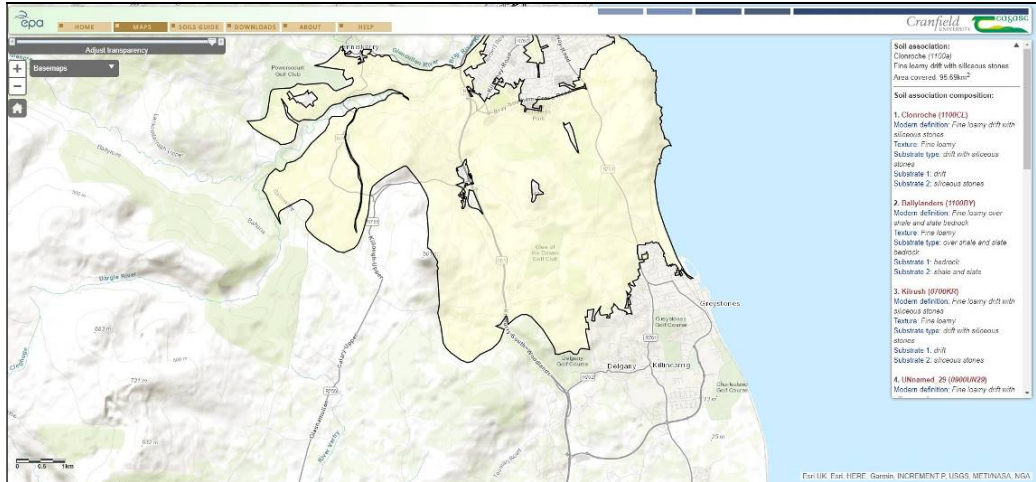
Figure 3. Underlying geology (Source: Geological Survey of Ireland).

The Cambrian Period marks an important point in the history of life on Earth; it is the time when most of the major groups of animals first appear in the fossil record. This event is sometimes called the "Cambrian Explosion," because of the relatively short time over which this diversity of forms appears. The Cambrian lasted 55.6 million years from the end of the preceding Ediacaran Period 541 million years ago (mya) to the beginning of the Ordovician Period 485.4 mya. The rocks in this part of Wicklow date from this time. To try and understand geological time the diagram below produced as part of The Geological Heritage of Wicklow shows how the geological timescale works if it were a 24 hour period...

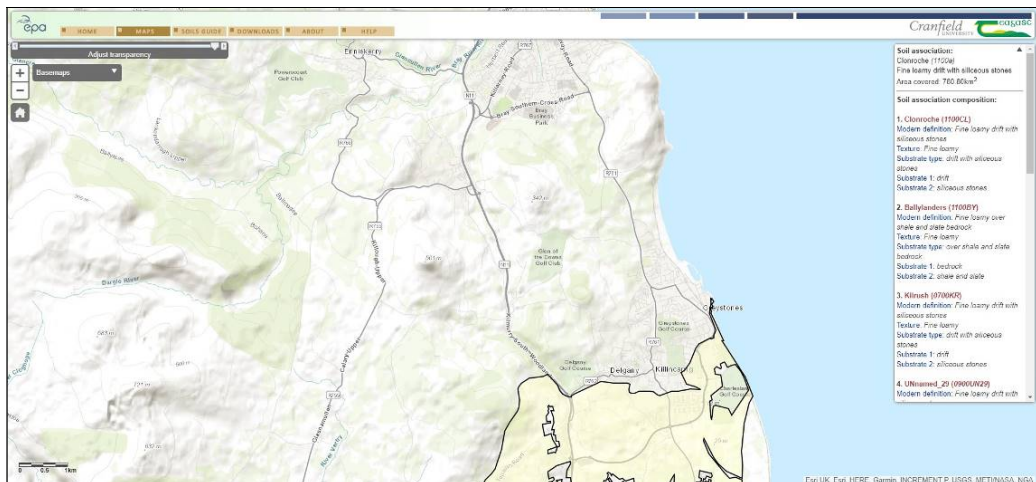
AGE (Million Years Ago)	ERA	PERIOD	EVENTS IN WICKLOW	IF THIS TIMESCALE WERE A DAY LONG ...
2.6	Cenozoic	Quaternary	Several ice ages smothering Wicklow, followed in the last 10,000 years by the spread of vegetation, growth of bogs and arrival of humans. Sculpting of corries and U-shaped valleys in the Wicklow mountains. Meltwater sculpts deep channels and deposits sands and gravels during deglaciation.	The ice ages would begin 38 seconds before midnight
66		Tertiary	Erosion, weathering of rocks and denudation of land surface. No record of rocks of this age in Wicklow.	The Tertiary period begins at 11.40 pm
145	Mesozoic	Cretaceous	Erosion. No record of rocks of this age in Wicklow.	11.15 pm
201		Jurassic	Uplift and erosion. No record of rocks of this age in Wicklow.	The age of the dinosaurs, starting at 10.55 pm
252		Triassic	Desert conditions on land.	10.42 pm
298	Palaeozoic	Permian	No record of rocks of this age in Wicklow.	10.30 pm
359		Carboniferous	Land became submerged, limestones with some shales and sandstones deposited in tropical seas across much of Ireland. No record of rocks of this age in Wicklow.	Inundation of land by sea around 10.10 pm
419		Devonian	Caledonian mountain building. Leinster Batholith Granite intruded, forming Wicklow Mountains.	Granite intruded into Wicklow, at 9.52 pm
443		Silurian	Shallow seas, following closure of the Iapetus Ocean. Slates, greywacke and shales deposited along eastern extreme of Wicklow.	Starts at 9.42 pm
485	Ordovician	Slates, siltstones and volcanic rocks form across much of southern and eastern Wicklow, as well as portions along the Glen of Imaal.	Begins at 9.28 pm	
541	Cambrian	Opening of the Iapetus Ocean. Greywackes and quartzites formed between Bray Head and Roundwood.	Starts at 9.11 pm	
2500	Proterozoic	Precambrian	Some of Ireland's oldest rocks deposited in Mayo and Sligo.	Beginning 11.00 am
4000			Oldest known rocks on Earth.	Beginning 3.00 am
4600	Archaean		Age of the Earth.	Beginning 1 second after midnight

*The Geological Timescale and County Wicklow*

The bedrock around Greystones is overlain by glacial drift soils with siliceous rocks as can be seen on **Figure 4** and **5** below. These are described and mapped by the EPA soils project as part of the Clonroche Association and although the underlying geology of the area is acidic the soil brings a neutral to calcareous influence to the vegetation.



**Figure 4. Soils in the northern part of Greystones (Source: EPA).**



**Figure 5. Soils in the southern part of Greystones (Source: EPA).**

Soils in the Glen of the Downs are fine loamy soils over mudstone, shale or slate bedrock and are described and mapped by the EPA soils project as part of the Borrisoleigh (960c) Association as seen on **Figure 6** below.

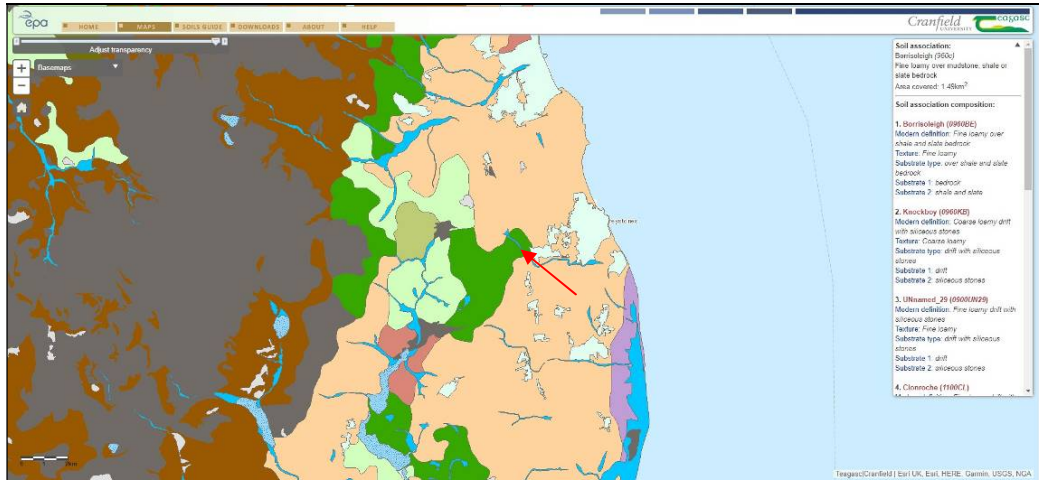


Figure 6. Soils in the Glen of the Downs - indicated by the red arrow (Source: EPA).

Along the Three Trout Stream the soils are alluvial in nature as shown on Figure 7 below.

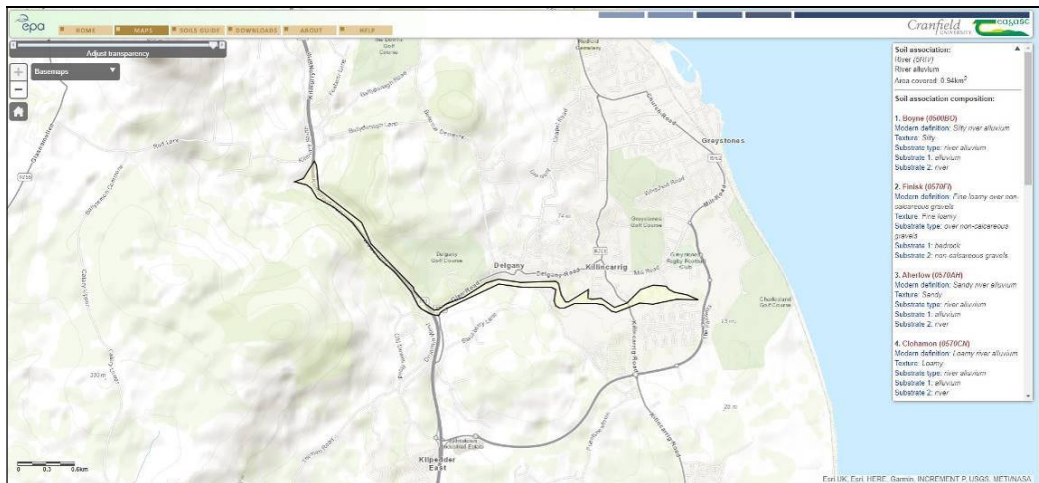


Figure 7. Soils along the Three Trout Stream are alluvial - indicated by the red arrow (Source: EPA).

Within the environs of Greystones there are a number of Geological Heritage Areas. These are:

- Greystones (Appinite)
- Greystones Beach
- Greystones Wicklow Coast
- Glen of the Downs
- Bray Head

Their location and extent are presented below on Figure 8 and the site reports for each are presented in Appendix 1.



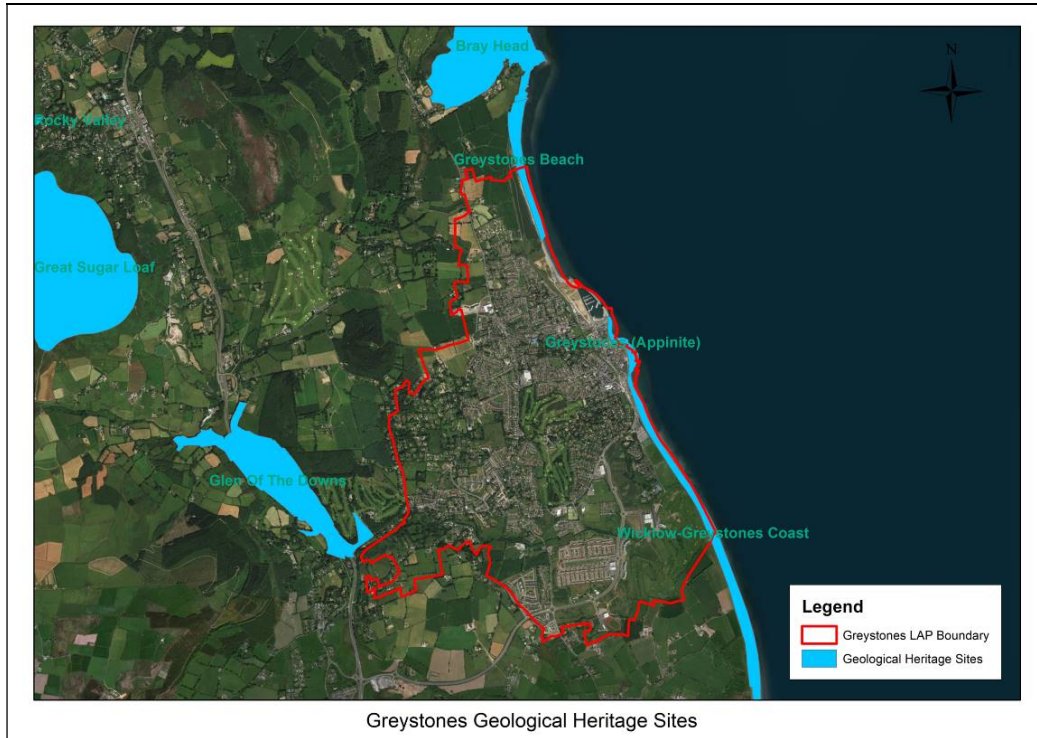


Figure 8. Geological Heritage Sites in the environs of Greystones.

### 3.2 Nature Conservation Designations

The lands within the study area are not currently the subject of any of the formal proposed nature conservation designations as described above. There are a number of areas designated for nature conservation within the wider environs of Greystones – the location of these is shown on **Figure 9** below.

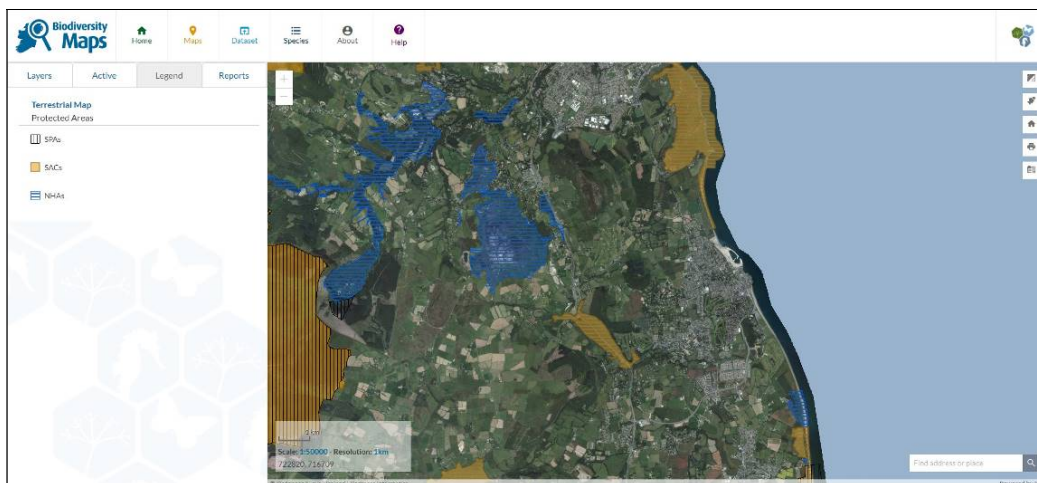


Figure 9. Areas legally designated for nature conservation within the immediate environs of Greystones.

Upstream of Greystones town and hydrologically connected to it by the Three Trout Stream is the Glen of the Downs SAC (000719). This is a glacial spillway valley, which supports extensive areas of oak woodland, and is also a National Nature Reserve.

North of Greystones the boundary of Bray Head SAC (Site Code: 000714) extends south towards the town. This section of the SAC includes the eroding boulder clay/alluvial deposit cliffs in which sand martins nest each summer. The remainder of the SAC is designated for its cliff vegetation, heathland and grassland habitats. Bray Head also supports a rich diversity of nesting seabirds.

South of Greystones is an extensive area of shingle beach, saltmarsh and wetland habitats, wet woodland and fen, which extends from south of Greystones some 15km south to Wicklow Town. These lands are designated as a Special Area of Conservation (SAC) (The Murrrough SAC (Site Code: 002249)) and a Special Protection Area (SPA) for birds (The Murrrough SPA (Site Code: 004186)).

Much of the Wicklow uplands, which are located to the west of Greystones, are included within the boundary of the Wicklow Mountains National Park (which is also designated as a Special Area of Conservation (SAC) (Site Code: 002122) and a Special Protection Area (SPA) for birds (Site Code: 004040)).

Further information on the sites of international importance in the wider environs of Greystones and the reasons for their designation and legal protection are detailed in **Table 3.2.1** below.

There are a number of other sites of national importance within the general environs of Greystones, Enniskerry and Bray. These are known as proposed NHAs. Proposed NHAs are also habitats or sites of interest to wildlife that have been identified by NPWS. These sites become NHAs once they have been formally advertised and land owners have been notified of their designation. NHAs are protected under the Wildlife (Amendment) Act, 2000, from the date they are formally proposed. NHA is a statutory designation according to the Wildlife Act 1976 (as amended) and requires consultation with NPWS if any development impacts on a pNHA. These sites include:

- Ballyman Glen pNHA (Site Code: 000713)
- Bray Head pNHA (Site Code: 000714)
- Carrigower Bog pNHA (Site Code: 000716)
- Dargle River Valley pNHA (Site Code: 001754)
- Devil's Glen pNHA (Site Code: 000718)
- Glen of the Downs pNHA (Site Code: 000719)
- Glenree Valley pNHA (Site Code: 001755)
- Great Sugarloaf pNHA (Site Code: 001769)
- Kilmacanogue Marsh pNHA (Site Code: 000724)
- Knocksink Wood pNHA (Site Code: 000725)
- Powerscourt Waterfall pNHA (Site Code: 001767)
- Powerscourt Woodland pNHA (Site Code: 001768)
- The Murrrough pNHA (Site Code: 000730)
- Vartry Reservoir pNHA (Site Code: 001771)

**These sites were designated on account of the presence of rare plants, habitats of conservation interest or faunal importance.**

**Table 3.2.1. Sites of international nature conservation importance near Greystones, Co. Wicklow.**

Site Code	Site Name and Designation	Approximate distance from Greystones	Qualifying Interest (Reason for Designation)
000714	Bray Head SAC	Within and adjoins the town boundary to the north	<ul style="list-style-type: none"> <li>• (1230) Vegetated sea cliffs of the Atlantic and Baltic coasts,</li> <li>• (4030) European dry heaths,</li> <li>• (6210) Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco Brometalia</i>) (*important orchid sites).</li> </ul>
000719	Glen of the Downs SAC	1.6km west and upstream	<ul style="list-style-type: none"> <li>• (91A0) Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in British Isles.</li> </ul>
000716	Carrigower Bog SAC	6km SW	<ul style="list-style-type: none"> <li>• (7140) Transition mires and quaking bogs.</li> </ul>
002249	The Murrough Wetlands SAC	1km S	<ul style="list-style-type: none"> <li>• (1210) Annual vegetation of drift lines,</li> <li>• (1220) Perennial vegetation of stony banks,</li> <li>• (1330) Atlantic salt meadows (<i>Glauco Puccinellietalia maritimae</i>),</li> <li>• (1410) Mediterranean salt meadows (<i>Juncetalia maritimi</i>),</li> <li>• (7210) * Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i>,</li> <li>• (7230) Alkaline fens.</li> </ul>
004186	The Murrough SPA	2km S	<ul style="list-style-type: none"> <li>• Red-throated Diver (<i>Gavia stellata</i>),</li> <li>• Greylag Goose (<i>Anser anser</i>),</li> <li>• Light-bellied Brent Goose (<i>Branta bernicla hrota</i>),</li> <li>• Wigeon (<i>Anas penelope</i>),</li> <li>• Teal (<i>Anas crecca</i>),</li> <li>• Black-headed Gull (<i>Chroicocephalus ridibundus</i>),</li> <li>• Herring Gull (<i>Larus argentatus</i>),</li> <li>• Little Tern (<i>Sterna albifrons</i>),</li> <li>• Wetlands &amp; Waterbirds.</li> </ul>
000725	Knocksink Wood SAC	10km NW	<ul style="list-style-type: none"> <li>• (7220) Petrifying springs with tufa formation (<i>Cratoneurion</i>),</li> <li>• (910E0) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae).</li> </ul>
000713	Ballyman Glen SAC	10km NW	<ul style="list-style-type: none"> <li>• (7220) Petrifying springs with tufa formation (<i>Cratoneurion</i>),</li> <li>• (7230) Alkaline fens.</li> </ul>
002122	Wicklow Mountains SAC	8.5km W	<ul style="list-style-type: none"> <li>• (3130) Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea</li> <li>• (3160) Natural dystrophic lakes and ponds,</li> </ul>

Site Code	Site Name and Designation	Approximate distance from Greystones	Qualifying Interest (Reason for Designation)
			<ul style="list-style-type: none"> <li>• (4010) Northern Atlantic wet heaths with <i>Erica tetralix</i>,</li> <li>• (4030) European dry heaths,</li> <li>• (4060) Alpine and Boreal heaths,</li> <li>• (6230) Species-rich Nardus grasslands, on siliceous substrates in mountain areas,</li> <li>• (7130) Blanket bog (*active only),</li> <li>• (8110) Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>),</li> <li>• (8210) Calcareous rocky slopes with chasmophytic vegetation,</li> <li>• (8220) Siliceous rocky slopes with chasmophytic vegetation,</li> <li>• (9990) Blanket bog (not active),</li> <li>• (1355) Otter (<i>Lutra lutra</i>).</li> </ul>
004040	Wicklow Mountains SPA	8.5km W	<ul style="list-style-type: none"> <li>• Peregrine falcon (<i>Falco peregrinus</i>),</li> <li>• Merlin (<i>Falco columbarius</i>).</li> </ul>

### 3.3 Rare, Scarce or Threatened plants

There are recent and historic records of rare, scarce or threatened plants from within the 10km squares in which Greystones is located (O21, O31, O20 and O30) (NPWS online database). These include:

- Red hemp nettle (*Galeopsis angustifolia*)
- Bog orchid (*Hammarbya paludosa*)
- Round prickly headed poppy (*Papaver hybridum*)
- Penny royal (*Mentha pulegium*)
- Annual knawel (*Scleranthus annuus*)
- Killarney fern (*Trichomanes speciosum*)
- Sea kale (*Crambe maritima*)
- Pale toadflax (*Linaria repens*)

Two of species - populations of (Sea Kale (*Crambe maritima*) and Pale Toadflax (*Linaria repens*)) have become locally extinct in Greystones in the last decade arising directly from the development of the marina – see **Section 4.5**.

### 3.4 Local Biodiversity Areas

The Local Area Plan prepared for Greystones/Delgany in 2006<sup>18</sup> by Wicklow County Council contained a study of sites of natural habitats in the town and environs, which was completed by Altemar, Marine and Environmental Consultants. This section of the LAP report describes the area as follows:

‘The study area comprises of medium to high density housing in and around the immediate areas of Greystones/Delgany (40% of the area). In the outlying areas, larger houses with substantial gardens comprise approximately 25% of the area and improved grassland/amenity and scrub currently account for 35% of the area. The latter two areas are usually surrounded by well-established hedgerows, which are important wildlife refuges. However, with the introduction of the high density Charlesland development in the south east corner of the area, it is envisaged that the area of improved grassland/amenity and scrub will be reduced dramatically to approximately 25% of the entire area and medium to high density housing will increase to approximately 50% of the study area. This and smaller scale developments will have significant negative impacts on the biodiversity of the region, which has already been confined to very few areas. As a result, the remaining wildlife refuges, though not necessarily nationally important due to the rarity of protected/rare species, should be classed as locally important with the function of maintaining biodiversity in the region. Wildlife refuges in the region are mainly concentrated, in substantial derelict sites, amenity areas, large well established gardens, hedgerows and along the banks of streams, the railway line and along the coast’.

The 2006 study conducted as part of the Local Area Plan for Delgany/Greystones initially highlighted 25 areas of potential ecological value in the area. These were described as Local Biodiversity Areas<sup>19</sup>.

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<sup>18</sup> Wicklow County Council (2006). Greystones-Delgany and Kilcoole Local Area Plan 2006 - 2012. Wicklow County Council.

<sup>19</sup> Wilson, F. and R. Nairn (2005). Local Biodiversity Areas. A Pilot Study On The Identification And Evaluation Of Local Areas For Wildlife And Nature Conservation. Report prepared for The Heritage Council, Wicklow County Council and Westmeath County Council.

Following a survey and visit 16 of these were deemed to be of importance to local biodiversity and 9 were dismissed as either being subsequently developed or were of low importance to biodiversity.

The 16 areas of significant importance to local biodiversity identified in that study are shown in **Figure 10** and listed in **Table 3.4.1** below.



Figure 10. Sixteen Local Biodiversity Areas were identified in Greystones and Delgany in the 2006 study.

**Table 3.4.1. Local Biodiversity Areas identified in 2006.**

Site No.	Townland/site name	Habitats present (Fossitt 2000)	Fauna/Flora Species present or likely	Possible Threats	Relative Biodiversity Importance
1	Seashore to and including railway from south to Rocky outcrop (329839/212244)	CC1 Seawalls Piers and Jettys BL2 Earth Banks ED2 Spoil and Bare Ground LS2 Sandy Beach BL1 Stone Walls and other Stonework FW3 Canals	Seabirds (Gulls, Turnstones) Foxes	Human/canine disturbance Terrestrial litter Marine Pollution (oil, litter) Sea-level rise/ severe storms could impact	Low
2	Rocky outcrop to (329839/212244) Greystones Harbour	LR1 Exposed Rocky Shores CS3 Sedimentary Cliffs CB1 Shingle and Gravel Banks	Sand martins	Erosion of sea cliff. Human and canine disturbance at the top of the cliff.	Medium
3	North of Greystones harbour and part of Bray Head SAC	CB1 Shingle and Gravel Banks CS3 Sedimentary Cliffs HH1 Dry Siliceous Heath GS2 Dry Meadows and Grassy Verges	Sand Martin Peregrine Falcon Kestrel	Erosion of sea cliff. Human and canine disturbance at the top of the cliff.	Medium
4	Three Trout Stream and surrounding area (entire length from boundary to the sea)	GS4 Wet Grassland GM1 Marsh WS1 Scrub ED3 Recolonising Bare Ground WN1 Oak Birch Holly woodland WL2 Treelines GA2 Amenity Grassland FW1 Eroding Upland Rivers FW2 Depositing Lowland Rivers BL1 Stone walls and other stonework WL1 Hedgerows	Sea Trout Common Eel Heron Mallard Stickleback Oak Willow Birch Dipper	Encroachment from development leading to accidental and intentional damming Litter Removal of treeline /scrub Siltation of gravel bed Pollution (organic/non organic)	Medium/ High
4a	Glacial meltwater channel	FW1 Eroding Upland Rivers WL2 Treelines (Enda Mullen NPWS Pers Comm.)	Mainly of Geological interest	Development of site and drainage upstream resulting in loss of habitat and water that feeds stream	Medium
4b	Oak, birch and holly woodland bordering Three Trout Stream	WN1 Oak, birch and holly woodland	Birch Oak Holly	Removal of trees and scrub resulting in loss of habitat	Medium
4c	Marsh areas that border Three Trout Stream	GM1 Marsh	Possible frog breeding areas and important floral habitat	Removal/drainage of habitat.	Medium

Site No.	Townland/site name	Habitats present (Fossitt 2000)	Faunal/Flora Species present or likely	Possible Threats	Relative Biodiversity Importance
5	Small stream at Redford Bridge (328170/213579)	FW1 Eroding Upland Rivers WS1 Scrub	Holly Birch Willow Ash	Development/removal or small stand of native scrub	Low
6	Ruins of Captain Tarrants Farmhouse and St. Crispins Cell, Rathdown 328692/ 213663	WS1 Scrub BL1 Stone walls and other stonework	Bats Barn Owl (?) Willow sp. Bramble Gorse	Development of the site would lead to loss of habitat/ nesting site/ loss of prey habitat Vandalism and human disturbance of buildings is evident. Loss of roof covering	Medium
7	Redford Bridge Graveyard 328462/213222	WS1 Scrub BL1 Stone walls and other stonework	Large Stand of Willow sp.	Development. Littering is already a problem	Low/ Medium
8	Stream from Redford Bridge to shore 328649/213500 to 328920/213625	FW1 Eroding Upland Rivers WS1 Scrub (20m wide) and 150m wide gorse dominated close to shore BL1 Stone walls and other stonework	Willow sp Bramble Ash Ivy Wide gorse area	Development would lead to loss of trees/pollution. Littering is already a problem	Low/ Medium
9	Small stream South of Redford	FW1 Eroding Upland Rivers WS1 Scrub (20m wide x 30m long)	Bramble Elder Sycamore	Development/pollution from new and current development upstream/litter	Low
10	Greystones Golf Course	WS1 Scrub (Gorse dominated) WD5 Scattered Trees and Parkland	Gorse Oak Bats	Removal of broadleaf trees, hedgerows and scrub areas resulting in loss of habitat	Low/ Medium
11	Treeline west of DART carpark (329996/211406)-(329893/211620)	WL2 Treeline	Scots Pine Beech Bat species	Development\ felling resulting in loss of trees	Low/ Medium
12	Treeline between R762 and sewage treatment works (330062/211014) - (329798/21187) -(329793/211558)	WL2 Treeline	Scots Pine Ash	Development/infrastructure resulting in loss of treeline and scrub areas.	Low/ Medium
13	Old Mill ruins (329068/210744)	WS2 Scrub BL1 Stone walls and other stonework	Barn Owl Bat Species	Development resulting in loss of nesting/roosting habitat and felling of surrounding trees	Medium/ High
14	Charlesland House and surrounding farm buildings	WS2 Scrub BL1 Stone walls and other stonework BL3 Buildings and artificial surfaces	Barn Owl Bat Species	Development	Medium/ High



Site No.	Townland/site name	Habitats present (Fossitt 2000)	Faunal/Flora Species present or likely	Possible Threats	Relative Biodiversity Importance
15	Treeline at (328520/211598) - (328498/211761)	WL2 Treeline	Scots Pine	Development resulting in felling of trees	Low
16	South of Kindlestown	WS2 Scrub FW1 Eroding Upland Rivers WL2 Treeline	Elder Ash Willow Holly	Development resulting in loss of habitat.	Low

### 3.5 Fauna

#### 3.5.1 Birds

A good variety of birds associated with gardens, parklands and urban habitats were recorded during the surveys. These include; blackbird (*Turdus merula*), song thrush (*Turdus philomelos*), mistle thrush (*Turdus viscivorus*), robin (*Erithacus rubecula*), dunnock (*Prunella modularis*), wren (*Troglodytes troglodytes*), chaffinch (*Fringilla coelebs*), blackcap (*Sylvia atricapilla*), great tit (*Parus major*), long-tailed tit (*Aegithalos caudatus*), greenfinch (*Carduelis chloris*), goldfinch (*Carduelis carduelis*), goldcrest (*Regulus regulus*), coal tit (*Parus ater*), willow warbler (*Phylloscopus trochilus*), chiff chaff (*Phylloscopus collybita*) and blue tit (*Parus caeruleus*).

Other bird species recorded include hooded crow (*Corvus corone cornix*), black headed gull (*Chroicocephalus ridibundus*) and magpie (*Pica pica*).

Species such as pied wagtail (*Motacilla alba*), house sparrow (*Passer domesticus*) and jackdaw (*Corvus monedula*) were recorded from in and around the town.

Other species recorded from along the Three Trout Stream during the surveys include grey wagtail (*Motacilla cinerea*), grey heron (*Ardea cinerea*), mallard duck (*Anas platyrhynchos*), and dipper (*Cinclus cinclus*). There are also records of kingfisher (*Alcedo atthis*), which is a species, listed under Annex I of the EU Birds Directive, from the Three Trout Stream but none were seen during the current surveys.

Birds of prey such as sparrowhawk (*Accipiter nisus*), kestrel (*Falco tinnunculus*) and buzzard (*Buteo buteo*) are regularly seen with increasing sightings of red kite (*Milvus milvus*). The latter were reintroduced to Ireland and are now spreading from their core habitat in the Avoca Valley to other parts of the county. Peregrine falcon (*Falco peregrinus*) nest on Bray Head. Great spotted woodpecker (*Dendrocopos major*) - a recent colonist to Ireland, has been recorded at Killincarrig.

Sand martin (*Riparia riparia*) nest in the clay cliffs north of the town. They and other hirundines such as swift (*Apus apus*) and swallows (*Hirundo rustica*) are summer visitors to Greystones having travelled here from their wintering grounds in Africa. They rely on flying insects to feed on. Other summer visitors include whitethroat (*Sylvia communis*), grasshopper warbler (*Locustella naevia*) and more rarely spotted flycatcher (*Muscicapa srtiata*).

Winter visitors include redwing (*Turdus iliacus*) and fieldfare (*Turdus pilaris*). These thrushes migrate to Ireland during the winter months and rely on hedgerows and fields to forage in, where they normally feed on berries and worms. Black redstart (*Phoenicurus ochruros*) is recorded from The Cove during the winter. This is a scarce winter visitor to coastal areas in the east and south of Ireland. Areas of habitat like that at The Cove resemble their breeding habitat (exposed cliffs/rocks) with plenty of insects due to the vegetation there. These areas also support rock pipit (*Anthus petrosus*).

Increasingly rare species associated with farmland and the open countryside around Greystones include; tree sparrow (*Passer montanus*) and yellowhammer (*Emberiza citrinella*) and barn owl (*Tyto alba*). The barn owls, which were reported nesting in 2006 at two sites within the town, have been lost as a breeding bird town. They are unlikely to remain extant within the Greystones area given the level of urbanisation, development and loss of both nesting and foraging habitat. Summer visitors such as the iconic cuckoo (*Cuculus canorus*) are also threatened through the loss of breeding habitat for their target species - meadow pipit (*Anthus pratensis*) which along with the skylark (*Alauda arvensis*) requires meadows/rough grassland and scrub areas to breed in.

### 3.5.2 Bats

The Three Trout Stream is the most significant area of green infrastructure running through both Delgany and Greystones linking the Glen of the Downs SAC and Nature Reserve to the coast and is an important wildlife corridor - particularly for bats.

Several species of bats (which are all listed under Annex IV of the EU Habitats Directive) have been recorded from the general environs of Greystones. These include records of roosts sightings and other observations and are recorded within the Bat Conservation Ireland database. They are:

- Common pipistrelle (*Pipistrellus pipistrellus*),
- Soprano pipistrelle (*Pipistrellus pygmaeus*),
- Nathusius's pipistrelle (*Pipistrelle nathusii*),
- Daubenton's bat (*Myotis daubentonii*),
- Brown long-eared bat (*Plecotus auritus*),
- Leisler's bat (*Nyctalus leisleri*),
- Whiskered bat (*Myotis mystacinus*).

Bats will feed wherever their food source (insects) is found in abundance in dark, sheltered areas. Therefore secluded stretches of the stream with overhanging trees and a wide belt of trees and shrubs on the bankside offer a higher probability of being used by bats. They require darkened areas with good levels of cover and native vegetation to hunt along.

In 2012 a pre-construction otter, bat and breeding bird survey of the Three Trouts Stream Bridge on the R761 Kilcoole Road between Farrankelly and Killincarrig, Co. Wicklow was commissioned by Wicklow County Council<sup>20</sup>.

This survey was done in advance of a proposed upgrade to the bridge which included widening and realignment to allow for safer pedestrian access. This survey included a bat detector survey of the area, an inspection of the bridge to determine roosting potential by bats and an inspection of trees adjoining the bridge for potential roosts.

The detector survey confirmed the presence of three bat species within the immediate vicinity of the bridge. The most commonly encountered species were the Common and Soprano pipistrelles, which were detected foraging over the river and in the general vicinity of Three Trouts Stream Bridge. This activity seemed to be concentrated on the south side of the bridge and it is possible that bats are roosting in the Callosa Gatelodge as activity levels were particularly high near there. Leisler's bats were detected feeding over the general area and were amongst the first bats to be detected after dusk. No bats were detected emerging from the bridge. A number of crevices in the underside of the bridge were identified as potential bat roosting locations as shown in **Plate 1** and were recommended for retention.



<sup>20</sup> Wilson, F. (2012). R761 Three Trouts Stream Bridge, Kilcoole Road, Farrankelly to Killincarrig, Co. Wicklow. Pre-Construction Breeding Birds, Otter and Bat survey. Unpublished report for Wicklow County Council.

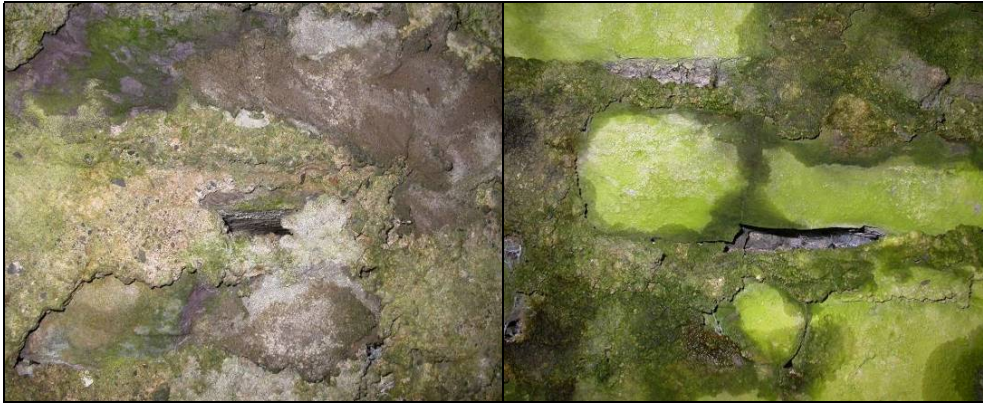


Plate 1. Crevices suitable for use by roosting bats in Three Trouts Stream Bridge.

### 3.5.3 Badger

There are no known records of badgers (*Meles meles*) from within the town but a badger sett is known from Charlesland Golf Course (F. Wilson, pers. obs.).

### 3.5.4 Otter

The pre-construction otter, bat and breeding bird survey of the Three Trout Stream Bridge on the R761 Kilcoole Road between Farrankelly and Killincarrig, Co. Wicklow commissioned by Wicklow County Council confirmed the presence of otter on this watercourse<sup>21</sup>.

The Three Trout Stream was walked from the confluence of the river with a small watercourse at O 284 105 downstream to below the bridge. No otter holts were encountered but otter spraints were observed on a boulder just west of the bridge confirming use by otters of this river.



<sup>21</sup> Wilson, F. (2012). R761 Three Trouts Stream Bridge, Kilcoole Road, Farrankelly to Killincarrig, Co. Wicklow. Pre-Construction Breeding Birds, Otter and Bat survey. Unpublished report for Wicklow County Council.

**Plate 2. Otter spraints on a boulder at the bridge.**

**3.5.5 Amphibians**

Suitable habitat for common frog (*Rana temporaria*) or smooth newt (*Lissotriton vulgaris*) for breeding purposes is likely to occur within ponds in private gardens in Greystones.

**3.5.6 Fisheries & Water Quality**

**Water Quality**

Greystones is located within the Ovoca - Vartry catchment (Catchment 10) and within the Newcastle (Wicklow) sub-catchment (SC\_010). There are three watercourses in the village. These are:

- The Kilruddery/Deerpark Stream
- The Greystones Stream
- The Three Trout Stream

**Three Trout Stream**

The Three Trout Stream (IE\_EA\_10T030580) rises west of Greystones in the Glen of the Downs and then flows in an easterly direction, passing through Delgany Village and Greystones as shown on **Figure 11** below.

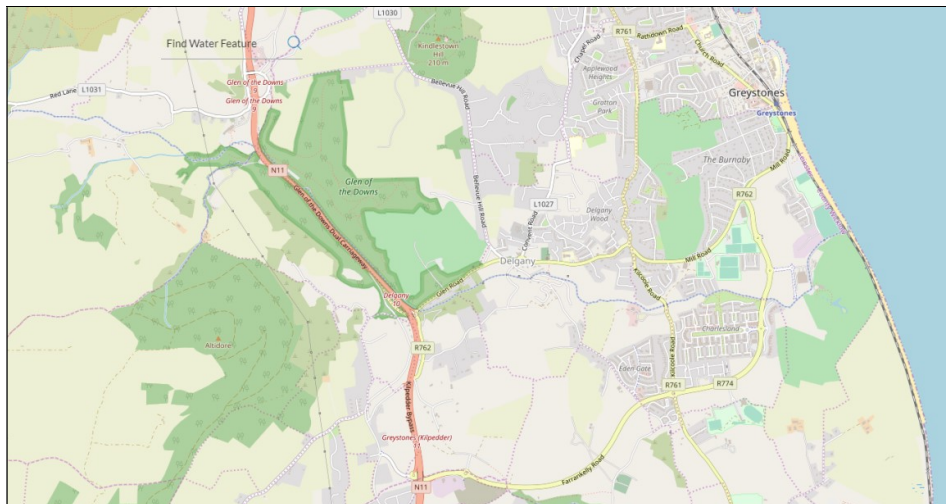
The water quality of the Three Trout Stream is currently unknown but the watercourse is classified as a stream 'Not At Risk' of not achieving 'Good Status' under the Water Framework Directive.

**Salmonids and Lamprey**

The Three Trout Stream is a known salmonid river with resident populations of brown trout (*Salmo trutta*) and three-spined stickleback (*Gasterosteus aculeatus*).

Eel (*Anguilla anguilla*) may also occur, as may brook lamprey (*Lampetra planeri*) which spend their entire life in freshwater, as opposed to river lamprey which migrate to estuaries in their adult phase and return to freshwater to spawn. All three species of lamprey which occur in Ireland, sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*) and brook lamprey (*Lampetra planerii*), are protected under Annex II of the EU Habitats Directive. Suitable habitat for ammocoetes within the Three Trout Stream would be confined to areas with a fringe of marginal aquatic vegetation where fine sediments would accumulate.

There are a number of barriers to movement of both fish and lamprey in the river.



**Figure 11. Watercourses in the Greystones area.**

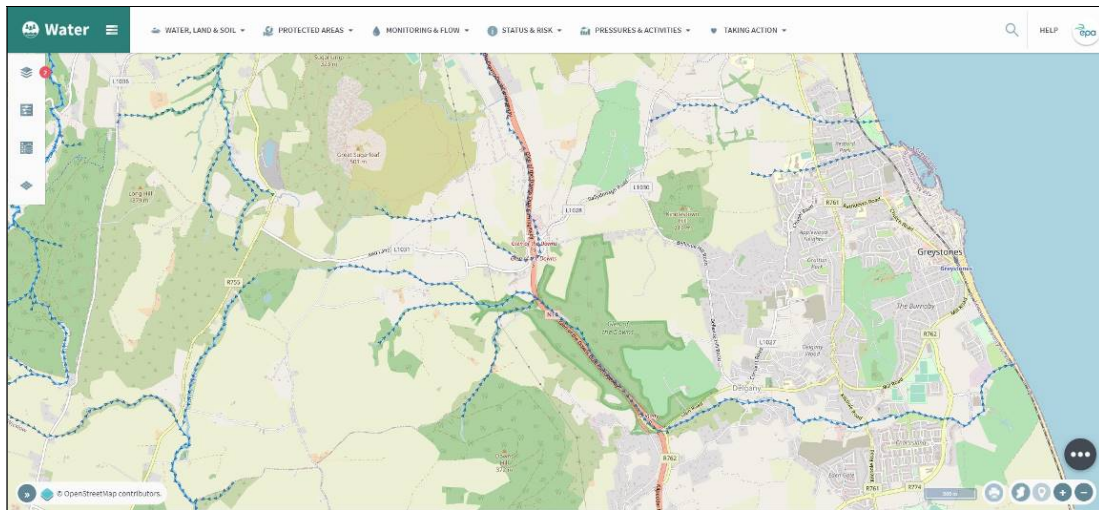
### 3.6 Main Areas Surveyed in 2020/2021

A description of each of the main study areas examined in 2020/2021 in Greystones and the habitat types encountered within them as described by Fossitt (2000) in the Heritage Council 'Guide to Habitats' is presented below.

#### 3.6.1 Three Trout Stream & Other Watercourses

There are three watercourses in Greystones as shown below on **Figure 12**. These are (from north to south):

- The Kilruddery Deerpark Stream
- The Greystones Stream
- The Three Trout Stream



**Figure 12. Rivers and streams in Greystones (Source: [www.catchments.ie](http://www.catchments.ie)).**

The largest of these, the Three Trout Stream rises above the Glen of the Downs at the foot of the Great Sugarloaf in Glencap Commons. A second tributary stream rises in Calary Lower and the two watercourses join above the woodland of the Glen of the Downs near the Glenview Hotel to form the Three Trout Stream. The Three Trout Stream is fed by a third tributary stream before crossing under the N11 and then flows parallel to the N11 on the floor of the valley before turning east through Delgany and Greystones to reach the Irish Sea.

**The Three Trout Stream, associated river corridor and adjoining lands are the most important area of natural habitat remaining in the Delgany/Greystones area.**

The 2006 study described the Three Trout Stream as follows:

“The Three Trout Stream flows for 4km approximately within the Greystones/Delgany area and forms one of, if not the most important wildlife area in the Greystones/Delgany LAP area. It forms a natural and important wildlife corridor/refuge from Glen of the Downs SAC to the sea and is recognised as important for the migration of sea trout to the point where it reaches the N11. It is predominantly clear, fast flowing, shallow in nature with a significant gravel bed along most of its length.

The stream enters the sea between Charlesland driving range and golfcourse (330407/211099). Going upstream the stream initially passes under the railway and

follows concrete banks either side of which is a 5m wide low scrub corridor, between golf course to the south and driving range to the north. Brent Geese (150 approximately) and oystercatchers were observed on the driving range. Following the bridge beside the sewage treatment works (330218/211038) taller scrub and steeper banks develop. The field on the north bank of the stream (centre point 329947/210748) is substantially lower than that of the golf course on the other side of the stream, and is poorly drained grassland (GS4) and is possibly open to seasonal/periodic flooding. Despite a steep incline 3-4m at the northern end of this field the wet grassland continues up the slope indicating a high water table. Significant littering of the stream is evident at the bottlebank/waste centre of the golf club (330104/210608).

A culverted stream enters Three Trout Stream just prior to an apartment complex (329952/210483) where the wildlife corridor has been removed for 100m. The Three Trout Stream is blocked by a fallen tree with builder's waste (timber, styrofoam, flooring, signs etc.) forming an impasse to fish at 329869/10513. Following on from the dual carriageway bridge at 329779/210531 the wildlife corridor widens to 10 m on the northside of the stream which contains willow sp, elder, gorse and holly. On the southside scrub has been removed and replaced by fencing. This has been vandalised to provide access to the stream. Littering including building waste is evident here also. Possible seasonal flooding up to 5m from the stream is evident at 329395/210601.

Encroachment of housing and littering from (329348/210591) to (329019/ 210517) is clearly evident east of Three Trout Bridge, and impacts strongly on local biodiversity.

Following the bridge at 328951/210465 and additional site of possible flooding is found on the north bank of the stream where the corridor is 2-3m wide. A substantial area of marsh (GM1) (70m x200m) with very high water table is located on the south side of the river at Farankelly House (328689 210473). The field on the north side of the river contains wet grassland (GS4) for approximately 40 meters from the stream.

A significant tributary enters the stream slightly west of Farankelly House (328508 210505). This was followed northwards. The west side of this stream was wet grassland (GS4) marshy in areas (GM1) for approx 50 m from the stream. The eastern bank of the stream forms a steep grassy slope and contains willow sp., holly gorse Ivy and bramble. A housing development (at 328513/210717) has removed the northern bank of the stream and the bed of the stream is now made of hardcore. The flora of northern banks and southern banks of the stream have also been removed further upstream (328434/210745).

From the junction with the tributary above, the Three Trout Stream continues towards Delgany. Scrub (WS1) is 25m in width approx and contains Holly, *Salix* species. Another impasse to fish, backed up with litter and building waste is located at 328246/210502. A significant building site is located on the western bank where all scrub has been removed. A new, possibly drainage, outfall is located at (328246/210502). At this point the eastern side of the stream forms a slope of approximately 25m wide, 45o. While this area is classified as WN1 according to Fossit (2000) the area is too small to be considered of any real conservation significance. It does however represent a small fragment of native Irish woodland, a habitat which is in serious decline and for this reason should not be impacted on further. Another impasse to migrating trout/eels is located further upstream (at 328015/210628).

Following the bridge at Delgany (327848/210659) recolonising bare ground (ED3) is possibly susceptible to flooding. Scrub is maintained on both sides of the stream for approx 3-4 m until it widens to 30m further up stream (at 327451 210621). Of noteworthy importance is a canopy covered ravine containing a small stream, located on the border

of the Greystones Delgany boundary. This ravine is potentially of geological significance as is one of several glacial meltwater channels.

The stream is currently extremely vulnerable to human based pressure and unless strict and significant preservation measures are put in place the Greystones Delgany area will imminently lose its main Local Biodiversity Area.

It is clear from examining the 6" maps, local flora and local knowledge that areas of this stream are liable to flooding. The presence of wet grassland and marsh in the area would tend to indicate areas that are possibly open to seasonal flooding. This includes areas within the proposed Charlesland development and in the Delgany area".

The Three Trout Stream is technically a lowland depositing river (FW2) but it resembles an upland eroding river (FW1), like many of the Wicklow Rivers, on account of its flashy spate nature and the sediments associated with it are mainly sands and gravels as opposed to muds. This is described by Fossitt (2000) as follows:

'This category includes watercourses, or sections of these, where fine sediments are deposited on the river bed. Depositing conditions are typical of lowland areas where gradients are low and water flow is slow and sluggish. These rivers vary in size but are usually larger and deeper than those above. In a natural state these rivers erode their banks and meander across floodplains. Because of this, most have been modified to some extent to control water flow, facilitate navigation or prevent flooding and erosion. Canalised or walled sections of rivers are included here, as are natural watercourses that have been dredged or deepened, and those with artificial earth banks. If channels have been excavated to divert water away from the main watercourse, these should be considered under canals - FW3. Tidal sections of rivers with brackish water influence are excluded (see tidal rivers - CW2). Rejuvenated sections of lowland rivers associated with rapids, waterfalls and weirs should be considered under eroding/upland rivers - FW1 if eroding conditions predominate.

Plant and animal communities are influenced by numerous factors including substratum type, water force, nutrient status, water quality, channel size, water depth, human impact, disturbance and shade. Within a river channel there may be deep pools, backwaters, banks or mid-channel bars of gravel, sand or mud, in addition to vegetated islands and fringing reedbeds. The substratum of depositing/lowland rivers comprises mainly fine alluvial or peaty sediments. Vegetation may include floating and submerged aquatics, with fringing emergents in shallow water or overgrowing the banks. Floating aquatics can include water-lilies (*Nuphar lutea*, *Nymphaea alba*), pondweeds (*Potamogeton* spp.), water-starworts (*Callitriche* spp.) and Unbranched Bur-reed (*Sparganium emersum*). Tall emergents such as Common Club-rush (*Schoenoplectus lacustris*), Common Reed (*Phragmites australis*) and Yellow Iris (*Iris pseudacorus*) may also be present. Large areas of fringing reedbed should be considered under reed and large sedge swamps - FS1'.

There are some small areas of willows (*Salix cinerea*, *Salix caprea*, *Salix fragilis*), alder (*Alnus glutinosa*) and ash (*Fraxinus excelsior*), which remain along the river margins of the Three Trout Stream particularly in the vicinity of Charlesland. Within these areas non-native species such as sycamore (*Acer pseudoplatanus*) and buddleia (*Buddleia davidii*) are also recorded. These are small elements of riparian woodland, which have developed on the fine river sediments, sands and muds that have been deposited over a succession of flooding events on the river margins and banks. Riparian Woodland (WN5) is described by Fossitt (2000) as follows:

'This category includes wet woodlands of river margins (gallery woodland) and low islands that are subject to frequent flooding, or where water levels fluctuate as a result



of tidal movement (in the lower reaches of rivers). Riparian woodland is dominated by stands of willows that may include native (*Salix cinerea*, *S. purpurea*, *S. triandra*) and nonnative (*Salix fragilis*, *S. alba*, *S. viminalis*) species. Alder (*Alnus glutinosa*) is occasional. The field layer is characterised by broadleaved herbs such as Nettle (*Urtica dioica*), Creeping Buttercup (*Ranunculus repens*), Wood Dock (*Rumex sanguineus*), Meadowsweet (*Filipendula ulmaria*), Wild Angelica (*Angelica sylvestris*), Hemlock Water-dropwort (*Oenanthe crocata*) and Hedge Bindweed (*Calystegia sepium*). Stands of Reed Canary-grass (*Phalaris arundinacea*) are common. Indian Balsam (*Impatiens glandulifera*), an introduced species, is locally abundant. These woodlands often reveal an accumulation of river borne debris, including dead vegetation and plastic, when water levels are low. A fine coating of grey mud on vegetation and tree bases that are regularly submerged and emersed is also characteristic. Willows were widely coppiced and used for basket-making in the past; old Osier (*Salix viminalis*) beds are included in this category but any actively coppiced areas should be considered under short rotation coppice – WS4 (Fossitt 2000)ʹ.

The small deposits of sand and gravel on the edge of the river are described as exposed sand, gravel and till (ED1). These areas are generally not individually mapped on habitat maps as they are very small. Exposed Sand, Gravel or Till (ED1) is described by Fossitt (2000) as follows:

‘This category includes natural or artificial exposures of unconsolidated coarse or mixed sediment. Sand and gravel are mostly made up of sediment particles that are less than 16 mm in diameter. Till, or boulder clay, is an unsorted mixture of pebbles, cobbles or boulders in a matrix of finer material such as sand, silt or clay. Most exposures of these sediments are associated with sand and gravel pits, or with excavated glacial landscape features such as eskers, drumlins or moraines, and include road cuttings or construction sites. Deposits of sand, gravel or till may also be exposed through natural forces of erosion along river banks, and on some lake shores, but note that **sedimentary sea cliffs - CS3** are excluded. Depending on their nature, these sediments may support a wide range of broadleaved herbs and grasses. Red Hemp-nettle (*Galeopsis angustifolia*), a rare plant, can be found in sand and gravel pits. As in the case of exposed rock categories, vegetation cover should be less than 50% for inclusion here. Note that **active quarries and mines - ED4** with high levels of disturbance are excluded, and that there is a separate category for **spoil and bare ground - ED2** (Fossitt 2000)ʹ.

The 2006 study identified threats to the Three Trout Stream as follows:

“Development, encroachment and their corresponding side-effects appear to currently be the most significant threat to the stream. This stream is a shallow and predominantly gravel based with very few pool areas. As such it is sensitive to extreme temperatures in summer, resulting in lower oxygen levels and is also sensitive to siltation of gravel areas (possible egg laying/nursery areas). The removal of native vegetation from the sides of the banks increases both of these threats significantly. When the aerial image from 2000 is compared to the current status of the area and the current planning images, significant development has been carried out and is due to be carried out which will impact directly on the stream. With the potential scale of development that could arise, significant additional pressure could be placed both north and south of the stream resulting in a significant loss in the biodiversity associated with this stream.

In addition, the development of significant areas of land within the watershed reduces the absorbing nature of the land and as a result the stream is more liable to suffer flooding and also lower water levels in times of drought, when the stream is most sensitive to impacts such as pollution. With no current monitoring system in place for the stream it is difficult to assess if pollution incidents are occurring. The Eastern Region Fisheries Board does not recall serious pollution incidents in the stream. However it is

evident (NPWS), that there has been disintegration in the quality of the stream over the past ten years”.

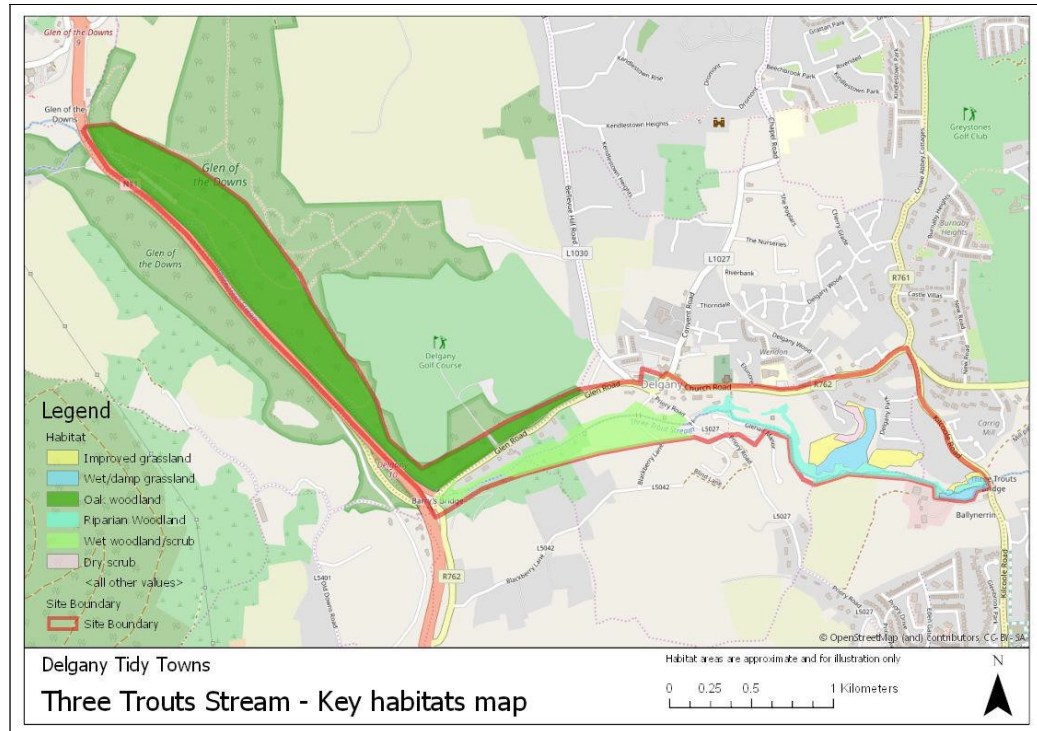
**Upstream of Three Trout Bridge**

In 2019 Delgany Tidy Towns, with support from LAWCO, commissioned a preliminary study of the Three Trout Stream, which was completed by ALCNature<sup>22</sup>. This survey extended from the Glen of the Downs to the Three Trout Bridge, which is on the boundary of the Greystones study area at Kilincarrig.

The survey identified seven main natural or semi-natural habitats along this section of the river as summarised in Table 3.6.1 and shown on Figure 13 below.

**Table 3.6.1. Natural/semi-natural habitats along the Three Trout Stream.**

Habitat Code	Habitat Type	Approx. extent (Ha)	Comments
GA1	Improved Grassland	3.5	Grazed pasture to south east end of site merges into modified wet grassland
GS4	Wet Grassland	6.7	Areas with some characteristics of wet grassland present, mainly highly modified as part of improved grassland fields
WN1	Oak Woodland	81.2	Mainly designated Sessile Oak woodland and small areas out with designated site
WN5	Riparian Woodland	16.8	Streamside and river corridor woodland and scrub dominated by Willow, Alder, Hawthorn and Ash
WN6	Wet woodland	15.3	Areas of low-lying woodland and scrub, probably floods regularly or sits on waterlogged ground. Alder and willow are frequent - merges with riparian woodland. Mainly highly modified.
WS1	Dry scrub	1.6	Bank of gorse scrub within grazed improved grass field
FW1	Eroding stream	n/a	The stream through its length is eroding and has a mainly stony/gravelly substrate. It has an established channel which is walled or canalised in some sections and is culverted (at both the North and south ends of Glen of the Downs and is bridged in a number of places.



**Figure 13. Habitat Map of the Three Trout Stream within Delgany (ALC Nature 2019).**

<sup>22</sup> ALCnature (2019). Preliminary Biodiversity Appraisal of Three Trout Stream, Delgany including recommendations for future enhancement & survey. Report to Delgany Tidy Towns.

The 2006 survey recommended the following high and medium priority recommendations in relation to Three Trout Stream:

**'High Priority**

- The stream is currently impassable for migrating fish at a minimum of three points. It is essential that these structures are removed as quickly as possible.
- Development of new houses and encroachment of by current inhabitants has removed the scrub and trees along the bank of the river making the river more vulnerable to extreme summer temperatures (reducing oxygen content) and an increase in particulates (clogging gravel beds). It is essential to the stream that the practice of scrub removal from either side of the bank is halted immediately and in areas that it has been removed, e.g. Charlesland, that these are replaced with similar native species. It is strongly recommended that a minimum of a 20m buffer zone of native vegetation, from each bank, is maintained along the bank of the stream and its main tributary, which would be extended where relevant to incorporate additional wooded/scrub/marsh areas (Figure 4). This would be deemed essential to protect the stream from extreme summer temperatures and reduce the threat of particulate material ending up in the stream, which would clog up spaces in gravelbed. It is also suggested where possible that an additional 3m of grassland/amenity area is maintained outside the buffer zone providing a "flyzone" for bats and Owl species. In areas where dense scrub (nor briar dominated) and tall trees have already been established that these are retained. Flushes of particulates due to construction, as observed during field work, should be avoided as it can cause fish mortality/irritations on fish gills and block gravel beds.
- Areas liable to seasonal flooding/marsh areas should not be developed (Figure 3). Instead areas of wet grassland, especially in the Charlesland area could be used to absorb runoff (including associated pollutants and silt) from developed areas through the use of reed beds. This would actively encourage and increase biodiversity while reducing the impact of development on the stream and avoiding the flooding of developments which could be placed in areas liable to flooding. Flooding becomes increasingly likely the more development that continues in the watershed. In addition in recent years summer rainfall levels have been lower on average than previously recorded. However, studies have shown that there has been a significant increase in winter rainfall over the past 40 years and it is predicted that climate change will introduce more erratic weather patterns including heavy rain and flooding. It is therefore emphasised that the areas outlined as marsh and wet grassland (Figure 3) are potentially conservative in relation to the flooding risk along this stream and the drawing of exclusion zones based on these alone should be done with caution. In addition these areas did not include bare or disturbed ground and amenity grassland due to the lack of indicator species.
- Continuous monitoring of the stream is needed to ensure that it retains its wildlife. This would include the monitoring of biological and chemical contamination as well as vigilance in relation to dumping, removal of the scrub corridor and discharge of contaminants, as well as accidental/intentional damming.
- Three sites for this monitoring would be suggested:
  - Junction of N11 and Three Trout Stream
  - Delgany East side of new housing development.
  - Downstream of Charlesland Development

### Medium Priority

- Littering is evident where development occurs beside the stream. These areas have been highlighted. The golf course needs to issue stronger litter management procedures which could include fencing of waste areas.
- The stream is not currently treated as an asset by the local community and this philosophy should be changed as soon as possible. The inclusion of a walkway from Delgany to Greystones and education initiative in local schools/along the stream could assist. The danger is that with additional development along the stream an increase in the dumping of waste could occur.
- An assessment of the impacts of a development whose boundary is within 20m of the stream or its tributaries should be carried out pre, during and post development. This could have pre-empted the current damming of the stream and construction litter problems in the Charlesland and Delgany areas.

The resurveys conducted in 2020/2021 along the Three Trout Stream Corridor found significant losses of biodiversity and threats to same. These are further explored in **Section 4**.

### 3.6.2 St. Crispin's Graveyard, Kilruddery Deerpark Stream & D'Arcy's Field

The heritage importance and habitats of St. Crispin's and the adjoining land to the east (D'Arcy's Field) have been long recognised by the community in Greystones and were the subject of long fought and hard won battle for their protection, which is detailed on the excellent website <https://rathdown.wicklowheritage.org/>. The lands here are now owned by Wicklow County Council.

The habitats here were first studied in some detail in a survey commissioned by The Friends of Historic Rathdown as part of their appeal to An Bord Pleanála in 1996 to prevent any further housing development on the site. The study was prepared by Clare Byrne, a grassland specialist from Trinity College Dublin. Her study is summarised below:

"33 plant species were recognised in the western field (dominated by *Agrostis capillaris* in the main), which is relatively uniform in composition, as a result of ploughing earlier this century, though the southernmost part does differ botanically with more thistle infestation. The least homogenous area was the western portion of the eastern field. 33 species are present, with the grassland dominated by *Holcus lanatus* and *Agropyron repens*.

The eastern portion of this field is wetter as indicated by the species composition. 31 species were identified there (dominated by *Agrostis stolonifera*, *Holcus lanatus*, *Agropyron repens* and the sedge *Carex hirta*). There were no rarities and species diversity, within 6 quadrats (3 in the western field and 3 in the eastern field), was relatively low. This is because of lack of grazing in recent years, which has led to rank grassland, with some coarser grasses and dicotyledons dominating the eastern field.

Nevertheless, the plant communities indicate *natural, unfertilised, neutral grasslands*.

The low abundance of *Lolium perenne* is indicative, as this species tends to dominate in fertilised and heavily managed grasslands. Grassland classification places these grasslands into the Arrhenatheretalia Elatioris category. Good management, with moderate, seasonal, grazing would lead to a rapid increase in the plant species diversity (subclass known as Cynosurion Cristati: National Vegetation Classification [UK], habitat type MG5).

Proper management of these rare grasslands precludes any application of artificial fertilisers. *The fields are exceptional for their lack of fertilisation and tillage over a considerable time*".

Since that study the Heritage Council 'Guide to Habitats in Ireland' was published and this habitat accords to the habitat Dry Meadows and Grassy Verges (GS2) as described by Fossitt (2000) as follows:

'Dry meadows that are rarely fertilised or grazed, and are mown only once or twice a year for hay are now rare in Ireland. Most have been improved for agriculture and this type of grassland is now best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens. These areas are occasionally mown (or treated with herbicides in the case of some railway embankments), and there is little or no grazing or fertilizer application. This pattern of management produces grasslands with a high proportion of tall, coarse and tussocky grasses such as False Oat-grass (*Arrhenatherum elatius*) and Cock's-foot (*Dactylis glomerata*). Other grasses may include Yorkshire-fog (*Holcus lanatus*), Smooth Meadow-grass (*Poa pratensis*), Barren Brome (*Anisantha sterilis*) and Meadow Foxtail (*Alopecurus pratensis*). The broadleaved herb component is characterised by a range of species that either grow tall, such as Cow Parsley (*Anthriscus sylvestris*), Hogweed (*Heracleum sphondylium*), Goat's-beard (*Tragopogon pratensis*), Nettle (*Urtica dioica*) and Common Knapweed (*Centaurea nigra*), or climb the stems of others, as in the case of Bush Vetch (*Vicia sepium*) and Meadow Vetchling (*Lathyrus pratensis*). Grassy verges may support other smaller broadleaved herbs such as Pignut (*Conopodium majus*), Creeping Cinquefoil (*Potentilla reptans*) and clovers (*Trifolium* spp.)'.

The 1996 grassland ecological study concluded that:

- The site is an undisturbed neutral grassland – extremely rare in lowland Ireland.
- The grasslands merit protection.
- No landscaping can be allowed.
- No natural or artificial fertilisers can be permitted.
- No tree-planting can occur.
- A programme of carefully controlled grazing by domestic stock should be introduced within an ecologically-based management plan.
- One very satisfactory solution would be to seasonally graze ancient breeds of cattle or sheep; some of these breeds are very similar to those stocked in medieval times, so they would be totally appropriate to, and part of, the attraction of Rathdown.

In June 2018 The Heritage Office of Wicklow County Council commissioned a biodiversity study<sup>23</sup> to propose ways to manage the Rathdown Heritage Park to benefit wildlife, enhance and maximise the biodiversity potential whilst respecting the archaeological integrity and community interest of the site. The report was prepared by Oran O'Sullivan and relevant excerpts and recommendations from same are presented below:

#### **"Grassland Management**

- A meadow mowing regime is proposed to promote a more diverse structure with more native flowering plants to encourage pollinators. It is not thought practical or economic to re-seed the grassland area, instead a gradual reversion to a meadow will be attained through an appropriate mowing regime. Reseeding with meadow species and / or disturbance of the ground layer is not envisaged.
- It is essential to remove cuttings, post mowing and to discourage dumping of garden clippings and waste around the margins of the grassland.

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<sup>23</sup> O'Sullivan, O. (2018). Rathdown Heritage Park Biodiversity Plan. Unpublished report for Wicklow County Council.

- County Council to seek a quotation for topping and baling on an interval of six to eight weeks, starting in mid-April and to include removal of all cut material from site, especially at the end of the grass growing season.

**Mowing regime, Year One to Three:**

- Cut in April, immediately after dandelions have flowered, (they are an important source of nectar for bees) and remove all cuttings if at all possible; Cut on a six to eight week cycle thereafter, bale and remove all cuttings. Dominant weeds such as Dock could be dug out manually, once a month in summer. Alternatively, Dock could be treated organically but not sprayed. A number of county councils now use organic weed control methods such as treatment with a strong solution of Vinegar, or acetic acid, (30% solution), in preference to use of pesticides which can be carcinogenic and damaging to wildlife and would require professional application.
- After soil fertility is weakened, and the meadow establishes, the mowing regime should be reviewed.
- Continue to close-cut margins of established pathways on a fortnightly basis to a width of a minimum of 1 meter on each side of the hard path and collect cuttings. Include seated areas and the fringe area around St. Crispins Cell in this fortnightly cut.
- Native wildflowers could be introduced into the relatively small area currently tilled and planted with garden perennials and bulbs of garden cultivars, adjacent to St. Crispins Cell. This substitution will ensure a more appropriate, colourful display to benefit pollinators, in an area already prepared for flowering plants.
- Suggested Native Wildflower list for area beside St Crispins Cell:
  - Choose from: Field Scabious; Devil's Bit Scabious, Oxeye Daisy, Purple Loosestrife, Selfheal, Knapweed, Birds foot Trefoil, Woundwort, Goldenrod".

The grassland management mowing regime proposed above has not been implemented to date.

The grass cuttings are not being removed but just left in place, which is evident from the species recorded within the grassland and the coarseness of the vegetation.

There is also ongoing weed killing activity and the development of a 'garden' of non-native species adjoining St. Crispin's.

A small area of grassland in the front garden of a nearby house in Redford Park is relatively species rich and provides an indication of the potential diversity that could be restored within the grassland in St. Crispin's once appropriate management is implemented.



**Plate 3. St Crispin's grassland management in 2020 - no biodiversity management in action here.**



**Plate 4. 27 species of wildflowers were recorded in a small area of managed lawn in the front garden of a house at Redford Park as a result of appropriate management as well as providing a rich pollinator resource for insects.**

### **Woodland & Stream**

The Kilruddery Deerpark Stream flows along the southern boundary of St. Crispin's. A small area of deciduous wood is found adjoining this stream within St. Crispin's. Mature specimen trees of Ash, Willow and Hawthorn occur with Elder and Hawthorn along the margins. All of these are native trees which support a rich diversity of invertebrates and also provide flowers and berries used by a variety of other wildlife. O' Sullivan reported that "A patch of Yellow Flag Iris and Rosebay Willow Herb is situated along the margin of the stream, providing good ground cover for aquatic species and a good nectar source for pollinators".

The Rathdown Heritage Park Biodiversity Plan recommended the following:

#### **"Woodland**

- The trees along the stream line would sustain a few nesting boxes for hole nesting bird species and should be assessed for suitability for deployment of bat boxes.
- Possible additional tree planting along the stream should include Alder, a high nature value native tree, tolerant of damp conditions.

#### **Stream**

- A nest box for Grey Wagtail should be provided in the area of the culvert/bridge.
- Dumping of garden clippings and hardwood should be completely discouraged in this area".
- An inventory of riparian fauna and flora should be considered. This could be carried out by local school groups/projects".

The margins of this small watercourse have been encroached upon by the housing developments of Redford Park through poor planning regulation which did not allow a suitable set back from the river. Garden waste and other rubbish has been dumped over the back gardens of various properties for many years which interferes with the natural course of the river, and the stream banks here were beginning to erode.

A natural willow revetment was installed here by the County Council in July 2020 to combat same. Unfortunately in conducting these works the existing biodiversity in the area (namely the trees and vegetation) was not given protection and machinery was allowed to encroach into the root protection area of the mature and semi-mature ash trees damaging their roots and destroying the existing vegetation. There was also significant disturbance of soil and changes in ground level. There has also been ongoing weed killing along the path edges and excessive cutting of ivy on the trees here.

The planting of various garden species in and around St. Crispin's is at odds with the natural heritage objectives for the area which are based around its natural heritage. The one garden species that should be gardened here and removed is the three cornered leek (*Allium triquetrum*), which is a species listed under the Birds and Natural Habitats Regulations 2011, which must be legally controlled.





**Plate 5. Flag Iris and Creeping Buttercup along the Kilruddery Deerpark Stream in St. Crispin's, June 2018 prior to revetment works (Source: Oran O'Sullivan, 2018).**



**Plate 6. Damage to habitats, tree roots and vegetation during revetment works in 2020.**



**Plate 7. Damage to habitats, tree roots and vegetation during the revetment works in 2020.**



**Plate 8. Three cornered leek, which should be removed.**



**Plate 9.** A small area of flag iris, marsh marigold, nettle and other native species remain adjoining the stream. This vegetation should be allowed to recolonise the disturbed areas. Signage and fencing may be required to prevent access and trampling of same as it establishes.



**Plate 10.** Willow revetment on the Kilruddery Deerpark Stream in St. Crispin's.

There has been wide scale dumping of garden waste in St. Crispin's, which is entering the watercourse and causing enrichment. The garden waste needs to be removed. In some locations the watercourse is blocked by this vegetation and this increases the risk of the stream finding another route and if unresolved this could potentially undermine the railway line downstream. During site visits I witnessed people driving to this area, unloading their car and bumping in the site despite being challenged on same. This needs to be tackled through education (promote responsible disposal of garden waste), and possibly CCTV cameras and fines/prosecutions. The current signage obviously isn't working. Dumping of garden waste is now beginning to occur in the recently disturbed work area around the willow revetment.



**Plate 11. Dumping of garden waste in St. Crispin's, which is blocking the river in places – the signage is obviously not working.**

The hedgerow along the western boundary of St. Crispin's has been intensively cut and managed in recent years by the local residents. It is noted that on one occasion that this activity occurred during the active bird breeding season (NPWS, pers. comm), which is illegal. Heavily cut hedgerows provided limited opportunity for nesting birds.



**Plate 12. Remnant hedgerow along the western boundary of St. Crispin's.**

The removed vegetation along the fenceline to the south of the entrance to St. Crispin's from Redord Park should be reinstated with a native hedgerow of thorn and scrub species such as hawthorn, gorse and blackthorn. The non-native Alexanders growing here should be tackled.



**Plate 13. Native hedgerow to be established here.**

The areas of scrub in D'Arcy's Field on either side of the Kilruddery Deerpark Stream must be protected and the area of same could be expanded into adjoining grass areas through additional planting of native thorn and scrub species such as hawthorn, gorse and blackthorn. These areas support a rich diversity of bird and insect species including wren, blackbird, whitethroat, linnets, goldfinch, song thrush, dunnock, and the willow, gorse, hawthorn and blackthorn flowers provide important natural resources for pollinators in the spring.



**Plate 14. Blackthorn blossom in April.**

It is recommended that a hedgerow of similar native is established along the railway line within the new dog park to replace the one removed as part of the development.

All plants used must be of Irish genetic origin and are available from suppliers to the Native Woodland Scheme who can provide certified material for planting.



Plate 15. Enjoy the wonderful scent of gorse in the sunshine.

There has been recent dumping of old concrete, other constructed materials and building waste at the mouth of the stream. This material must be removed under the supervision of an ecologist and the bare banks of the stream within the cutting on the cliffs revegetated with suitable native shrub species. These would include hawthorn, gorse and blackthorn on higher drier ground and willow and alder adjoining the stream.



Plate 16. Dumping of building material at the mouth of the Kilruddery Deerpark Stream.

### 3.6.3 Greystones Coastal Cliffs

North of Greystones marina and harbour are a series of clay cliffs (**Sedimentary Sea Cliffs CS3**), which extend north to meet the rocky outcrop of Bray Head. These are formed of glacial till and are a naturally eroding feature.

At the base of the cliff is a shingle beach (**CB1 Shingle and Gravel Banks/ LS1 Shingle and Gravel Shores**) and this was surveyed as part of the National Shingle Beach Survey of Ireland conducted in

1999<sup>24</sup>. This is one of four shingle beach sites in Co. Wicklow (as shown below) – the largest of these is The Murrough, which extends from south of Greystones Town to Wicklow Town.

Species recorded here include; *Atriplex prostrata*, *Beta vulgaris*, *Cirsium* sp., *Glaux maritima*, *Plantago major*, *Raphanus raphanistrum* (subsp. *raphanistrum*), *Rumex crispus*, *Senecio jacobaea*, *Trifolium repens*, and *Tripleurospermum maritimum*.

**Wicklow**

The Arklow site is included only because it is an ephemeral system that can disappear and reappear sporadically – there is no vegetation there. The Murrough is very extensive with the most interesting portion (botanically) being just north of the road to Newcastle. There are good amounts of *Glaucium flavum*, in the more disturbed places. Most of the northern part of the Wicklow coast, (i.e. Greystones and Bray beaches) is composed of shingle, which is poorly vegetated and is often intertidal (see Table 11).

Site code	Site Name	Classification	Interest	Grid reference
0132	Arklow.	Unvegetated fringing beach	Low	T265753
0133	The Murrough.	Vegetated shingle ridge	High	O306109
0134	Greystones Beach.	Vegetated fringing beach	Low	O288141
0135	Bray Beach.	Unvegetated fringing beach	Low	O275185

Table 11: Summary of sites surveyed in County Wicklow.

These habitats accord to the habitats **Sedimentary Sea Cliffs (CS3)**, **Shingle and Gravel Banks (CB1)** and **Shingle and Gravel Shores (LS1)** as described by Fossitt (2000) as follows, and also have links to the habitats listed under Annex I of the EU Habitats Directive:

#### ‘Sedimentary Sea Cliffs (CS3)

This category includes steep to almost vertical coastal cliffs that are greater than 3 m in height and are formed primarily of unconsolidated material. Sedimentary sea cliffs may comprise mud, sand, gravel or mixtures of these sediments. Stones and large boulders in a matrix of finer material may also be exposed on the cliff face in the case of sea cliffs that are composed of glacial till. Some sedimentary sea cliffs support substantial vegetation cover with a variety of seashore plants; others, especially those that are steep and unstable, may be completely unvegetated.

Links with Annex I: Corresponds loosely to the annexed habitat, ‘vegetated sea cliffs of the Atlantic and Baltic coasts (1230)’.

#### Shingle and Gravel Banks (CB1)

This category includes coastal areas where shingle (cobbles and pebbles) and gravel have accumulated to form elevated ridges or banks above the high tide mark. Most of the rocky material should be less than 256 mm in diameter for inclusion in this category (see Table 2, page 80). Shingle and gravel banks, also known as storm beaches, are subject to intermittent disturbance during storms. Vegetation cover is typically sparse on the more exposed seaward side; the leeward side, or back beach, may be extensively vegetated. Common colonisers of stony banks include Sea Sandwort (*Honkenya peploides*), Annual Sea-blite (*Suaeda maritima*), Sea Beet (*Beta vulgaris*), Rock Samphire (*Crithmum maritimum*), Sea Mayweed (*Tripleurospermum maritimum*), Herb-robert (*Geranium robertianum*) and Cleavers (*Galium aparine*). Lichen and moss cover may be extensive. Heath or scrub vegetation may develop on the more stable and sheltered back beaches. Two rare perennial plants, Sea-kale (*Crambe maritima*) and Oysterplant (*Mertensia maritima*), can also be found on shingle. Note that

<sup>24</sup> Moore, D. and F. Wilson (1999). The National Shingle Beach Survey of Ireland. Survey and report commissioned by National Parks and Wildlife Service.

the strandline is excluded and should be considered under **shingle and gravel shores - LS1**.

*Links with Annex I:* Corresponds to the annexed habitat, 'perennial vegetation of stony banks (1220)'

#### **Shingle and Gravel Shores (LS1)**

This category includes exposed or moderately exposed shores with accumulations of loose, coarse but usually rounded and mobile rocky material. Sediments comprise mainly shingle and gravel, where particle sizes are generally larger than coarse sand and smaller than boulders (mostly 4-256 mm in diameter). Shell fragments may also be common. Coastal accumulations of dead maerl, so called 'coral beaches', are included in this category. The strandline at the upper limit of the shore may be characterised by open communities of terrestrial vascular plants including Annual Sea-blite (*Suaeda maritima*), oraches (*Atriplex* spp.), Sea Sandwort (*Honkenya peploides*), Sea Beet (*Beta vulgaris*) and Sea Mayweed (*Tripleurospermum maritimum*). Two rare perennial plants, Sea kale (*Crambe maritima*) and Oysterplant (*Mertensia maritima*), are associated with shingle shores. Note that elevated ridges and banks of shingle and gravel are treated as a separate habitat in the coastland section (see shingle and gravel banks - CB1). Coarse, mobile sediments typically support little marine life other than opportunist amphipod and isopod crustaceans and oligochaete worms. Ephemeral green seaweeds (*Enteromorpha* spp.) may also be present in summer months.

*Links with Annex I:* This category may contain examples of the annexed habitat, 'annual vegetation of drift lines (1210)'.

In some areas vegetation recorded in and amongst the rock armour includes; *Lavatera arborea*, *Taraxacum* spp., *Raphanus raphanistrum* ssp. *maritimus*, *Anthyllis vulneraria*, and *Daucus carota*. At the base of the cliffs was *Euphorbia portlandica*, *Ononis repens*, *Anthyllis vulneraria*, *Elymus repens* and *Cakile maritima*.

The 2006 study conducted as part of the LAP for Delgany/Greystones identified this area as an area meriting special attention and described it as follows:

'The terrestrial habitat along the cliff top is dry coastal heath and grassy verges, broadly corresponding to Fossit's (2000) classification of HH1 and GS2, the heath occurs as a mosaic grading into scrub (WS1) which is dominated by Bramble (*Rubus fruticosus*), and grasses (*Agrostis canina* and *A. stolonifera*). Gorse (*Ulex europaeus*) also occurs frequently within this area. Land use at the site consists of recreational use. A well-worn path is located along the cliff for much of the site and is regularly used for walking. Severe erosion of the sea cliffs is having an obvious impact on this marginal area. A model of the erosion of these cliffs from the Greystones Harbour EIS (3rd January 2006) estimates that these cliffs will recede 20m at the toe of the cliff, and even more on the upper cliffs, over the next 30 years. As a result this habitat is likely to disappear. Sand martins nest in these cliffs each summer. However the nest site changes annually depending on where the cliffs have been eroded.

Behind the beach at the beginning of the "Cliff Walk" a waste ground area, on the northern edge of the proposed harbour development (329188/213111) is located. This marks the beginning of a scrub (WS1) based, bramble dominated, 30m wide wildlife corridor between the cliff walk and the railway line which extends as far as the football pitch (328978/213314). A substantial gorse dominated enclosed scrub area WS1 (150m x 150m) follows the northern extent of the football pitch that extends from the railway to the sea cliffs. This area marks the location of a stream that flows down from the Redford area'.



This wildlife corridor has been totally destroyed through the development of the marina, housing and associated park in D'Arcy's Field as can be seen when comparing Google Earth satellite imagery of the area from 2005 to the present day.

In 2020 the new public park associated with the marina and housing development was under construction and public access was being diverted outside the fencing associated with same. On the recently disturbed soil at the cliff top a rich diversity of opportunistic wildflowers and arable weeds had become established whilst other more stable areas of dry grassy verge vegetation remain extant rich in wildflowers providing a rich pollinator resource.

Species recorded here in 2021 include; wild carrot, red fescue, sea mayweed, bird's-foot trefoil, ribwort plantain, yarrow, coltsfoot, kidney vetch, yellow clover, red clover, white clover, and tufted vetch.

During the surveys it was noted that a local developer was removing beach material from the shingle beach at the base of the cliffs, which is not only illegal, but also exacerbates the natural erosion processes.



Plate 17. Google Earth Imagery (2005) showing wildlife corridor of scrub adjoining the railway line in D'Arcy's Field identified in 2006.

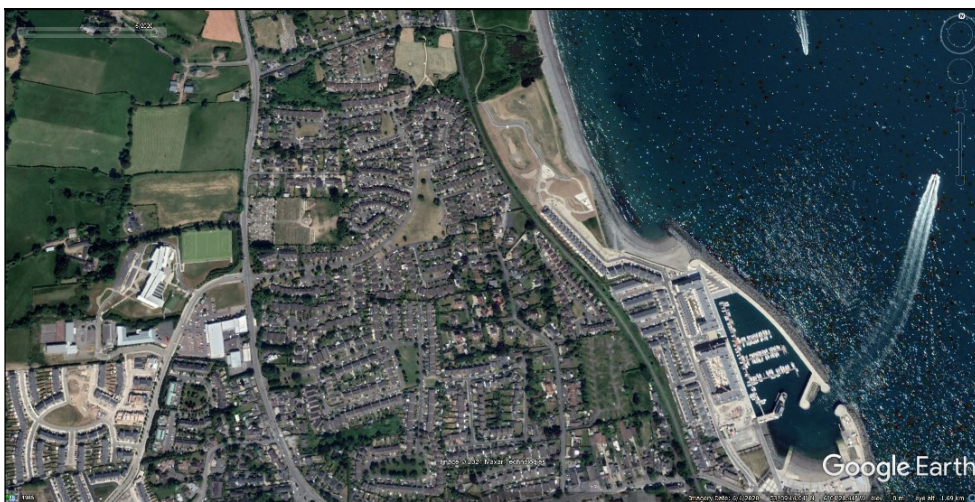
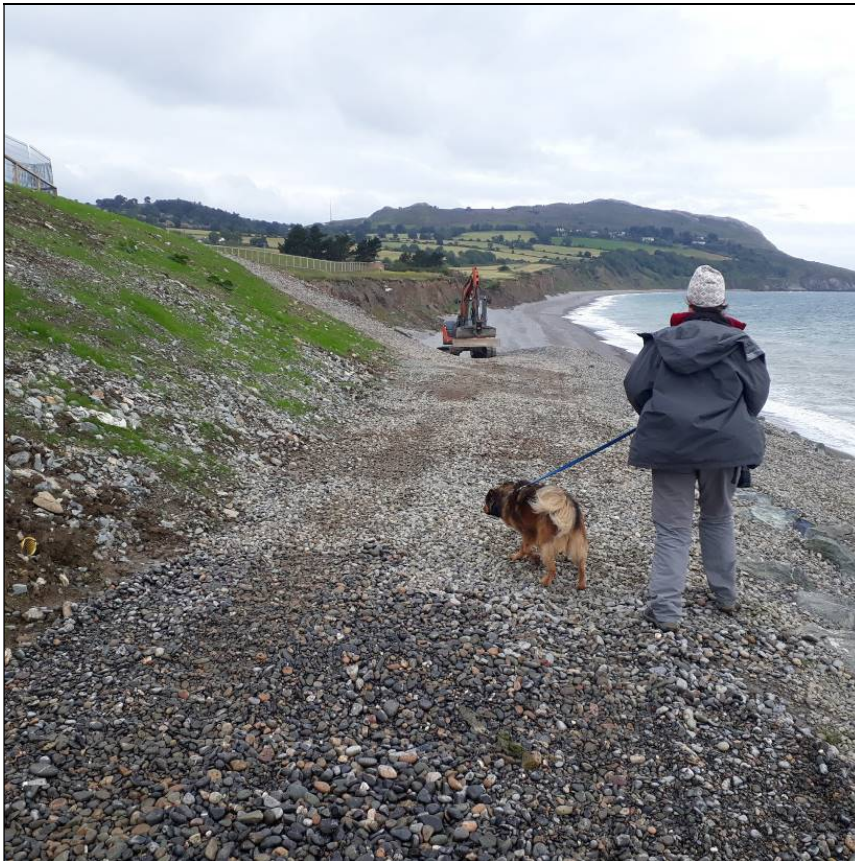


Plate 18. Google Earth Imagery (2020) showing loss of the local biodiversity area identified in 2006.



**Plate 19.** Species associated with disturbed ground had established on the cliff tops adjoining the path following soil disturbance in 2020. Note the trampling pressure on the path.



**Plate 20.** Looking north along the cliffs towards Bray Head. Note the digger illegally removing shingle material from the beach. This appeared to be being used to 'repair' the cliff walk pathway, which had become muddy as a result of high level use during the Covid 19 lockdown.



**Plate 21. Sedimentary Sea Cliffs (CS3), Shingle and Gravel Banks (CB1) and Shingle and Gravel Shores (LS1).**

A population of sand martin breed annually in the sedimentary cliffs here.

This part of the coastline is listed as a Geological Heritage Area - Greystones Beach (see **Appendix 1**).

This area of the coast has been ranked by the Geological Survey Ireland as being of moderate to high vulnerability in their new coastal vulnerability mapping initiative as shown below on **Figure 14**.

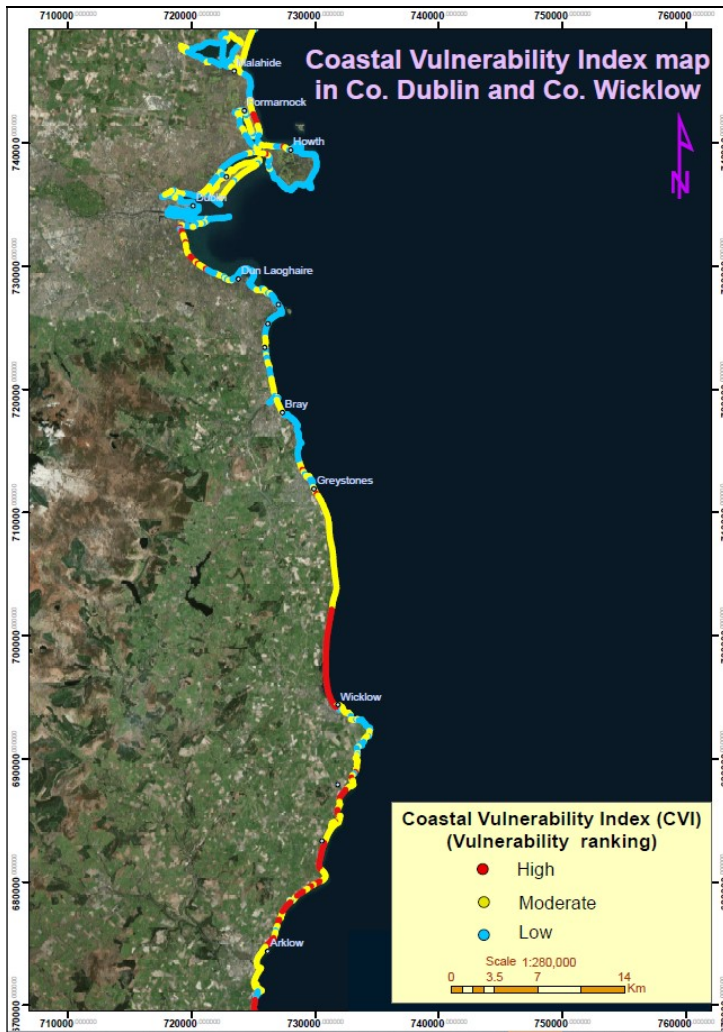


Figure 14. Coastal vulnerability (Geological Survey of Ireland).

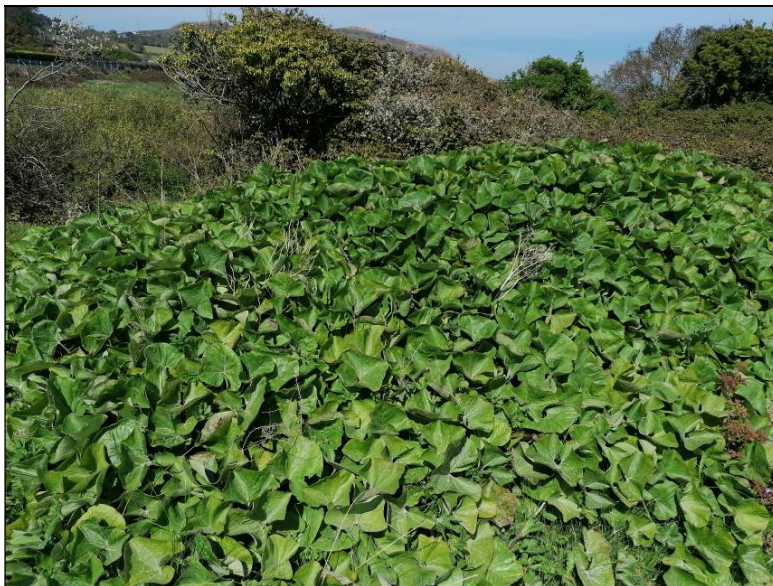


Plate 22. The non-native invasive species winter heliotrope (*Petasites fragrans*) along the Kilruddy Deerpark Stream in D'Arcy's Field should be controlled here.

A study of coastal erosion<sup>25</sup> commissioned by the Office of Public works and completed by RPS Consulting engineers has highlighted the vulnerability of the coastline north of the harbour to erosion as shown on **Figure 15** below.

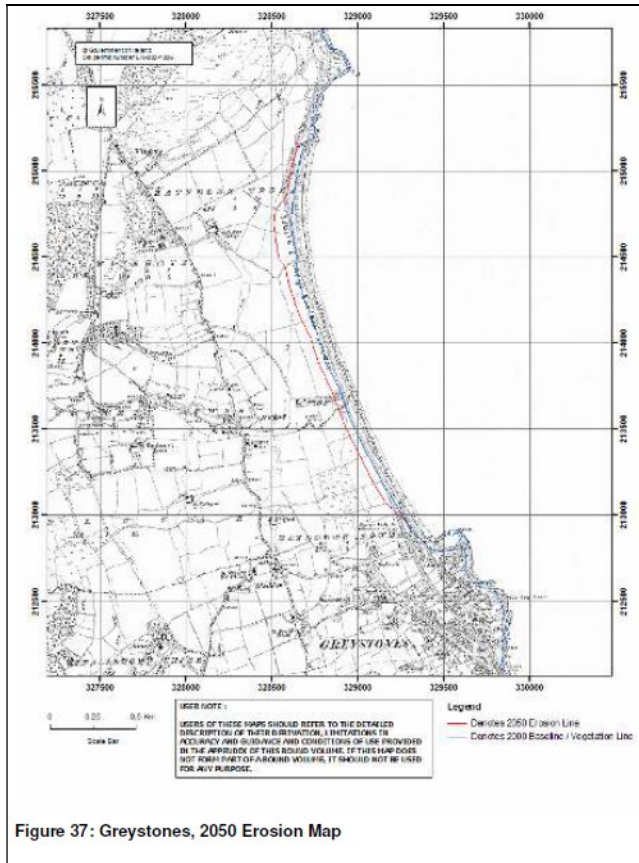


Figure 37: Greystones, 2050 Erosion Map

**Figure 15. Coastal erosion predictions for 2050 (Source: RPS/OPW 2010).**

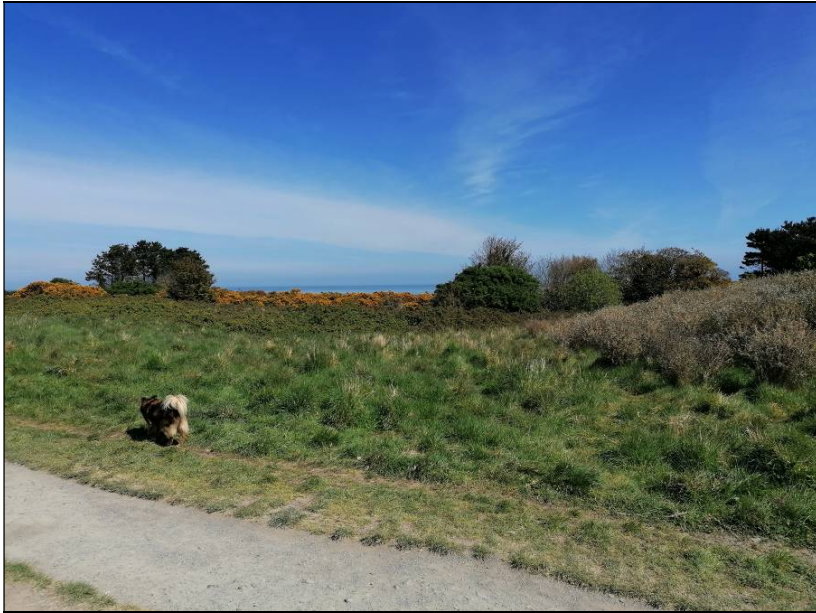
The erosion here is driven from two directions – both coastal and land based.

The latter could be tackled through a change in land use if the intensive agricultural use of the land here ceased and the establishment of coastal heath/scrub dominated by gorse and other native shrubs such as hawthorn, blackthorn, hazel, etc. was encouraged to develop.

This type of habitat can be seen in the environs of the Kilruddery Deerpark Stream as it flows through Darcy’s Field (see **Plate 23** below) and further north along the cliff walk as can be seen in the background of **Plate 21** above. It is critical that this habitat is protected.

Landuse at the rear of the cliffs needs to be considered in both the next Local Area Plan and County Development Plan in the context of climate change and nature based solutions should be considered as part of any coastal erosion measures proposed.

<sup>25</sup> RPS/OPW (2010). Irish Coastal Protection Strategy Study. Phase 2 - South East Coast Work Packages 2, 3 & 4A - Technical Report. IBE0104/June 2010.



**Plate 23.** It is critical that existing areas of scrub at the top of the sea cliffs are protected and enhanced both for their biodiversity value but also to prevent further erosion of the cliff below.



**Plate 24.** Sea mayweed on the cliff tops.



Plate 25. Woodland is beginning to establish within the areas of scrub along the Kilruddery Deerpark Stream in D'Arcy's Field.

#### 3.6.4 Greystones Rocky Shoreline

A series of exposed rocky outcrops jut eastwards into the Irish Sea along the shoreline here running south to the South Beach. At their base are a series of small rocky coves and shingle beaches and overlying them are areas of glacial till. These habitats correspond to the habitats **LR1 Exposed Rocky Shores**, **CS3 Sedimentary Cliffs** and **CB1 Shingle and Gravel Banks**. The former is described by Fossitt (2000) as follows (see **Section 3.6.3** for the other habitat descriptions):

##### 'Exposed rocky shores LR1

This category includes extremely exposed to exposed bedrock and boulder shores of the open coast. The effects of sea spray and wave splash are usually far-reaching and the lichen zone, described above, may be up to 30-40 m wide on the most exposed shores. At the upper extreme, these shores may support some patchy cover of terrestrial vegetation with Thrift (*Armeria maritima*), Sea Aster (*Aster tripolium*) and Red Fescue (*Festuca rubra*).

Snails such as *Littorina saxatilis* and *Melarhaphé neritoides* are common in the supralittoral zone. Below this, exposed rocky shores are typically dominated by communities of Common Mussel (*Mytilus edulis*) and barnacles (*Semibalanus balanoides*, *Chthamalus* spp.). Limpets (*Patella* spp.) are common throughout. Robust algae that can tolerate the physical stresses of wave wash are often abundant on the mid- and lower shore. These include red seaweeds such as *Corallina officinalis* and *Mastocarpus stellatus*, and the brown seaweed, Thongweed (*Himanthalia elongata*). Red seaweeds can form dense turfs that are resilient to wave wash; coralline crusts are also common'.



Plate 26. Looking south along the rocky shoreline in Greystones.

This part of the coastline is listed as a Geological Heritage Area - Greystones (Appinite) (see **Appendix 1**).

Species typical of sea cliffs (sea thrift, sea plantain, stag's horn plantain, red fescue, sea mayweed and sea campion) and neutral/calcareous grassland (red fescue, creeping bent, ladies bedstraw) are recorded here amongst the rocks (and formerly amongst the grassland on the glacial till areas) but these are gradually becoming lost through trampling pressure and the ongoing amenitisation of the area with concrete steps and access points to the beach and more recent upgrades to walking paths, the provision of benches, public sculptures, signage, litter bins, parking laybys and other developments. These actions disturb the natural vegetation and replace it with non-natural surfaces and grassland which has been reseeded with commercial grass mixes, which are then managed as mown amenity grassland or trampled to death when recreational pressures increase.

This is a concrete demonstration of the term 'coastal squeeze' in action.

Coastal squeeze is defined as '*the loss of natural habitats or deterioration of their quality arising from anthropogenic structures or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures.*'





Plate 27. Remnants of natural cliff top vegetation remain.



Plate 28. Trampling pressure resulting in loss of vegetation.

### 3.6.5 Greystones South Beach

The south beach in Greystones extends from the areas of exposed rocky shoreline south to the Three Trout Stream and the boundary of the LAP lands adjoining the Charlesland Golf Course.

The habitats here are classified as a mosaic of **shingle and gravel shores (LS1)/Sand Shores (LS2)/ Shingle and Gravel Banks (CB1)** with some areas of **embryonic dune formation (CD1)**. At the rear of the beach a small ridge of **marram dunes/dune grassland (CD2)** is present. Further south this then extends into an area of gabion cages and rock armoury (**Sea walls, piers and jetties CC1**), which have been installed to protect the railway line. These habitats are described by Fossitt (2000) as follows:

### **'Sand shores LS2**

This category includes exposed to sheltered shores of coarse, medium or fine-grained sand, usually with a very small proportion of gravel and mud (<10%). Most of the sediment particles should range from 0.063-4 mm in diameter for inclusion in this category but scattered shells or stones may occur on the surface. Bedrock and loose rock may also be exposed in places. Intertidal sandflats and strandlines are considered as part of the sand shore, but note that any ridges and mounds of sand should be considered under embryonic dunes - CD1.

Strandlines may support open communities of annual terrestrial vascular plants such as oraches (*Atriplex* spp.), Sea Rocket (*Cakile maritima*), Saltwort (*Salsola kali*) and Annual Sea-blite (*Suaeda maritima*). There may also be some sparse cover of Sand Couch (*Elymus juncea*), Lyme-grass (*Leymus arenarius*), Sea Sandwort (*Honkenya peploides*) and Sea-holly (*Eryngium maritimum*). Lines of decaying seaweed are characterised by communities of beach fleas and sand hoppers. Mobile sand of the upper shore is typically impoverished of animal and plant life. The lower shore is characterised by amphipod (*Pontocrates* spp., *Bathyporeia* spp., *Haustorius arenarius*) and isopod (*Eurydice pulchra*) crustaceans, with some polychaete worms (*Scolecipis squamata*, *Nephtys cirrosa*, *Lanice conchilega*) and bivalve molluscs (*Angulus tenuis*). Eelgrasses (*Zostera* spp.) may colonise sand along the lower seashore.

Links with Annex I: Sand shores may contain examples of the annexed habitats, 'mudflats and sandflats not covered by sea water at low tide (1140)' and 'annual vegetation of drift lines (1210).

### **Embryonic dunes CD1**

Embryonic, or shifting dunes are unstable low hills or mounds of sand that occur on the upper extreme of the littoral zone, or seashore, between the high tide mark and **marram dunes - CD2**, if present. Embryonic dunes rarely exceed 1 m in height and represent the initial stages of sand dune formation. They are largely unvegetated but typically accumulate in situations where Sand Couch (*Elymus juncea*) and Lyme-grass (*Leymus arenarius*) impede the movement of wind-blown sand. Embryonic dunes may support other salt-tolerant plants such as Sea Rocket (*Cakile maritima*), Saltwort (*Salsola kali*) and Sea Sandwort (*Honkenya peploides*). Marram (*Ammophila arenaria*) is generally absent.

Links with Annex I: Corresponds to the annexed habitat, 'embryonic shifting dunes (2110)'.

### **Marram dunes CD2**

Marram dunes are partially stabilised hills or ridges of sand that occur along the seaward edge of the main sand dune system. As the name suggests, these dunes are dominated by the dune-building species, Marram (*Ammophila arenaria*). Marram dunes are larger than embryonic dunes - CD1 and may accumulate to heights of 15-20 m. Vegetation cover is incomplete and loose sand at the surface is subject to wind-blow. Sand Sedge (*Carex arenaria*), Sea Spurge (*Euphorbia paralias*), Sea-Holly (*Eryngium maritimum*), Cat's-ear (*Hypochoeris radicata*) and ragworts (*Senecio* spp.) frequently colonise bare sand between tussocks of Marram (*Ammophila arenaria*). Lichens and mosses are largely absent where the sand is unstable. Marram dunes that are formed primarily of siliceous (acid) sands are known as 'yellow dunes'; those comprising mainly calcareous sands are known as 'white dunes'. Blow-outs or eroded and damaged dune areas with mobile sand are included in this category.

Links with Annex I: Marram dunes correspond to the annexed habitat, 'shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") (2120)'. This includes yellow dunes.

#### **Sea walls, piers and jetties CC1**

This category is used for all coastal constructions that are partially or totally inundated by sea water at high tide, or subject to wetting by sea spray or wave splash. It includes sea walls, piers, jetties, slipways, causeways and other structures associated with ports and docks in urban or rural areas. Any other artificial structures that are exposed along the coast at low tide should also be included: coastal defences or groynes, wrecks, and pipes or pipelines. Most buildings are excluded and should be classified under buildings and artificial surfaces - BL3. Coastal constructions may be made from a range of artificial and natural materials such as rock, cement, metal, wood or plastic. Note that in the littoral and sublittoral zones of sea walls, piers and jetties, the plant and animal communities that develop are similar to those of natural rocky substrata described in the marine section of the classification'.

This part of the coastline is listed as a Geological Heritage Area - Wicklow Greystones Coast (see **Appendix 1**).

The 2006 study conducted as part of the LAP for Delgany/Greystones described this section of the coast as follows:

'The south-eastern boundary of the area begins at the southern boundary of the Charlesland Golf club (330698/210600) on a 20m wide boulder beach (man made). Beside the railway track was boulder clay and gravel (CC1, BL1 and ED2), which was species poor. On the west side of the track is a golf course. Sandy Beach (LS2) starts opposite the golf course (at 330498/210988) and a grass verge 3m wide starts shortly after (at 330356/211181) between the railway track and boulders (BL1/ED2). The distance between the track and the railway at this point is 10m and as a result this area may be prone to sea based intrusion. On the west side of the track is the southern end of the driving range which contained Brent Geese, Oystercatcher and Turnstones.

Towards Greystones marram grass starts on the beach (at 330234/211364) and ends with the boulders (at 330096/211566) as the grassy bank also begins beside the railway. The terrestrial habitat along the majority of railway track behind the boulder defence is grassy verge (GS2). The main vegetation consists of *Taraxicum* sp., *Senecio vulgaris*, *Senecio jacobaea*, *Cirsium vulgare* and *Valeriana officinalis* and various grass species. A small area of marram grass (*Ammophila arenaria*) occurs on the beach to the east of the railway track at the northern edge of the driving range. The area behind railway track (west of track) appears to be slightly damper than the area to the east of the railway track and supports a community dominated by Common reed (*Phragmites australis*), Ivy (*Hedera helix*), Wood avens (*Geum urbanum*) and Butterbur (*Petasites hybridus*). The wildlife corridor area of the track stops prior to Greystones. The beach ends at a rocky outcrop 329873/212268. Up to this point the area is species poor and no noteworthy besides those mentioned above were found.

However, grey seals, protected under Annex II of the Habitats directive are known to frequent the sea in the northern section of this beach. On the boulder clay cliffs (CS3) behind the rocky cove at Carrig Eden (329666/21602) a possible nesting site for sand martins is located. No other noteworthy species or habitats were found in this area'.

The natural processes of coastal building have accelerated on the south beach since the 2006 survey was completed and shows the commencement of natural dune formation. The development of dune habitats is dependent on a complex interaction between controlling winds, sediment supply, and the geomorphology of the nearshore and beach environment. The process begins with the

deposition of the material along the high tide mark on the beach where a community of plants and species form along the drift line as seaweeds and other flotsam and jetsam are deposited in storms and at high tide. This forms the habitat known as **shingle and gravel shores (LS1)**. Growing here is a rich community of orache, sea rocket, sea milkwort and curled dock. These form a niche in which the dune building species marram grass can get a foothold.



**Plate 29. Beach vegetation along the drift line.**



**Plate 30. Embryonic dune formation.**

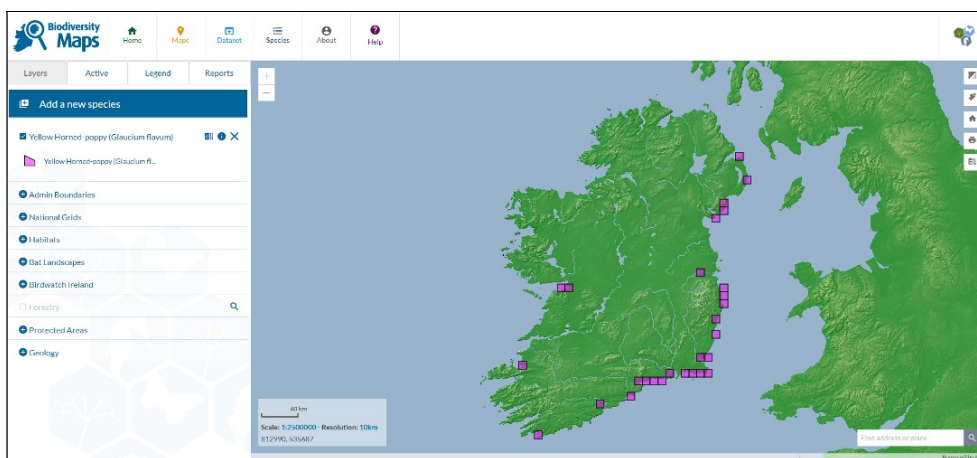
To the rear of these extensive areas larger clumps of marram grass, sea spurge, sea milkwort, sea couch, sea mayweed, wild radish\*, common scurvygrass\* and sea holly have formed.

These correspond to the habitat embryonic shifting dunes (2110) and grade into a low lying area of shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") (2120). **These are habitats listed on the EU Habitats Directive as being of international importance.**

At the back of the beach adjoining the railway is a small shingle ridge with a well established community of red fescue, sea mayweed, sea beet\*, wild carrot\*, bird's-foot trefoil\*, ribwort plantain, kidney vetch, marram grass, rock samphire, yellow horned poppy, yarrow, sea campion, stag's-horn plantain and sea plantain.

This is the natural shingle beach vegetation which is found from here south to Wicklow town and is one of the reasons for designation (qualifying interests) of The Murrrough SAC and is a **habitat listed on the EU Habitats Directive as being of international importance**. The habitat is extensive here in parts and is damaged by trampling pressure and dog fouling.

Many of these species are the wild species from which our common food plants and crops were cultivated from or form important foodstuffs for our livestock. These are highlighted with an asterisk\* above. Of particular interest is the yellow horned poppy, which has a very limited distribution in Ireland, being mostly found on the shingle habitats of the east and south east coasts as can be seen on **Figure 16** below.



**Figure 16. Distribution of yellow horned poppy.**

The non-native species red valerian (*Centranthus ruber*), which is a garden escape, is also present here having spread along the railway, and threatens the vegetation of the shingle habitat. Spikes of New Zealand flax (*Phormium tenax*) are present on the beach at the northern end and should also be removed.

The natural coastal processes required for the formation of this habitat have been interfered with and damaged by the placing of rock armour along the front of this habitat further south.

The beach here is backed by the embankment, wall and boundary fence of the railway line and a large proportion of non-native species are recorded here including the invasive species old man's beard (*Clematis vitalba*), winter heliotrope (*Petasites fragrans*), sycamore, hebe and other garden escapes. These all threaten the native habitats which are present on South beach.



**Plate 31. Heavy trampling pressure on the embryonic dune habitat damages the habitat and reduces the natural protection from coastal erosion that these habitats provide.**



**Plate 32. Rock armour at the southern end of the beach.**



**Plate 33. Red Valerian a non-native invasive species threatens the shingle habitat.**

#### 4. UNDERSTANDING BIODIVERSITY LOSS IN GREYSTONES TOWN

The loss of biodiversity in the Greystones area has been a steady and ongoing one since the mid-1800s, which can be seen in a review of land use as depicted in the Ordnance Survey Ireland mapping and aerial photography for the area.

These losses were increased significantly following the coming of the railway in 1855. The railway station was built on the line dividing the properties of two landowners: the La Touche family of Bellevue House (now in ruins, near Delgany), and the Hawkins-Whitshed family of Killincarrig House (which is now Greystones Golf Club).

##### 4.1 North Greystones - Rathdown Lower

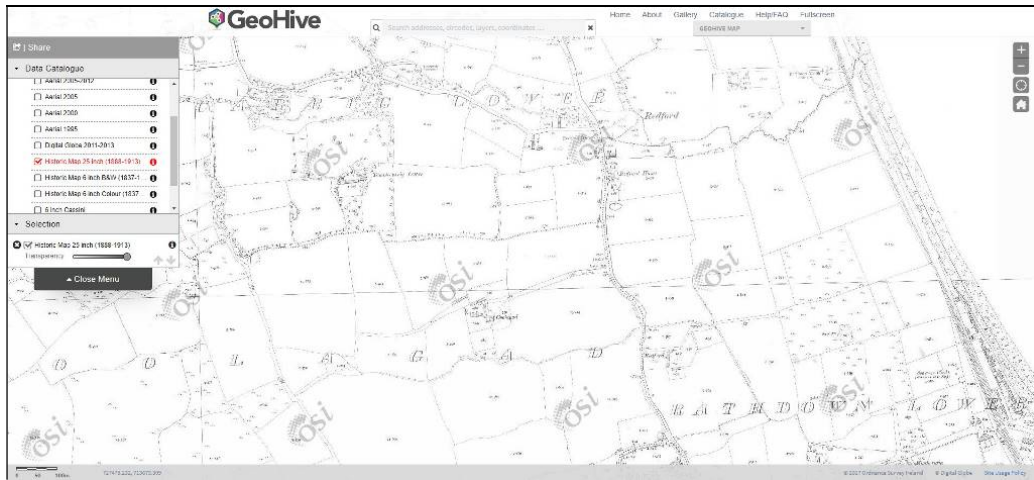


Figure 17. First edition OSI 6" mapping of North Greystones dating from 1837 – note agricultural nature of the lands surrounding Greystones at Rathdown Lower with only a handful of properties and very few residences present.

The La Touche lands north of the railway line were among the first to be developed followed by the lands to the south (Burnaby lands).

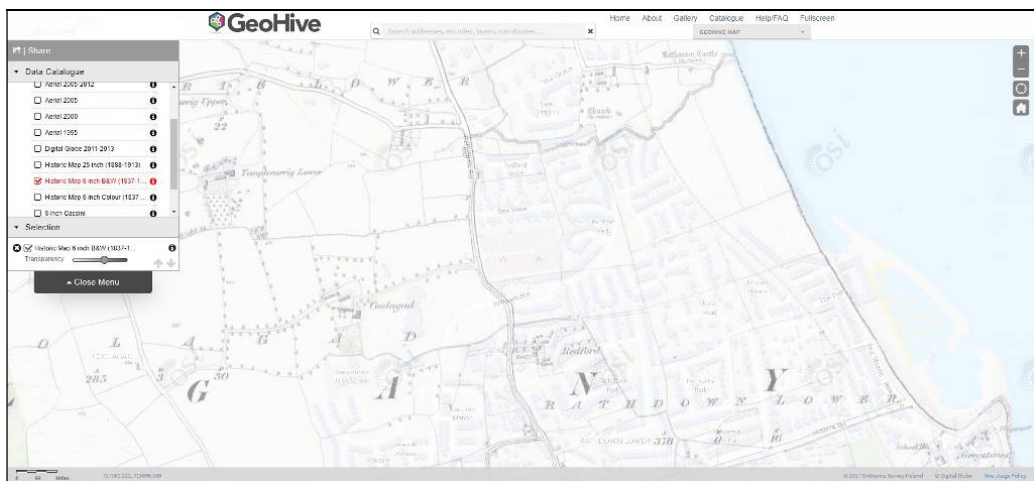


Figure 18. The background imagery in this map shows the almost complete dominance of housing in Rathdown Lower at the present time with subsequent losses of biodiversity.





Figure 19. Aerial imagery of Rathdown Lower showing loss of green spaces, which with the exception of St. Crispin's graveyard and the field to the east, are typically restricted to areas of grassland managed for amenity purposes in housing estates and back gardens.

The few extant areas of importance for biodiversity in Rathdown Lower shown above on Figure 19 are not being managed or protected in a favourable way at present but this is within our gift to do something about and is discussed below in Section 5.

#### 4.2 Greystones

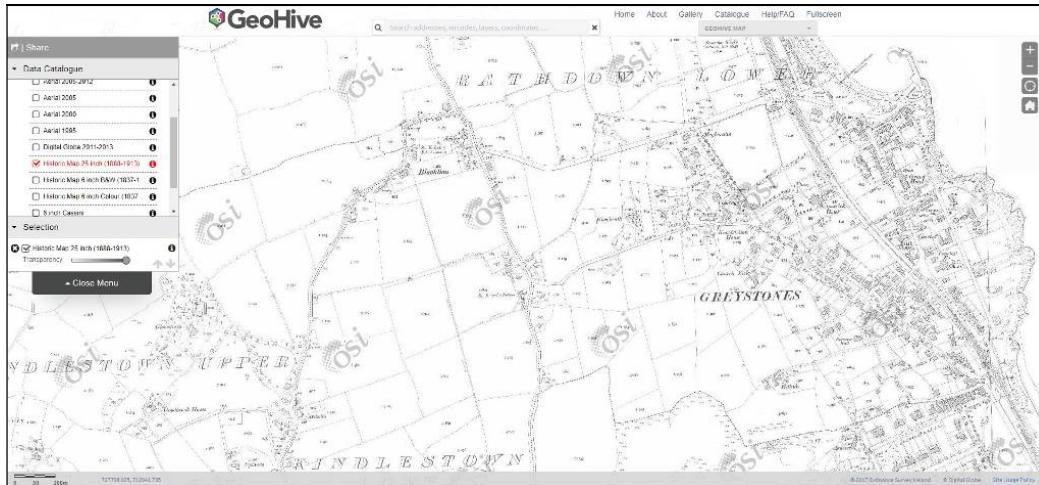


Figure 20. First edition OSI 6" mapping of Greystones dating from 1837 - note agricultural nature of the lands east and south of the harbour with only a handful of properties present and lack of a harbour.

The original harbour at Greystones consisted of just a small natural indentation at the northern end of the 'Grey Stones'. The Greystones Archaeological and Historical Society<sup>26</sup> report that between 1885 and 1897, the people of Greystones campaigned for a harbour and a small pier was constructed in 1888. Soon after the pier was built it became evident that the harbour, whose entrance faced north-northeast was unsafe. Heavy swells rolling into the harbour from the point from which our storms come endangered the boats moored to the wharf or anchored there: in the

<sup>26</sup> <https://www.greystonesahs.org/gahs1/index.php?id=103>

face of a gale they were trapped and couldn't put to sea, to ride out the storm. A groyne was then added but by the 1960s the harbour, having ceased or been unfit to serve any commercial purpose, fell into decay. The groyne disappeared and with it about one third of the pier. Only the boat-slip and the dock remained. Despite belated efforts to encourage it, the tide went against the local fishing industry, which wasn't able to compete with steam trawlers landing their catches much nearer to the Dublin markets. In 1968 the base of the Kish Lighthouse was purchased by Greystones and towed here to give protection to the harbour. Since that time a major marina and housing development has been underway in Greystones.



**Figure 21.** The development of the town around the railway line is clear by the Second edition OSi 6" mapping of Greystones dating from 1888 and the harbour is also evident.



**Figure 22.** The background imagery in this map shows the almost complete dominance of housing at the present time in Greystones with subsequent losses of biodiversity.



Figure 23. Aerial imagery of Greystones showing loss of green spaces, which with the exception of the golf courses, are typically restricted to areas of grassland managed for amenity purposes in housing estates, private gardens, and the areas of rocky coast.



Figure 24. Second edition OSI 6" mapping of Greystones dating from 1888 - note development of the town around the railway station and of the Burnaby.



Figure 25. Aerial imagery of southern Greystones showing green spaces within the golf course, large private gardens, and the south beach.

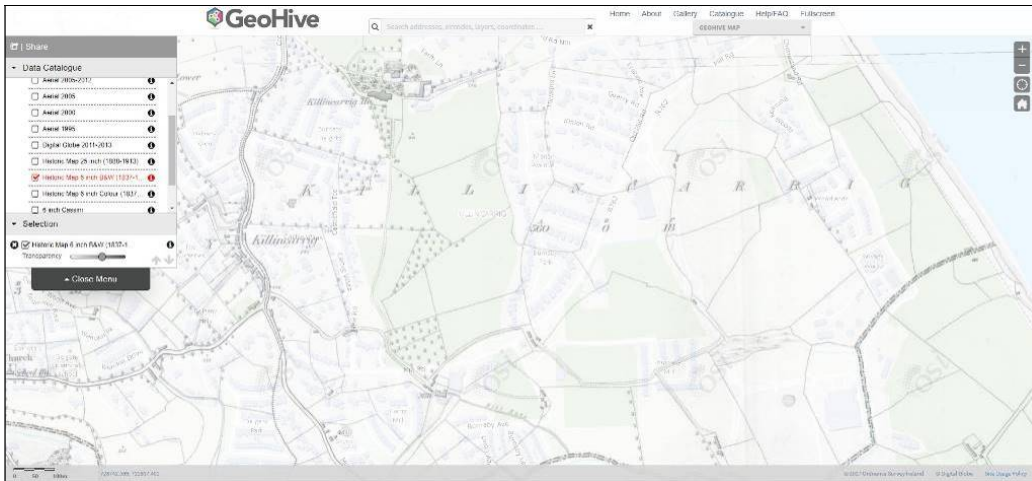


Figure 26. By the beginning of the 21<sup>st</sup> century Greystones had continued to expand in Killincarrig and develop south towards Charlesland.

The main extant areas which support biodiversity within the town are now limited to green spaces within the golf course, large private gardens, and the south beach as shown on Figure 25 above. How we manage and protect these areas is a choice for the people of Greystones.

### 4.3 Southern Greystones – Charlesland

In 2001 I conducted ecological survey work to inform the Environmental Impact Assessment for the proposed housing developments and the IDA business park in Charlesland.

At that time the lands here were wholly undeveloped and consisted of agricultural lands as can be seen in the aerial photographs from the time as shown on **Figure 27** below. By 2005 much of the development of these lands was underway as shown on **Figure 28** below.



**Figure 27. Charlesland in 2000 prior to development (Source: Ordnance Survey Ireland).**



**Figure 28. Charlesland in 2005 as development had commenced (Source: Ordnance Survey Ireland).**

The habitats recorded on the lands proposed for housing were those typically associated with agricultural lands. They included:

- Hedgerow
- Treelines
- Earthen banks
- Spoil and bare ground
- Improved agricultural grassland
- Arable fields
- Amenity grassland
- Dry meadows and grassy verges

- Buildings and artificial surfaces
- Drainage ditches
- Depositing or lowland rivers
- Stone walls and other stone works
- Scattered trees and parkland

The species and habitat information recorded at that time is presented below to give a direct sense of the biodiversity losses in this area.

#### 4.3.1 Charlesland Housing

The habitats recorded on the lands proposed for development for housing in Charlesland and the species they contained in 2001 are described below.

##### 'Hedgerow:

Hedgerows within the site were dominated by ash, both mature trees and sapling ash, hawthorn, blackthorn, bramble, and elder. Wild privet, sapling sycamore, holly, gorse, hazel, dog rose, and sally willow were all frequent. Non-native species present included lilac and buddleja. Silver birch and bittersweet were present in hedgerows 16 and 6 respectively. A variety of willow species along with alder dominated the hedgerow adjacent to Three Trout stream, these included crack willow, osier willow, and sally willow. Climbers within hedgerows included ivy and honeysuckle. A number of mature trees were located within hedgerows, these included beech, oak, horse chestnut, ash, and sycamore.

Hedgerows are numbered 1 - 19 on **Figure 29** below. The species composition of hedgerows is given in **Table 4.3.1** below. The species composition of the hedgerow is divided into dominant and additional species as indicated in columns two and three.

**Table 4.3.1 Hedgerows recorded within the Charlesland Housing development lands.**

Hedge No.:	Dominant Species:	Additional Species:
1	Mature ash, hawthorn, and elder.	Semi-mature ash, hazel, holly, bird cherry, bramble, gorse, honeysuckle, sally willow, sycamore, mature oak.
2	Ash, hawthorn, blackthorn, gorse.	Sally willow, hazel, bramble, ivy, immature sycamore, mature beech, dog rose, holly, mature horse chestnut, elder.
3	Ash, blackthorn, hawthorn, elder, hazel.	Dog rose, gorse, bramble.
4	Hawthorn, blackthorn.	Elder, dog rose, gorse, holly, and bramble.
5	Bramble.	Elder, immature ash.
6	Hawthorn, bramble.	Wild privet, hazel, elder, common privet, bittersweet.
7	Ash, hawthorn.	Willow, mature beech.
8	Hawthorn.	Immature sycamore.
9	Hawthorn, mature and semi-mature ash.	Bramble, elder, holly, gorse, willow.
10	Hawthorn, blackthorn, elder.	Mature ash, semi-mature ash, and wild privet.
11	Ash, blackthorn, hawthorn.	Gorse, elder, sycamore, willow.
12	Mature sycamore and mature ash.	Blackthorn, elder and beech.
13	Hawthorn.	Ash, elder, blackthorn.
14	Mature ash, hawthorn, and semi-mature ash.	Elder, gorse, bramble, hazel, holly, lilac.
15	Willow, alder.	Buddleja, gorse, bramble, ash, holly, elder, hawthorn, blackthorn.
16	Hawthorn, willow, ash.	Blackthorn, dog rose, silver birch, elder, immature sycamore, holly.
17	Willow, gorse.	Immature sycamore and ash, hawthorn.
18	Mature ash, hawthorn.	Elder, bramble.
19	Hawthorn, ash, willow.	Immature sycamore, gorse.
20	Semi-mature ash.	Hawthorn, bramble, dog rose, gorse.

Hedge No.:	Dominant Species:	Additional Species:
21	Hawthorn, elder, blackthorn.	Gorse, dog rose, bramble.
22	Hawthorn, elder, gorse.	Bramble, dog rose.
23	Elder, hawthorn.	Dog rose, bramble.
24	Hawthorn.	Bramble.
25	Hawthorn, mature sycamore, willow.	Gorse, bramble.

All hedgerows within the site were untrimmed with the exception of hedgerow 8, which was dominated by hawthorn with occasional immature sycamore. Hedgerows 1, 2, 3, 4, 5, 6, 7, 12, 14, 16 and 19 all contained a dry ditch at their base, although hedgerows 1, 2, 7, and 19 also contained occasional wet areas. Wet ditches were associated with sections of hedgerows 1, 2, 7, 11, 16, 19, 17 and 25, and along the south side of the main access road next to fields I and J.

Ground flora found beneath hedgerows was typically dominated by dense swathes of nettle and bramble tangles with occasional cow parsley and hogweed. Bush vetch, cleavers, ivy, wood sanicle, primrose, hart's tongue fern, male fern, lady fern, St. John's wort, wood rush, alexanders, and trailing tormentil were also common. Grass and rush species present included false brome, hairy brome and the wood rush.

**Arable:**

Fields A, C, D, I, and J were currently planted with an arable crop, which was unidentified. Field bean was planted in fields F, H and K. Fields O and P were planted with potatoes, whilst field N contained corn. Remnants of previous arable crops such as oats and barley were present along margins in field P. Weed species growing within these crops and along field margins included; fumitory, herb robert, nettle, spear thistle, yellow clover, sorrel, pineapple weed, meadow vetchling, dandelion, creeping buttercup, wild pansy, wild turnip, cut leaved geranium, sun spurge, and common forget-me-not. Field P contained an area which had been recently sprayed with weed killer which made plant identification within this section difficult.

**Improved Agricultural Grassland:**

Uncut improved agricultural grassland was located in fields G and E. Dominant grass species present included; Italian rye grass, Yorkshire fog, creeping bent, red fescue, and sweet vernal grass. This habitat merged with the vegetation of dry meadows and grassy verges.

Herbaceous species such as; red clover, white clover, field horsetail, willowherb, creeping buttercup, bush vetch, meadow vetchling, creeping cinquefoil, broad-leaved dock, curled dock, nettle, creeping thistle, yellow clover, meadow buttercup, wood woundwort, germander speedwell, lesser stitchwort, thyme-leaved speedwell, silverweed, hogweed, and meadowsweet were all occasional within the grassland, particularly near the edges where the grassland merged into the vegetation of the grassy verges and hedgerows.

**Amenity grassland:**

Amenity grassland was located around the residential dwellings within the site, and adjacent to Mill Road and was dominated by meadow grass, white clover, dandelion, daisy, groundsel, spear thistle, ragwort, thyme leaved speedwell, yellow clover/black medick, and ribwort plantain.

**Dry meadows and grassy verges:**

Dry meadows that are rarely fertilised or grazed, and are mown only once or twice a year for hay are now rare in Ireland. Most have been improved for agriculture and this type of habitat is best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected

fields or gardens. The best example of this type of habitat was found in field B, (adjacent to Three Trout stream) and along field margins and roadsides. Fields L, M and Q also showed a diversity of grass species which indicated less frequent fertiliser applications than fields G and E.

Herbaceous species found at the verges of fields and along roadside verges within the site included; nettle, creeping cinquefoil, silverweed, lesser stitchwort, winter heliotrope, dove's-foot crane's-bill, yellow clover, hogweed, ragwort, groundsel, burdock, cow parsley, cleavers, red dead nettle and herb robert. Dandelion, willowherb, bush vetch, ground elder, black medick, alexanders, creeping buttercup, spear thistle, creeping thistle, curled dock, wood woundwort, meadow vetchling, butterbur, germander speedwell, broad leaved dock, St. John's wort, clustered dock and meadowsweet were also common.

Grass species present included Yorkshire fog, creeping bent, common bent, red fescue, cock's foot grass, meadow grass, timothy grass, soft brome, creeping soft grass, tall fescue, Italian rye grass, rough meadow grass, smooth meadow grass, sweet vernal grass, and occasional meadow foxtail.

**Wet grassland:**

This type of grassland was found adjacent to Three Trout stream in field B. Yellow flag, marsh foxtail, creeping buttercup, silverweed, meadowsweet, ladies smock, horsetails and bulrushes were present.

**Buildings and artificial surfaces:**

A number of agricultural buildings and residential dwellings are located on the site. Species found growing on the stone walls of these structures were dominated by ivy and common polypody fern, with occasional buddleja and sycamore saplings.

**Treelines:**

A treeline is a narrow row or single row of trees, which typically occurs along field or property boundaries. Treelines were located along the southern side of the site access road. A mixed variety of immature species were present here - mainly hawthorn and elder with honeysuckle, ivy and dog rose also present. A treeline consisting of mature Scot's Pine specimens were located between fields H and K. A newly planted treeline was located outside the proposed development site within the grounds of the golf course, and will mature with time.

**Scrub:**

An area of scrub was located at the junction of hedgerows 2 and 4. This area was dominated by sally and osier willow, which formed a thicket with blackthorn, gorse, elder, hawthorn and immature ash. This area was well used by animals. A large tangle of bramble and nettles were located at the end of hedgerow 3 growing on a mound formed within field A.

**Earthen banks:**

Earthen banks were located at the base of most hedgerows within the site and were associated with ditch formation. An earthen bank and ditch forms the eastern boundary of the site at the bottom of field C (wet ditch), the northern boundary of fields H and K (wet ditch), and the southern boundary of field J (dry ditch) adjacent to the road. Species typical of earthen banks included; nettle, hogweed, cow parsley, cleavers, bramble, creeping buttercup, bush vetch, alexanders, lesser stitchwort, field horsetail, broad-leaved dock, curled dock, creeping thistle, spear thistle, meadowsweet, common mouse ear chickweed, dog violet, and willowherb. Fern species such as hart's tongue, lady and male fern were also common on earthen banks as was primrose but these species were associated with hedgerow species.



**Soil and bare ground:**

This category includes areas of bare ground that are either very transient in nature or persist for longer periods of time because of ongoing maintenance or disturbance. The ground in and around the farm buildings and the vegetation along track edges fall into this category. Species present include; ribwort plantain, greater plantain, burdock, spear thistle, hogweed, hairy bittercress, white clover, wavy bittercress, silverweed, daisy, buddleja saplings, blackthorn saplings, sycamore saplings, field horsetail, creeping thistle, red clover, nettle, cleavers and hedge mustard.

**Drainage ditches:**

Most ditches within the site were dry but those which contained vegetation (and thus fit into this category) contained few species. Typical species include; horsetails, water mint, wavy bittercress, willowherb, brooklime, and yellow flag.

**Depositing or lowland rivers:**

A small stream (Three Trout Stream) adjoins the northern boundary of the site. It was unvegetated. A small stream/wet ditch was located at the base of hedgerow 25. It was vegetated with great willowherb and brooklime, with meadowsweet and creeping buttercup along the banks.

**Stone walls and other stone work:**

A stone wall, which is overgrown with bramble and occasional hedgerow species, forms the western boundary of the site adjacent to the Greystones - Kilcoole road. This boundary is considered as hedgerow habitat as per the Heritage Council guidelines, but where there was less dense growth wall vegetation was dominated by ivy.

**Scattered trees and parkland:**

A small section of scattered trees were planted for ornamental purposes around the residential dwellings within the site, and within the amenity grassland adjacent to Mill Road.

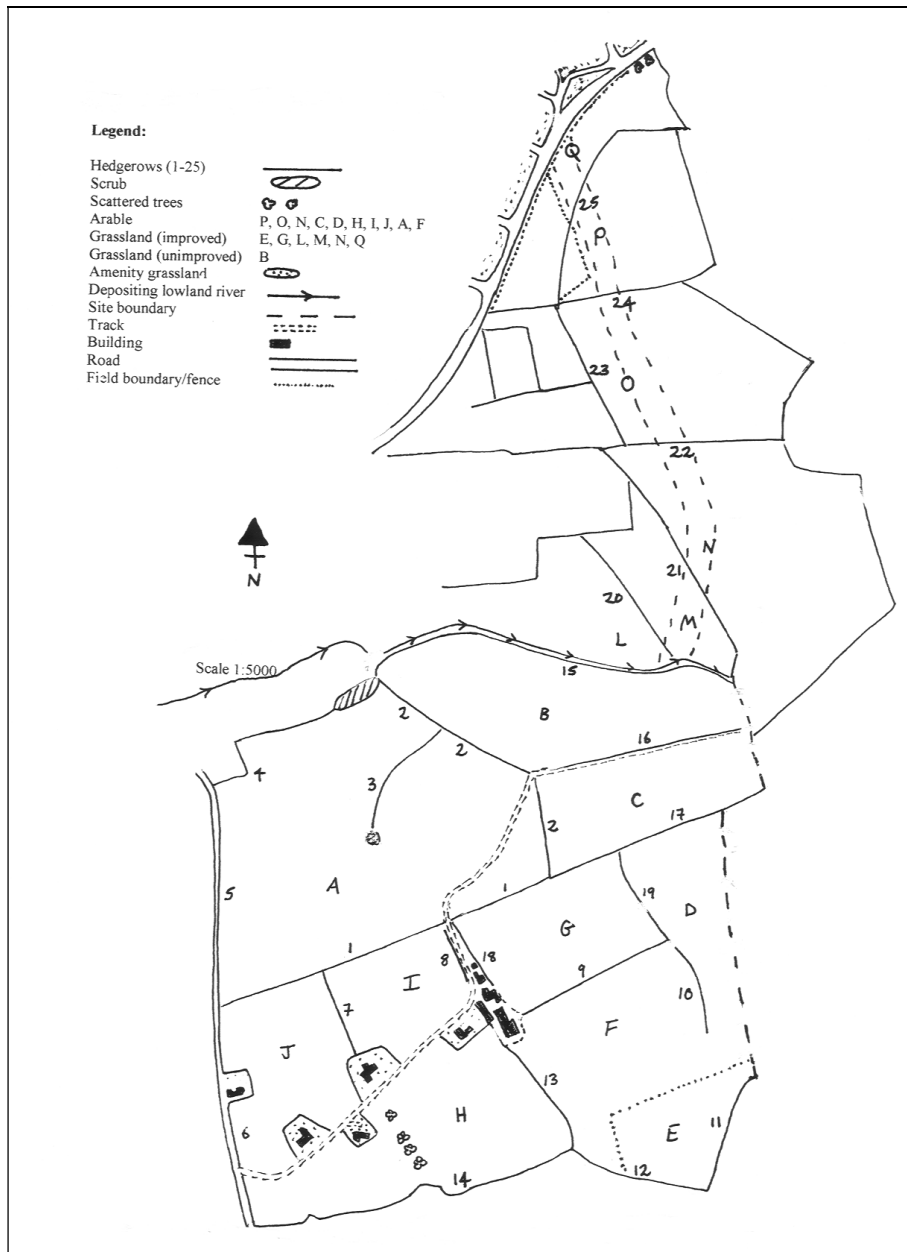


Figure 29. Habitat map of the Charlesland Housing lands in 2001 prior to development.

Only a handful of areas of intact habitat remain intact in the Charlesland lands today from the perspective of biodiversity. These include the lands to the south of the R477, which have developed naturally over time into a rich habitat for wildlife through natural succession.

### 4.3.2 IDA Lands

The habitats recorded on the lands proposed for development for the IDA Business Park and the species they contained in 2001 are described below.

**Hedgerow:**

Hedgerows within the site were dominated by ash, both mature trees and sapling ash, hawthorn, blackthorn, bramble, and elder. Wild privet, sapling sycamore, holly, gorse, hazel, dog rose, and sally willow were all frequent. Non-native species present included lilac, sycamore and beech. Bittersweet was present in hedgerow 2. Climbers within hedgerows included ivy and honeysuckle. A number of mature trees were located within hedgerows, these included beech, oak, horse chestnut, ash, and sycamore.

Hedgerows are numbered 1 – 12 on **Figure 30** below. The species composition of hedgerows is given in **Table 4.3.2** below. The species composition of the hedgerow is divided into dominant and additional species as indicated in columns two and three.

**Table 4.3.2 Hedgerows recorded in the IDA lands at Charlesland.**

Hedge No.:	Dominant Species:	Additional Species:
1	Mature ash, hawthorn, and elder.	Semi-mature ash, hazel, holly, bird cherry, bramble, gorse, honeysuckle, sally willow, sycamore, mature oak.
2	Hawthorn, bramble.	Wild privet, hazel, elder, common privet, bittersweet.
3	Ash, hawthorn.	Willow, mature beech.
4	Hawthorn.	Immature sycamore.
5	Mature ash, hawthorn.	Elder, bramble.
6	Hawthorn, ash, willow.	Immature sycamore, gorse.
7	Hawthorn, blackthorn, elder.	Mature ash, semi-mature ash, and wild privet.
8	Hawthorn, mature and semi-mature ash.	Bramble, elder, holly, gorse, willow.
9	Ash, blackthorn, hawthorn.	Gorse, elder, sycamore, willow.
10	Mature sycamore and mature ash.	Blackthorn, elder and beech.
11	Hawthorn.	Ash, elder, blackthorn.
12	Mature ash, hawthorn, and semi-mature ash.	Elder, gorse, bramble, hazel, holly, lilac.

All hedgerows within the site were untrimmed with the exception of hedgerow 4, which was dominated by hawthorn with occasional immature sycamore. Hedgerows 1, 2, 3, 10, and 12 all contained a dry ditch at their base, although hedgerows 1, 3, and 6 also contained occasional wet areas. Wet ditches were associated with sections of hedgerows 1, 3, 9, and 6 and along the south side of the current main access road next to fields B and A.

Ground flora found beneath hedgerows was typically dominated by dense swathes of nettle and bramble tangles with occasional cow parsley and hogweed. Bush vetch, cleavers, ivy, wood sanicle, primrose, hart’s tongue fern, male fern, lady fern, St. John’s wort, wood rush, alexanders, and trailing tormentil were also common. Grass and rush species present included false brome, hairy brome and the wood rush.

**Arable:**

Fields D, B and A were currently planted with an arable crop, which was unidentified. Field bean was planted in fields F, H and K. Weed species growing within these crops and along field margins included; fumitory, herb robert, nettle, spear thistle, yellow clover, sorrel, pineapple weed, meadow vetchling, dandelion, creeping buttercup, wild pansy, wild turnip, cut leaved geranium, sun spurge, and common forget-me-not.

**Improved Agricultural Grassland:**

Uncut improved agricultural grassland was located in fields C and E. Dominant grass species present included; Italian rye grass, Yorkshire fog, creeping bent, red fescue, and sweet vernal grass. This habitat merged with the vegetation of dry meadows and grassy verges.

Herbaceous species such as; red clover, white clover, field horsetail, willowherb, creeping buttercup, bush vetch, meadow vetchling, creeping cinquefoil, broad-leaved dock, curled dock, nettle, creeping thistle, yellow clover, meadow buttercup, wood woundwort, germander speedwell, lesser stitchwort, thyme-leaved speedwell, silverweed, hogweed, and meadowsweet were all occasional within the grassland, particularly near the edges where the grassland merged into the vegetation of the grassy verges and hedgerows.

**Amenity grassland:**

Amenity grassland was located around the residential dwellings within the site, and was dominated by meadow grass, white clover, dandelion, daisy, groundsel, spear thistle, ragwort, thyme leaved speedwell, yellow clover/black medick, and ribwort plantain.

**Dry meadows and grassy verges:**

Dry meadows that are rarely fertilised or grazed, and are mown only once or twice a year for hay are now rare in Ireland. Most have been improved for agriculture and this type of habitat is best represented on grassy roadside verges, on the margins of tilled fields, on railway embankments, in churchyards and cemeteries, and in some neglected fields or gardens. The best example of this type of habitat was found along field margins and roadsides.

Herbaceous species found at the verges of fields and along roadside verges within the site included; nettle, creeping cinquefoil, silverweed, lesser stitchwort, winter heliotrope, dove's-foot crane's-bill, yellow clover, hogweed, ragwort, groundsel, burdock, cow parsley, cleavers, red dead nettle and herb robert. Dandelion, willowherb, bush vetch, ground elder, black medick, alexanders, creeping buttercup, spear thistle, creeping thistle, curled dock, wood woundwort, meadow vetchling, butterbur, germander speedwell, broad leaved dock, St. John's wort, clustered dock and meadowsweet were also common.

Grass species present included Yorkshire fog, creeping bent, common bent, red fescue, cock's foot grass, meadow grass, timothy grass, soft brome, creeping soft grass, tall fescue, Italian rye grass, rough meadow grass, smooth meadow grass, sweet vernal grass, and occasional meadow foxtail.

**Buildings and artificial surfaces:**

A number of agricultural buildings and residential dwellings are located on the site. Species found growing on the stone walls of these structures were dominated by ivy and common polypody fern, with occasional buddleja and sycamore saplings.

**Treelines:**

A treeline is a narrow row or single row of trees, which typically occurs along field or property boundaries. Treelines were located within hedgerows 1, 3, 5, 9, 10 and 12 and along the southern side of the site access road. A mixed variety of immature species were present here - mainly hawthorn and elder with honeysuckle, ivy and dog rose was also present. A treeline consisting of mature Scot's Pine specimens were located between fields H and K. A newly planted treeline was located outside the proposed development site within the grounds of the golf course, and will mature with time.

**Earthen banks:**

Earthen banks were located at the base of most hedgerows within the site and were associated with ditch formation. An earthen bank and ditch forms the northern boundary of fields H and G (wet ditch) adjacent to the access track, and the southern boundary of field A (dry ditch) adjacent to the road. Species typical of earthen banks included; nettle, hogweed, cow parsley, cleavers, bramble, creeping buttercup, bush vetch, alexanders, lesser stitchwort, field horsetail, broad-leaved dock, curled dock, creeping thistle, spear thistle, meadowsweet, common mouse ear chickweed, dog violet, and willowherb. Fern species such as hart's tongue, lady and male fern were also common on earthen banks as was primrose but these species were associated with hedgerow species.

**Soil and bare ground:**

This category includes areas of bare ground that are either very transient in nature or persist for longer periods of time because of ongoing maintenance or disturbance. The ground in and around the farm buildings and the vegetation along track edges fall into this category. Species present include; ribwort plantain, greater plantain, burdock, spear thistle, hogweed, hairy bittercress, white clover, wavy bittercress, silverweed, daisy, buddleja saplings, blackthorn saplings, sycamore saplings, field horsetail, creeping thistle, red clover, nettle, cleavers and hedge mustard.

**Drainage ditches:**

Most ditches within the site were dry but those which were wet and contained vegetation (and thus fit into this category) contained few species. Typical species include; horsetails, water mint, wavy bittercress, willowherb, brooklime, and yellow flag.

**Stone walls and other stone work:**

A stone wall, which is overgrown with bramble and occasional hedgerow species, forms the western boundary of the site adjacent to the Greystones - Kilcoole road. This boundary is considered as hedgerow habitat as per the Heritage Council guidelines, but where there was less dense growth wall vegetation was dominated by ivy.

**Scattered trees and parkland:**

A small section of scattered trees were planted for ornamental purposes around the residential dwellings within the site'.

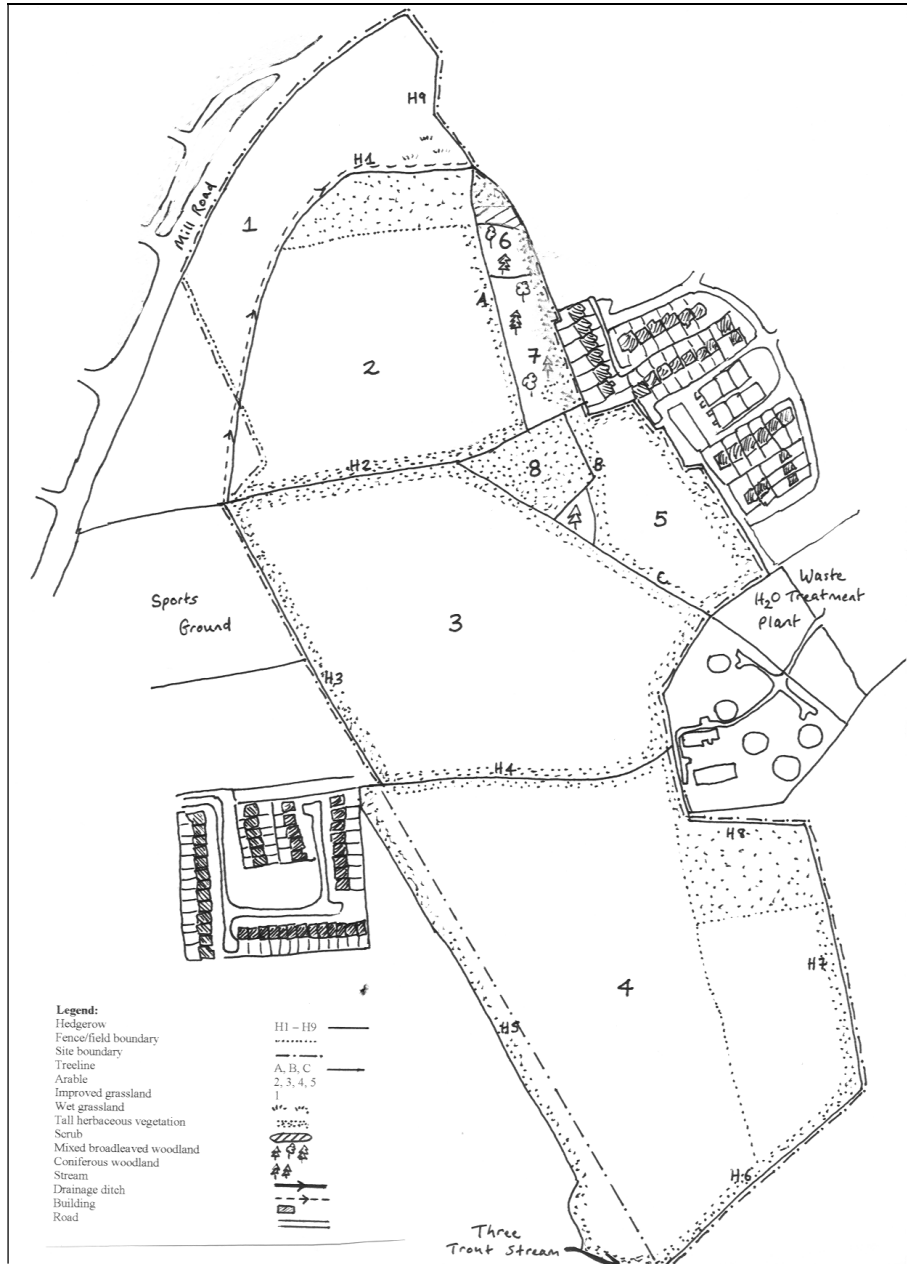
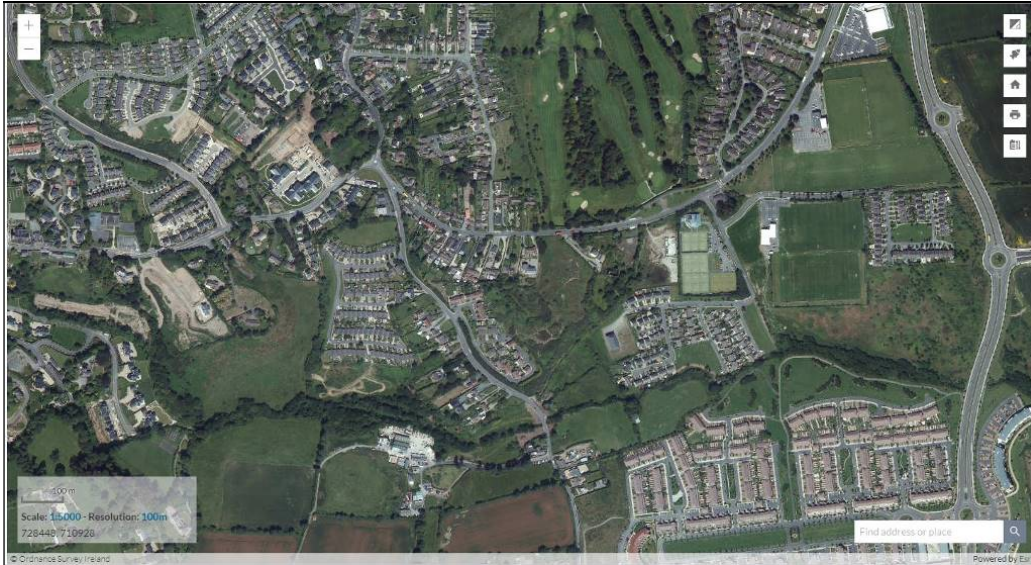
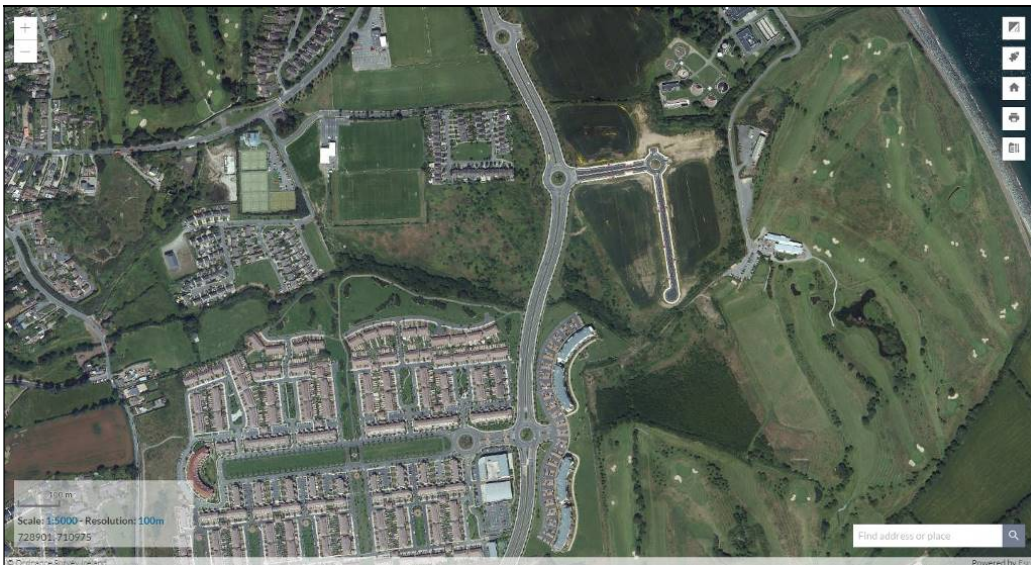


Figure 30. Habitat map of the Charlesland IDA lands in 2001 prior to development.

Many areas of habitat currently remain intact in the Charlesland IDA lands today from the perspective of biodiversity but these are scheduled for development in the near future. These include the lands to the east of the R477, which are still farmed while other areas have developed naturally over time into scrub or emerging woodland - a rich habitat for wildlife through natural succession.



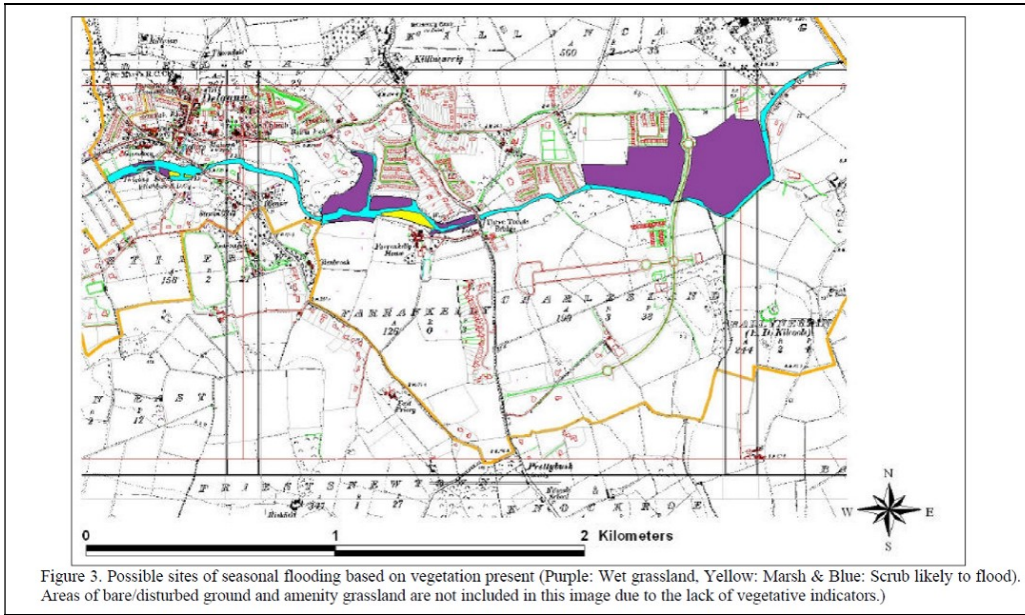
**Figure 31.** Aerial imagery of southern Greystones and Charlesland showing housing developments and the new access road from the N11.



**Figure 32.** The golf course at Charlesland is one of the few extant areas of open space along the coast in this location and it and the adjoining farmland provides an important green space between Kilcoole and Greystones.

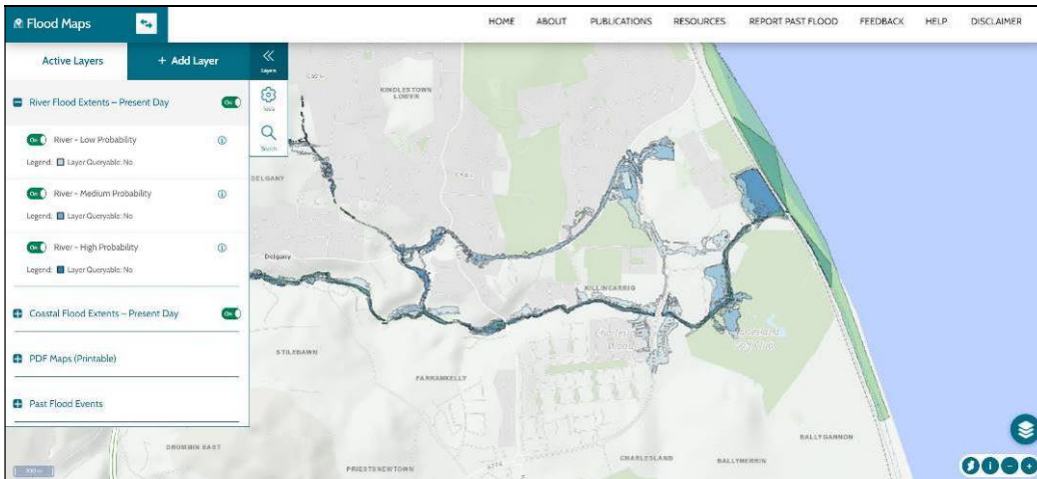
#### 4.3.3 Three Trout Stream Corridor

As described in the 2006 study a number of areas adjoining the Three Trout Stream are prone to flooding. These were mapped within that report as shown on **Figure 33** below.



**Figure 33. Possible sites of seasonal flooding adjoining the Three Trout Stream identified in 2006.**

These are more recently shown on the CFRAMS flood mapping (see **Figure 34** below). The CFRAMS flood mapping database can be queried online at <https://www.floodinfo.ie/map/floodmaps/>.



**Figure 34. Flood extent mapping for the Three Trout Stream showing probability of flood extents from the river (Source: <https://www.floodinfo.ie/map/floodmaps/>).**

Flooding is a natural dynamic of the healthy activity of a river and the severity and intensity of flood events downstream are indicative of land use and changes in landuse upstream. Drainage of wetlands, removal of trees, drainage of fields, intensive agriculture which results in compaction of soil, increases in built surface through construction, restrictions in water flows through culverts, surface water runoff from roads and other hard surfaces all increase flooding events downstream.

The areas of wet grassland habitat adjoining the river in Charlesland, which were identified in 2006, are no longer extant. This habitat and the flooding capacity that it provided have been destroyed through infilling of these lands and the creation of an earthen berm to prevent them from flooding as part of the development of the lands where the United Caps factory is now located (See **Figure 35**).





Figure 35. United Caps factory on the IDA lands at Charlesland.

The 2001 surveys recommended that a permanent fence was erected along the stream to prevent access by the public from the new housing development and reduce disturbance to species using this area. This was implemented by the developer and has been relatively successful in ensuring that the section of the Three Trout Stream adjoining the housing development remained an undisturbed corridor for wildlife. Over the years sections of the fence has been removed and access opened up to the river at a number of locations within Charlesland with subsequent localised trampling of the bankside vegetation and flora.

The 2006 report recommended that a buffer zone/setback of a minimum of 20m from the Three Trout Stream was established and that other habitats of ecological interest were also protected.

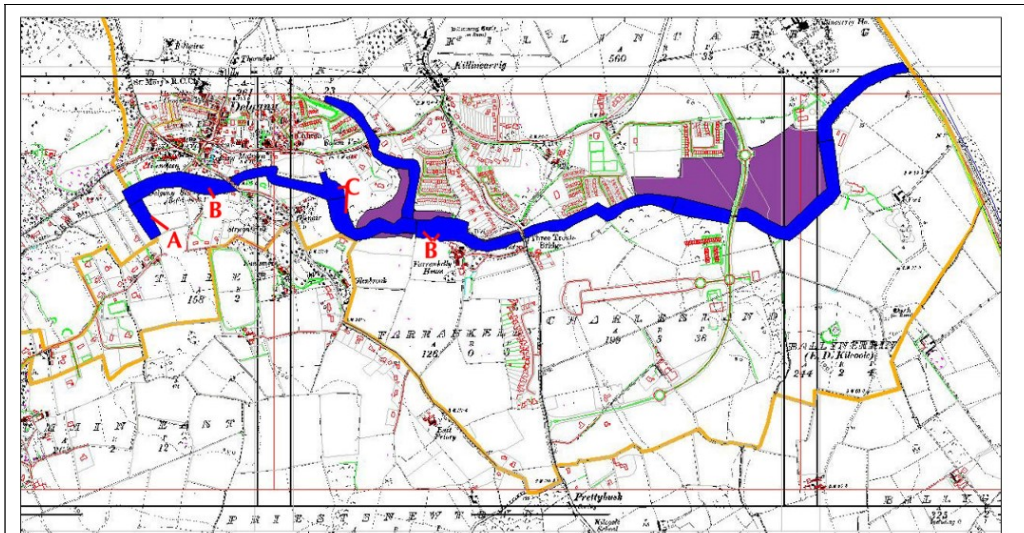


Figure 4. Three Trout Stream with a 20m buffer zone from each bank of the stream (blue) which also includes specific areas of interest A) Glacial meltwater channel B) Marsh areas C) Oak Birch and Holly woodland. Areas of wet grassland (Purple) indicate possible seasonal flooding or a high water table.

Figure 36. Recommended buffer zone along the Three Trout Stream corridor.

Further proposals for the development of lands on the floodplain of the river are currently under consideration in the Greystones area including new council housing on the two undeveloped fields north of the Glenheron and Charlesland Court housing developments. A proposed 'Greenway' between Delgany Village and Greystones further threatens this ecological corridor with a proposed walkway and further amenitisation of the area.

#### 4.4 Lands north of Rathdown towards Windgates/Templecarrig/Belmont Demesne

The extant undeveloped lands north of Greystones form a very important remaining green space between Greystones and the Bray Head SAC. These lands are currently under agricultural use and were partly surveyed in the 2006 survey.

‘An additional survey of the hedgerows and treelines of significance outside local biodiversity areas was carried out. Areas with prominent treelines and areas of native hedgerows that should be preserved were identified’.



Figure 37. Additional survey of hedgerows and treelines identified in 2006.

These lands although rural in nature are beginning to become urbanised and lose their sense of place in the countryside through loss of roadside hedgerows of native species and inappropriate well-meaning planting on the roadside verges approaching Greystones where species such as daffodils, *Photinia* 'Red Robin', Montbretia, Rose of Sharon and other species more suited to suburban settings are being used.

These erode the character of these roadside verges which formerly were dominated by native species which give a sense of rural place as opposed to an urban one.



Plate 34. Approaches to Greystones on the R761 from Windgates (Google Maps Streetview).

#### 4.5 Loss of Rare Plants

Sea Kale (*Crambe maritima*), was previously recorded growing on the shingle beach within the harbour<sup>27</sup> before it was developed. The Greystones population of Sea Kale was first recorded by Wyse Jackson in the 1990s.

In the Flora of County Wicklow Brunker<sup>28</sup> had commented that this species was probably extinct in Co. Wicklow. It was first recorded from Wicklow ‘on The Murrough’ in notes in Threlkeld’s Synopsis Stirpium Hibernicarum (1726) and then by Hart (Cybele II) in 1872 ‘a few plants at the Breaches’. It had not been seen by Brunker. It was subsequently seen by Stelfox in 1959.

The Wicklow populations seem to have recovered since then, and populations of this plant remain extant to the south (at Newcastle beach) where a population was recorded on Leamore Strand and to the north of Greystones (at Bray Head). Both of these were new records made by Dr Tom Curtis and Faith Wilson during the Rare Plant Survey of Co. Wicklow in 2007. The plants in Greystones harbour (27 crowns) were translocated under licence from National Parks and Wildlife Service to join the Newcastle beach population<sup>29</sup>. More recently a small population has been recorded at Killiney Beach as shown on **Figure 38** below.

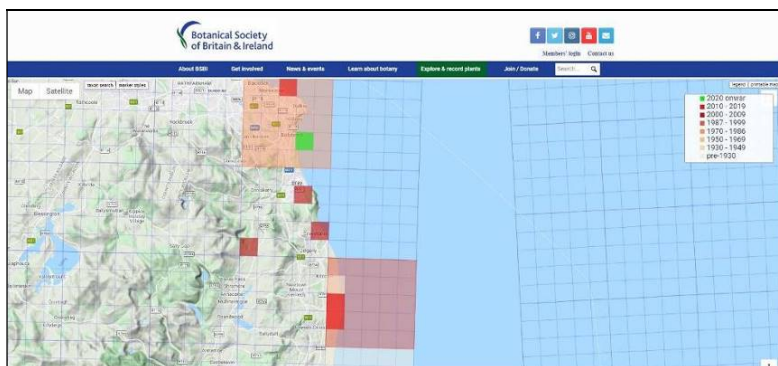


Figure 38. Sea Kale records from the Greystones area (Source Botanical Society of Britain and Ireland).

<sup>27</sup> Curtis, T.F.G. and F.R. Wilson (2008). Field Survey Of Rare, Threatened And Scarce Vascular Plants In County Wicklow. June 2008. Unpublished report for National Parks and Wildlife Service.

<sup>28</sup> Brunker, J. P. (1950). *Flora of the County Wicklow. Flowering Plants, Higher Cryptogams and Characeae*. Dundalgan Press (W. Tempest Ltd.), Dundalk.

<sup>29</sup> Curtis, T.G.F. & Wilson, F.R.G. (2011) Additions and amendments to the flora of Co. Wicklow (H20). *Irish Naturalists' Journal* 31 (2): 141-146.

This species is classed as NEAR THREATENED in the Red Data List of Vascular Plants 2016. This species requires the natural coastal processes of winter storms depositing seed and nourishment to the beach to develop – these processes are interfered with through erosion measures such as sea walls, groynes, rock armour, etc.



Plate 35. Sea Kale (*Crambe maritima*) which was formerly recorded in the harbour before it was developed.

**Pale Toadflax (*Linaria repens*)**

A population of Pale Toadflax (*Linaria repens*) was previously recorded from waste ground near the old dump beside the harbour during the Rare Plant Survey of Co. Wicklow in 2007. This population was also destroyed by the development of the new marina.

This plant had first been recorded here by Brunker in 1944 who recorded it from ‘waste ground by the railway N of Greystones’.

This species is classed as NEAR THREATENED in the Red Data List of Vascular Plants 2016. The BSBI database has further records of the species south of Greystones as can be seen on **Figure 39** below. It is possible that new populations of this plant might occur within the environs of Greystones. It is a species that occurs on rough and waste ground, stony and cultivated land, grassy banks and along railway tracks, usually on dry, calcareous or base-rich soils, so it may reappear.



Plate 36. Pale toadflax (*Linaria repens*) previously recorded in Greystones.

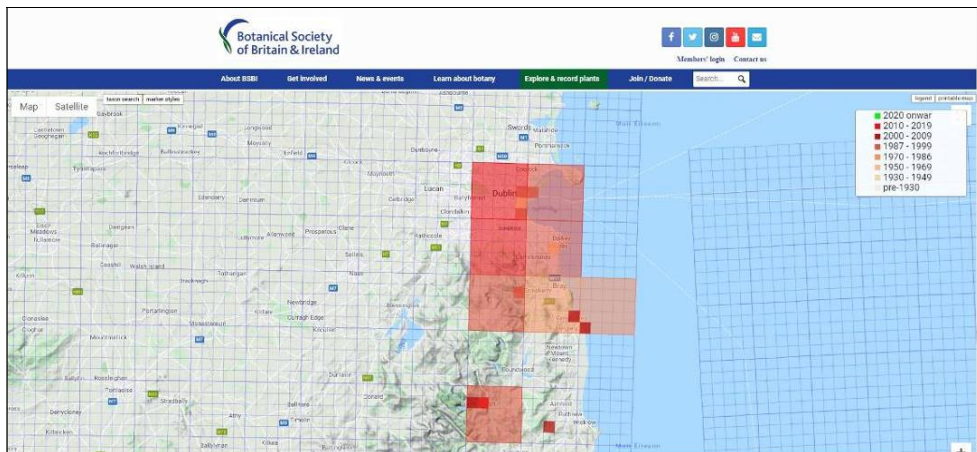


Figure 39. Pale flax records from the Greystones area (Source Botanical Society of Britain and Ireland).

#### 4.6 Planning Control – has it worked for biodiversity?

**The following observations and recommendations were made in the 2006 report in relation to the Greystones/Delgany LAP-Local Biodiversity areas.**

‘With increasing development in the Greystones/Delgany area biodiversity is clearly being reduced and apparently at an alarming rate. When the aerial image from 2000 is compared to the current situation on the ground, which is in turn compared to the proposed planning developments especially in the Charlesland area, there will soon be no real space for wildlife outside garden hedgerows and specific amenity areas in the Greystones/Delgany area. If this is the case one would have to question the existence of any Local Biodiversity Areas in the region. This may not sound significant but it is likely result in the loss of the remaining protected/rare species of resident mammals and birds such as otters and barn owls from the area. This need not be the case and the incorporation of certain recommendations as outlined below, from the planning permission level would assist in the presence of areas that are important wildlife refuges.

- The maintenance of all hedgerows, treelines, scrub and native wooded areas would be deemed essential to preserve biodiversity in the area and their removal should be prohibited. The planting of native hedgerows/trees possibly as a percentage of remaining green areas should be “encouraged”.
- Derelict Buildings that currently possess protected species should be preserved and if possible enhanced to increase their biodiversity value e.g. incorporation of bat boxes, additional nesting sites etc.
- Buffer zones should be placed around areas that are deemed important to wildlife. This includes areas such as Three Trout Stream.
- The planning permission stage would be seen as the key to encourage biodiversity in the remaining areas that are going to be developed in the area.
- A biodiversity education programme should be incorporated into local schools to encourage the enhancing of biodiversity.
- Wildlife corridors should be maintained. This is especially important in relation to streams and infrastructural projects e.g. roads bridges etc. cross wildlife areas.
- Careful consideration needs to be taken in relation to flooding and the location of developments. It is felt that areas that are possibly prone to seasonal/infrequent flooding have been built upon in the past five years near the Three Trout Stream.
- An Expansion of the western edge of the LAP by 40 m to include glacial melt water channel.
- An expansion of the LAP area to include the prominent tree line of Scots Pine on hill east of Drummin (observed from N11 and LAP area).
- Both the Mill brook Mill and Charlesland house have been identified by National Parks and Wildlife Service as areas containing barn owls. As a result these are sensitive areas that require special attention and conservation. This would include prohibiting/ restricting development and possibly enhancing the conservation value of these areas to increase biodiversity. However, the preservation of these areas needs to be in tandem with the conservation of surrounding hedgerows, linear scrub and treelines in order to maintain the value of these sites’.

##### 4.6.1 Local Biodiversity Areas Identified in 2006 – What Has Happened to Them?

A review of the previously identified Local Biodiversity Areas and comments on the current condition and management of same was conducted as part of this survey and are summarised below in **Table 4.6.1**. A number of additional sites (numbers 17 - 28) have been identified as being of local biodiversity interest in 2020/2021 (see **Table 5.2.2 in Section 5.2**).

**Table 4.6.1. Local Biodiversity Areas identified in 2006 and resurveyed in 2020/2021.**

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
1	Seashore to and including railway from south to Rocky outcrop (329839/212244)	CC1 Seawalls Piers and Jettys BL2 Earth Banks ED2 Spoil and Bare Ground LS2 Sandy Beach BL1 Stone Walls and other Stonework FW3 Canals	Presence of habitats listed under Annex I of the EU Habitats Directive  Trampling pressure  Dog fouling  Increased rock armoury  Spread of non-native/ invasive species  Educational opportunity	<b>Decline</b>
2	Rocky outcrop (329839/212244) to Greystones Harbour	LR1 Exposed Rocky Shores CS3 Sedimentary Cliffs CB1 Shingle and Gravel Banks	Sanitisation of area  Biodiversity impacted through development and coastal squeeze  Trampling pressure  Dog fouling	<b>Decline</b>
3	North of Greystones harbour and part of Bray Head SAC	CB1 Shingle and Gravel Banks CS3 Sedimentary Cliffs HH1 Dry Siliceous Heath GS2 Dry Meadows and Grassy Verges	Majority of lands outside the SAC heavily impacted by the marina development and associated housing  Loss of large area of scrub adjoining the railway line  Loss of two rare plant populations  Ongoing cliff erosion  Threat of further rock armour/hard engineering/coastal defence measures	<b>Severe Decline</b>
4	Three Trout Stream and surrounding area (entire length from boundary to the sea)	GS4 Wet Grassland GM1 Marsh WS1 Scrub ED3 Recolonising Bare Ground WN1 Oak Birch Holly woodland WL2 Treelines	Development and loss of functioning floodplain and pressures on same  Trampling pressure  Increase in non-native species	<b>Decline</b>

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
		GA2 Amenity Grassland FW1 Eroding Upland Rivers FW2 Depositing Lowland Rivers BL1 Stone walls and other stonework WL1 Hedgerows	Threats of further amenitisation through development of 'Greenway'  Lighting impacts associated with Greenway  Development of Farrankelly SHD increases pressure on this river corridor  Moves to have fencing removed in Charlesland - this protects the river corridor and was a mitigation measure for the development from the perspective of ecology to prevent degradation of the river corridor and vegetation  Loss of floodplain and riparian habitat at United Caps premises  Barriers to fish passage remain	
4a	Glacial meltwater channel	FW1 Eroding Upland Rivers WL2 Treelines (Enda Mullen NPWS Pers Comm.)	Not surveyed - outside study area	Unknown
4b	Oak, birch and holly woodland bordering Three Trout Stream	WN1 Oak, birch and holly woodland	Not surveyed - outside study area	Unknown
4c	Marsh areas that border Three Trout Stream	GM1 Marsh	Not surveyed - outside study area	Unknown
5	Small stream at Redford Bridge (328170/213579)	FW1 Eroding Upland Rivers WS1 Scrub	Not surveyed - outside study area  Loss of area of scrub based on satellite imagery on Google Maps	<b>Decline</b>



Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
6	Ruins of Captain Tarrants Farmhouse and St. Crispins Cell, Rathdown 328692/213663	WS1 Scrub BL1 Stone walls and other stonework	Inappropriate grassland management  Inappropriate gardening/planting of site  Cutting of ivy on trees  Herbicide use  Lack of ecological supervision and appropriate methodology for works to the river bank have resulted in damage to woodland habitat and adjoining vegetation  Dumping of garden waste is a serious issue  Invasive species  Damage to hedgerow  Loss of hedgerow	<b>Decline</b>
7	Redford Bridge Graveyard 328462/213222	WS1 Scrub BL1 Stone walls and other stonework	Invasive species - three cornered leek  Opportunity to implement less intensive mowing for pollinators  Dumping and disturbance of ground	<b>Decline</b>

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
8	Stream from Redford Bridge to shore 328649/213500 to 328920/213625	FW1 Eroding Upland Rivers WS1 Scrub (20m wide) and 150m wide gorse dominated close to shore BL1 Stone walls and other stonework	Development of 'Dog Park'  Coastal erosion  Invasive species – winter heliotrope, montbretia  No reinstatement of native species to replace loss of scrub along the length of the railway line within the park  Dumping of old remnant building materials at the stream mouth with loss of ecological integrity  (See also comments for upstream section in St. Crispin's)  Important to retain scrub habitats in this area	<b>Severe Decline</b>
9	Small stream South of Redford	FW1 Eroding Upland Rivers WS1 Scrub (20m wide x 30m long)	Important to retain scrub habitats in this area	<b>Stable</b>
10	Greystones Golf Course	WS1 Scrub (Gorse dominated) WD5 Scattered Trees and Parkland	Not surveyed – should be surveyed from the perspective of ecology  Trees here are protected by a Tree Protection Objective in the LAP – will not protect scrub/understorey	<b>Stable?</b>
11	Treeline west of DART carpark (329996/211406)- (329893/211620)	WL2 Treeline	Not surveyed in detail – appears to have lost understorey  Under planting of treeline with native trees should be considered here to ensure long term retention of this feature in the landscape  Trees here are protected by a Tree Protection Objective in the LAP – will not protect scrub/understorey	<b>Stable?</b>
12	Treeline between R762 and sewage treatment works (330062/211014) - (329798/21187) - (329793/211558)	WL2 Treeline	Invasive species recorded at margins in arable fields – winter heliotrope  Not surveyed in detail  Trees here are protected by a Tree Protection Objective in the LAP – will not protect scrub/understorey	<b>Stable?</b>

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
13	Old Mill ruins (329068/210744)	WS2 Scrub BL1 Stone walls and other stonework	ALDI supermarket developed here  Loss of native vegetation and scrub cover  Poor planting design in landscaping from the perspective of biodiversity  Barn owl site permanently lost	Severe Decline
14	Charlesland House and surrounding farm buildings	WS2 Scrub BL1 Stone walls and other stonework BL3 Buildings and artificial surfaces	Not surveyed - outside study area  Some natural rewilding of the lands in the environs of this LBA (south of the R774) has occurred and forms a refuge for wildlife.  Threatened by development	Improvement
15	Treeline at (328520/211598) - (328498/211761)	WL2 Treeline	These lands were surveyed for bats and badger by this author as part of planning compliance with the planning conditions for the development of these lands for housing by the Wood Group. Three species of bats were recorded using the site. These were common pipistrelle, soprano pipistrelle and Leisler's bat. No badgers were recorded here.  The planning process gave no legal protection to the area of grassland, immature woodland or scrub habitats in the development lands (only the trees within the treelines) and these habitats were lost through the provision of a car park for St. Laurence's School and access road to the development.  Ecological input into the landscape design proposals for the development resulted in the retention of scrub and other vegetation on the knoll, the strengthening and creation of a designated wildlife corridor along the western boundary of the site and a detailed lighting design was completed to reduce lighting impacts on wildlife.  Trees here are protected by a Tree Protection Objective in the LAP - will not protect scrub/understorey	Decline

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Biodiversity Assessment (Decline/Stable/Improvement)
16	South of Kindlestown	WS2 Scrub FW1 Eroding Upland Rivers WL2 Treeline	Not surveyed – outside study area  Trees here are protected by a Tree Protection Objective in the LAP – will not protect scrub/understorey	Stable?

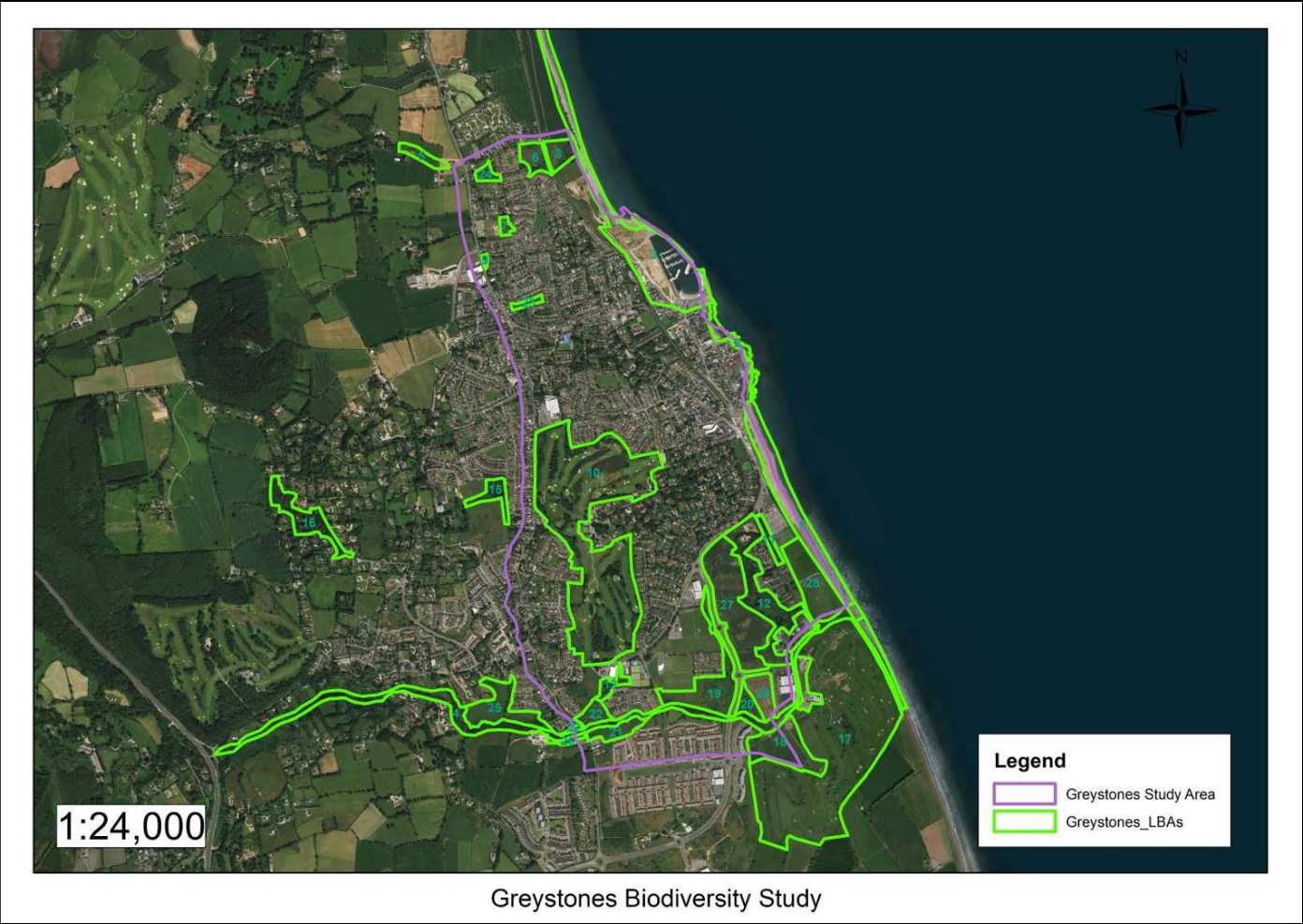


Figure 40. Local biodiversity areas identified/examined in 2020/2021.

## 5. RECOMMENDATIONS FOR 2021-2024

The biodiversity loss in the environs of Greystones in the last twenty years has been an ongoing and relentless one as documented in this report.

### **So what needs to be done and can be done for the biodiversity in Greystones by it's residents and citizens?**

A number of recommendations are presented below in order of importance. The recommendations are made based on firstly the extreme loss of natural biodiversity that Greystones has experienced, and secondly the acknowledgement of the declaration by Wicklow County Council of the Climate and Biodiversity Crisis, the first local authority in Ireland to respond to the crisis in this way. The recommendations are the most immediate and critical ways in which Greystones can respond to both of these.

They can be summarized into 8 categories:

1. Planning Control and Citizen Engagement – these include zoning the extant areas of lands in Greystones with biodiversity still intact as lands with **biodiversity as the core objective for the lands**, which has been done in other local authorities such as Fingal County Council.
2. Implement the Actions for the Biodiversity Areas Identified in 2006
3. Implement the Actions for the Biodiversity Areas Identified in 2020/2021
4. Implementation of Grassland Management Measures which are favourable to biodiversity
5. Protect the Coastal Areas, including reviewing adjacent land uses in light of climate change
6. Restore a Sense of the Wild Back to Greystones
7. Tackle Invasive Species within Greystones
8. Implement individual and garden measures for biodiversity

These priorities are discussed in the detailed recommendations below.

**An overriding theme running through all of these is that of the need for education and improving awareness of biodiversity and understanding the forces driving losses of same.**

## 5.1 Planning Control & Citizen Engagement

The most significant biodiversity losses occur when lands are rezoned in an area through either Local Area Plans or the County Development Plan – this drives development, land prices, development pressures, urbanisation and land use change.

### Nature Needs Your Voice at the Planning Stage

The identification of local biodiversity areas very much focused on linear features in the landscape in 2006 – the idea being that these would ensure connectivity remained between undeveloped areas and provide linear corridors for the movement of wildlife. This can be seen on **Figure 41** below and show that very little land remains undeveloped within the environs of the town.

In the majority of situations even these linear features have now become highly fragmented and reduced in size and even areas that were identified for protection have been degraded.

In retrospect larger areas of habitat need to be identified and conserved for biodiversity and then managed appropriately. Since 2006 there has been no upgrading of the identification of biodiversity and natural heritage requirements in the Delgany/Greystones LAP and both the 2006 – 2012 and 2013 – 2019<sup>30</sup> Local Area Plans relied on that initial 2006 survey although biodiversity has been lost at an increasing rate during the lifespan of both those plans, until it has now reached a critical point.

*The approach in Wicklow to date has been very much focused on the ‘corridor’ approach and now needs to be revised and widened to include ‘Nature Development Areas’.*

Even the corridors identified as Local Biodiversity Areas have not been adequately protected with scrub and vegetative growth removed and developments only required to ensure the protection of trees within boundaries (generally defined by the root protection zones identified by project arborists) as opposed to the creation of functioning ecological corridors.

The remaining areas of open countryside, the two golf courses, woodlands, linear features and coastline within the Greystones environs, as shown in green or green hatching on **Figure 42** below, **must be protected for their biodiversity value in the next Local Area Plan**, which is due for renewal and **not rezoned for development**.

These areas not only need to be protected from development but zoned with **biodiversity as their zoning objective**. This is not the same zoning as ‘active open space’, which as we have seen in Greystones, has led to the amenitisation of areas, manicuring, tidying up and loss of the wild with subsequent impacts on biodiversity or the development of innocuous sounding ‘green routes’ or ‘greenways’ with similar negative impacts.

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<sup>30</sup> Wicklow County Council (2012). Greystones-Delgany and Kilcoole Local Area Plan 2013-2019. Wicklow County Council.

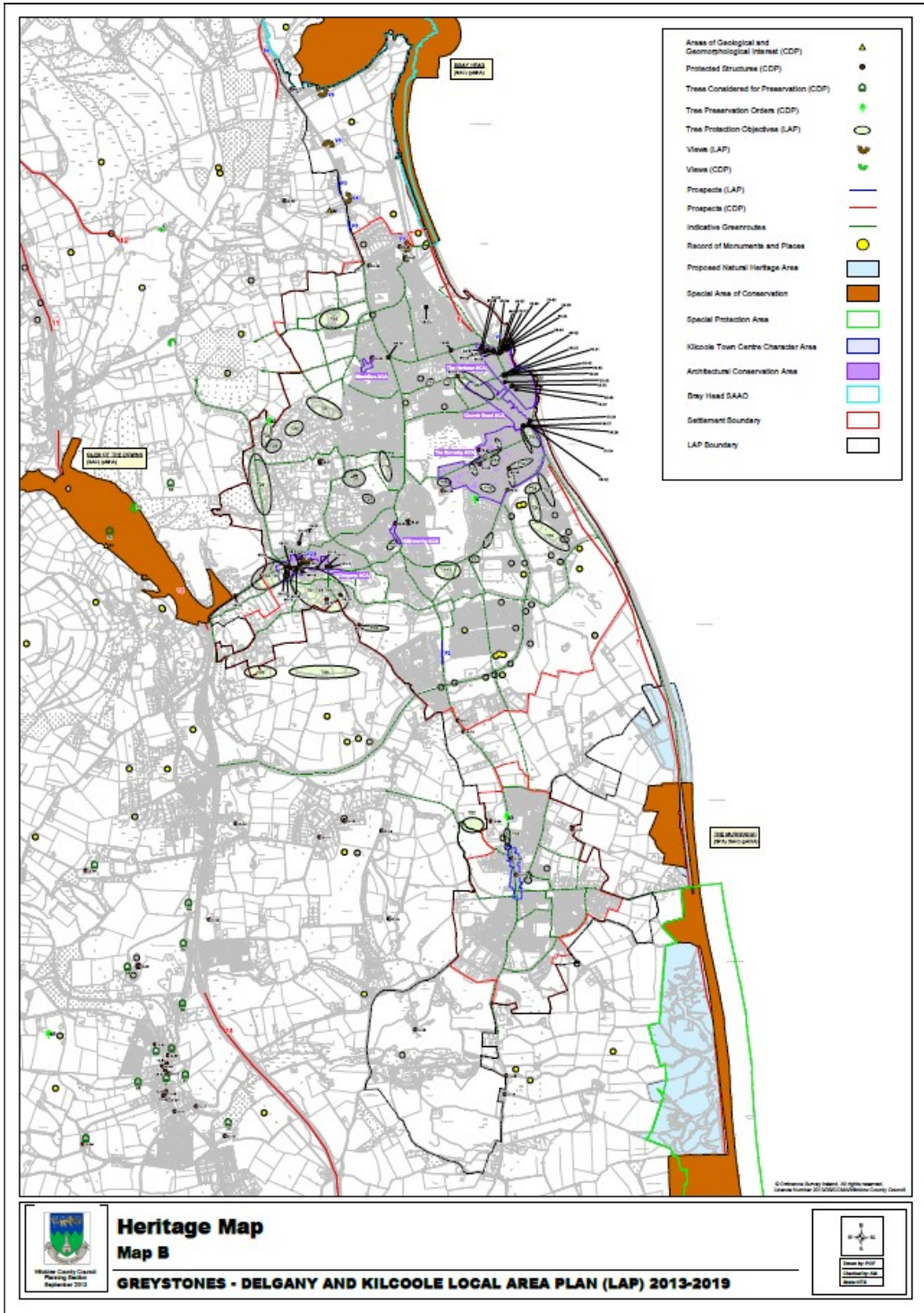


Figure 41. Heritage Map (Greystones - Delgany and Kilcoole LAP 2013 - 2019).



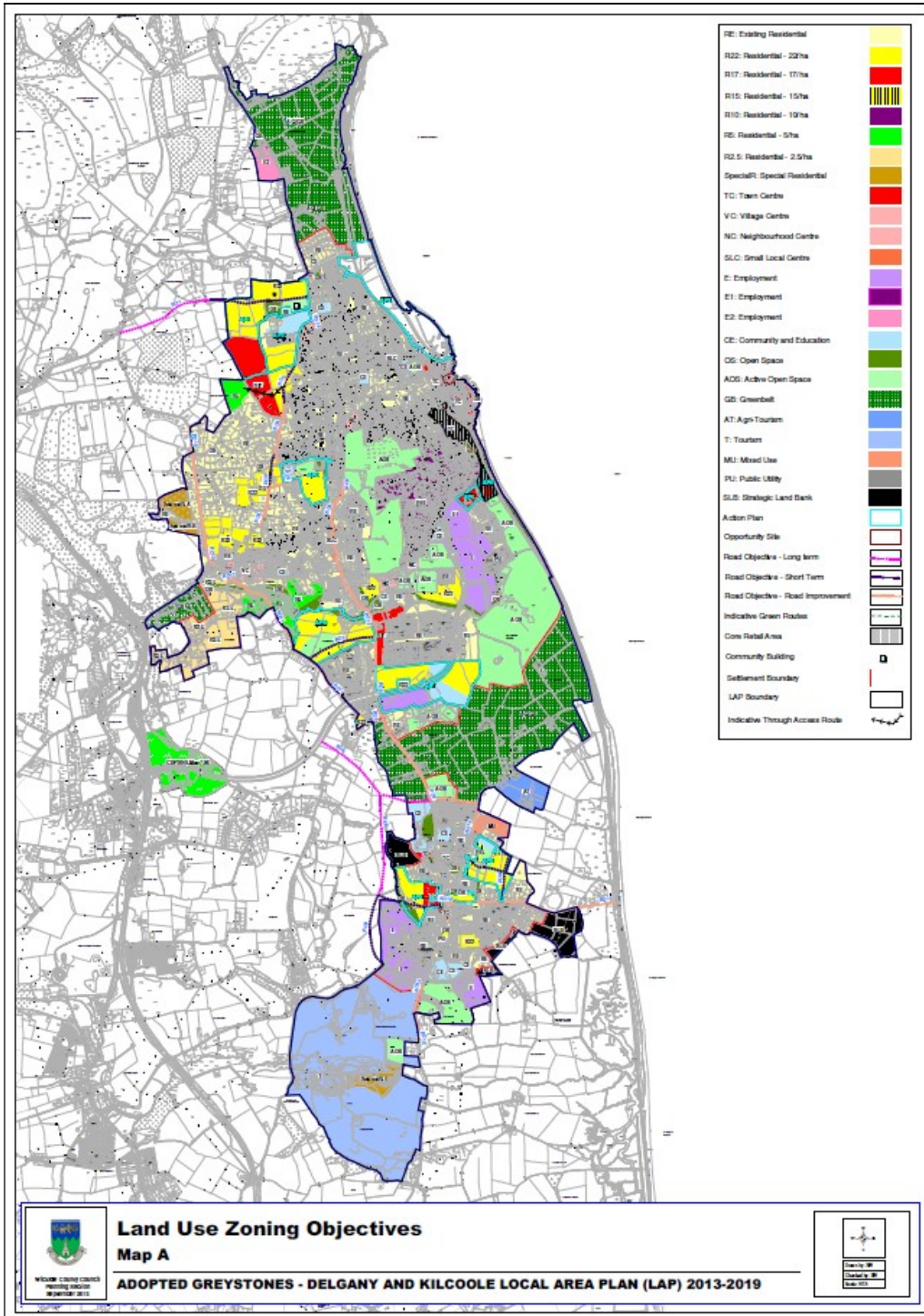


Figure 42. Zoning Map (Greystones - Delgany and Kilcoole LAP 2013 - 2019).

### 5.1.1 Other Local Authority Approaches

Zoning with **biodiversity as the zoning objective** has been successfully done in several other local authorities. In Fingal County Council for example two zoning types are listed in the County Development Plan<sup>31</sup> with biodiversity as the core objective for lands zoned in this way. These are **Buffer Zones** and **Nature Development Areas**.

#### Buffer Zones

**Buffer Zones** in the Fingal County Development Plan cover the lands surrounding the designated nature conservation areas currently protected by national and international nature conservation designations (which in the case of Fingal are mostly large coastal wetlands). The purpose of the **Buffer Zones** is to protect the integrity of the nationally and internationally designated sites and enhance the surrounding lands for the key flora & fauna species. The **Buffer Zones** around the estuaries in Fingal, for example aim to protect existing land uses and may provide opportunities for flood protection, erosion control and amenity use.

#### Nature Development Areas

**Nature Development Areas** are areas where nature conservation can be combined with existing land use such as farming, quarries, golf courses, forestry etc. These areas were selected in Fingal based upon existing wildlife values or potential wildlife values related to habitats and species present on the site.

The **Nature Development Areas** are considered reservoirs of biodiversity in the wider countryside and combined with the corridors and stepping stones allow species to move through the landscape.

Seven habitat types and land use functions covering a range of habitat types have been identified at various locations in the county in Fingal for inclusion in the ecological network under the zoning of **Nature Development Areas**. These include:

1. Farmland
2. Demesnes
3. Golf Courses
4. Parkland
5. Quarries
6. Waterbodies
7. New Forestry

Several examples are provided below from the **Fingal Biodiversity Action Plan<sup>32</sup>** - for golf courses, parkland and open space, farmland and the demesnes (which contain woodland habitat) as they are of relevance to the habitats within the environs of Greystones.

#### 5.1.1.1 Nature Development Areas - Golf Courses

In Fingal County Council the strategy under the Biodiversity Plan to protect biodiversity within these is as follows:

'Golf courses are important elements of the ecological network in Fingal. With some 28 courses in Fingal, golf can make an important contribution to the development of the Fingal Ecological Network. Golf courses are often associated with intensive management practices, but large areas within the course are not used for playing golf. These out-of-play areas often contain pockets of woodland, hedgerows, rough grassland, ponds, wetlands and rivers. These areas can provide valuable habitats for many wildlife species, particularly within an intensively

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<sup>31</sup> Fingal County Council (2017). Fingal County Council County Development Plan (2017 - 2023).

<sup>32</sup> Fingal County Council (2010). Fingal Biodiversity Action Plan 2010-2015.

farmed or urban landscape. Ecological studies on the Links courses in the dunes of Fingal have shown that they harbour many rare and legally protected flora & fauna species. This abundance of rare and protected species make the Links courses key elements of the Ecological Network. No ecological studies have been undertaken on golf courses in the rural hinterland of Fingal, but a UK study on the their effects on local biodiversity found that they can enhance the diversity of birds, beetles and bumblebees of an area by providing a greater variety of habitats than intensively managed agricultural areas in their surroundings (Tanner R. A. & A. C. Gange, 2004).

### **Vision**

The vision for golf courses within the ecological network is that they will be much richer in wildlife than they are today. They will be managed to provide wildlife habitats, while preserving the aesthetics and golfing opportunities that the courses currently provide. Golf courses can have hay meadows full of wildflowers, ponds and wetlands with amphibians and dragonflies, pockets of mixed woodland and hedgerows for birds and bats.

Existing rare and legally protected species will be protected within the golf course. Invasive plant species such as Sea buckthorn will be removed from the golf courses in the dunes where possible. The input of herbicide and pesticides shall be reduced from today's levels and biological control measures are mainly used to tackle pest & diseases. Turf and water management shall be adapted to reduce the requirement for watering and fertilizers. Importantly, golf courses will be recognized for their efforts to protect native wildlife.

### **Strategy**

The County Council wishes to encourage golf course managers to protect, improve and expand natural habitats within their courses by developing management guidelines and ecological management plans for golf courses together with the management teams and members of the golf clubs. The golf courses owned and managed by Fingal County Council such as Elm Green in Blanchardstown and Corballis in Donabate shall be managed in accordance with best ecological practice to provide demonstration sites for other golf courses in Fingal. Where new or existing golf courses are developed or re-developed, the County Council will request the applicants to retain existing hedgerows, ponds, grasslands and wetlands as much as possible and to provide new natural habitats such as outlined in Appendix XIIIf. This will protect the existing wildlife on the site and would enhance the nature conservation role of the golf course within the ecological network'.

**A similar approach and recommendations need to be adopted and implemented to ensure the protection of extant Biodiversity in the Golf Course within the heart of Greystones.**

#### **5.1.1.2 Nature Development Areas - Parkland And Open Space**

In Fingal County Council the strategy under the Biodiversity Plan to protect biodiversity within these is as follows:

'Fingal County Council manages and maintains approx 2000ha of parks and open space. Parkland in the ecological network mainly relates to regional parks that are not demesnes. It includes the Ward River Valley in Swords, Tolka River Valley Park in Dublin 15, the Millenium Park in Blanchardstown, Robswalls Park in Malahide and the Millenium Park in Baldoyle. All these parks are important havens for wildlife in the urban areas. They include large areas of natural habitats such as woodland, grassland and wetlands and the focus of the development of these parks is to protect and improve these habitats. The other smaller open spaces in the county are not included in the Ecological Network, but they are part of the

overall Green Infrastructure of Fingal and the vision and strategy for parkland can therefore also apply to other open spaces.

Regional parks and local open spaces are important amenity resources for the local communities, but can also provide habitats for many native species of flora and fauna. Parks that originate as old demesnes or as agricultural land tend to have a higher diversity of plants and animals compared to green spaces set aside following urban development. While new open spaces are often considered to require manicured lawns, playing fields and some standard trees, there is a growing proportion of the community who appreciate a more natural setting with a rural feel. Some of the more recently established parks have taken this change into account and have been designed to cater for amenity use, while at the same time enhancing the wildlife value by maximising the number of habitat types.

### **Vision**

The regional parks outside the demesnes and other open spaces will offer a lot more wildlife habitat than they currently do. The parks have a maximum diversity of natural habitats and more colour that will be pleasing to the eye, while also catering for a variety of recreational uses. The range of habitats that can be found in the parks include amenity grassland, wildflower meadows, copses of trees, single hedgerows, arable flower mixes, low maintenance herbaceous planting and water features. All these habitats will be developed taking into account maintenance constraints and anti-social activities.

The overall approach to managing the open spaces shall be modified to save money and provide more opportunities for wildlife, but not at the expense of the aesthetics or functionality of the park or open space. Some of the intensively maintained amenity grassland and species poor grassland shall be turned into wildflower meadows and cut once a year. Birds such as Skylark and Meadow pipit and many insects will benefit from these ranker grasslands. Where parkland and open space is located near the coast, shorter amenity grassland will be maintained as feeding sites for Brent Goose.

The use of livestock for maintaining the meadows within the larger parks shall be more common. Grazing would help to make grassland management more sustainable and to provide an additional visitor attraction. The wettest sites within the parks shall be set aside for ponds and other SUDS features to provide a habitat for amphibians.

The local community will play an active role in their local park or open space, either by providing ideas and suggestions at public consultation meetings or by being actively involved in the management and development of the area.

### **Strategy**

Fingal County Council will assess the various regional parks and other open spaces for opportunities for habitat enhancement and habitat creation. The focus in the management strategies for these parks will be on the development of wildflower meadows, copses of trees, arable flower mixtures and low maintenance herbaceous planting schemes. Pond and other wetland features can be added to the wettest parts of the open spaces and/or where SUDS are required.

Public consultation with local communities will play an important role in the change of management of the parks and open spaces. This will ensure that local people can express their ideas and concerns for the parks in their locality and will keep them informed of upcoming developments.

Where park development or other infrastructural works are planned to take place in the regional parks by the County Council or third parties, the natural habitats of good ecological quality shall be avoided'.

**The Charlesland Golf course lands are currently zoned as Active Open Space under the current LAP. There is a local appetite for the protection of these lands for many interests including recreational and the potential for creation of a park for the town. A similar vision and recommendations to those presented above need to be developed, adopted and implemented to ensure that Biodiversity forms the core objective for the future management of these lands.**

### **5.1.1.3 Nature Development Areas - Farmland**

In Fingal County Council the strategy under the Biodiversity Plan to protect biodiversity within farmland is as follows:

'With approx 60% of Fingal covered by farmland, it is clear that farmers have an important role to play in the conservation of habitat and species in the countryside. Many semi-natural habitats and associated plants and animals have been lost from the countryside due to the intensification of farming. Although much of the farmland is of low biodiversity value, the remaining network of hedgerows, pockets of woodland, unimproved grassland and wetlands in the county provide important habitats for many species.

The farming profession is facing challenging times and it is important that farming continues to thrive in Fingal. This is not only for employment and economic reasons, many wildlife species in the countryside are dependant on farmland and certain farming practices. The best opportunities for wildlife enhancement on farms are in the corners and along the edges of the fields, without impacting upon food production and farm incomes. The network of hedgerows provide important corridors for wildlife and will require particular attention to prevent further loss and deterioration.

#### **Vision**

The vision for farmland within the ecological network is that the countryside will be much richer in wildlife than it is today. The edges and corners of fields will be managed less intensively to provide space for wildlife. The least productive parts of the farm would be set aside for wildflower meadows, pockets of woodland, ponds and wetlands. The latter two habitats could be incorporated in the waste water system on the farm and would provide a habitat for amphibians and bats. The hedgerow network will be expanded by planting new hedgerows. The existing hedgerows will be maintained and restored by landowners to provide living stock proof barriers. As a result of these measures, populations of typical farmland species such as Barn Owl, Yellowhammer, Tree Sparrow and Cornflower will recover and expand. Rare farmland species such as Grey Partridge, Corncrake, Lapwing, Prickly Poppy and Small-flowered Crane's bill will return to Fingal as a result of habitat improvement measures. Farmers in Fingal will be recognized for their efforts to protect native wildlife and this will be part of a marketing strategy to promote and sell their produce.

#### **Strategy**

A demonstration farm or groups of farms is to be set up in Fingal to promote wildlife enhancement works in the countryside. The purpose behind this farm is to explore the range of habitat improvement measures possible on a farm, explore the costs associated with these measures, study the wildlife effects and provide a cost-benefit analysis.

To improve the hedgerow resource in the county, the County Council will encourage farmers to plant new hedgerows. Training courses will be provided by Fingal County Council and the Fingal Hedgerow Society to showcase best practice to landowners, contractors and Council staff. The County Council will also assist with sourcing volunteers via the Conservation Volunteers Fingal and Business in the Community to help farmers with carrying out habitat improvement works such as hedgerow management.

The County Council will also seek to establish a small grants scheme to help landowners improve their lands for wildlife.

A Grey Partridge release and conservation project will be explored in more detail as Fingal could provide substantial habitat for this typical arable land bird, which is now restricted to one site in Ireland. This project will also benefit other farmland species.

Where new development is proposed within the farmland, the local authority will request the applicants to retain existing natural features as much as possible and to provide new habitats such as outlined in Appendix XIIe and XIIIf. This will protect the existing wildlife on the site and would enhance the nature conservation role of the lands within the ecological network'.

**A similar approach and recommendations for the preservation of farmland surrounding Greystones needs to be adopted and implemented to ensure the protection of the extant Biodiversity in wider environs of Greystones.**

#### **5.1.1.4 Nature Development Areas - Demesnes**

In Fingal County Council the strategy under the Biodiversity Plan to protect biodiversity within these areas is as follows:

'There are 14 demesnes or estates in Fingal of which Ardgillan, Newbridge, Malahide, Santry and St. Catherine's Demesne are in public ownership. These demesnes comprise of various habitat types such as mature woodland, hedgerows, amenity grassland, wildflower meadows and are home to many flora & fauna species including some protected species.

The demesnes are particularly important in relation to the woodland habitat in the County. Most of the woodland resource in Fingal is located in the demesnes and date from the 1800's. The woodland habitat in the demesnes is often linear and narrow, making these woodlands susceptible to external influences from adjacent land use and to disturbance as a result of recreational use. Management of many woodlands has been limited for the last decades, resulting in the spread of invasive species and not achieving the full ecological potential. Economic use of woodlands such as the production of wood, firewood, forest fruits, etc. is almost non-existent in Fingal, while amenity use of woodlands is limited to walking in the publicly owned Demesnes.

#### **Vision**

The demesnes in Fingal shall be managed and developed with wildlife in mind, thereby turning these areas into biodiversity hotspots. The mature woodlands shall be widened and more varied in both species composition and structure with plenty of old & dead trees for Bats and Pine Marten. Grey Squirrel will be eliminated from the demesnes and Red squirrel will return to these woodlands. Amenity grassland and species poor grassland shall be turned into wildflower meadows and managed with the help of local farmers. The use of cattle for maintaining the meadows shall be more common, particularly in the public

demesnes, to make grassland management more sustainable and to provide an additional visitor attraction.

The wettest sites within the demesnes shall be set aside for ponds and wetland features. Rivers and streams within the demesnes are restored and other wetland features developed alongside them such as reedbed, wet grassland and marsh. The walled gardens can be used for food production and contribute to preservation of Irish vegetables and fruit varieties. The local community shall be actively involved in helping out with the day to day management of their local demesnes such as the maintenance of the walled garden, woodland management, guided tours etc. The products from the demesnes could be marketed as local produce and the demesnes can be marketed as a wildlife and tourist resource in Fingal and abroad.

### **Strategy**

Fingal County Council will assess the demesnes that it manages for opportunities for habitat enhancement and habitat creation, with respect for the historical landscape character. The initial works are most likely to focus on the recommendations made in the Fingal woodland study (McCourt & Kelly 2008) e.g. the removal of invasive species (incl. Grey Squirrel), thinning out of dense stands of non-native stands of conifers, Beech and Sycamore and planting native shrub species to widen the woodlands and create a more gradual woodland edge. The woodland management works shall be carried out in small-scale operations, to allow for natural processes and succession to take place. This will result in diverse and structured woodlands that are attractive to wildlife and to the visitor. The County Council will also explore the possibilities of grazing in the public demesnes and facilitate farmers to take hay from these parks. On private estates Fingal County Council will approach estate owners and see what habitat improvement works could be carried out and establish if there are opportunities for public access, working with the local community or local food production for example. The landowner shall decide what is possible and what is not. Where development is proposed within the private demesnes, the county council shall require the applicant to carry out small scale habitat improvement works as outlined in Appendix XIIe & XIIIf.

**A similar approach and recommendations for the preservation of remnants of old treelines, wooded copses and trees within large residential properties in Greystones needs to be adopted and implemented to ensure the protection of the extant Biodiversity in these habitats within Greystones.**

#### **5.1.1.5 Linear Ecological Corridors - Watercourses**

For linear features which provide ecological corridors such as watercourses these need to be buffered from development in order to function ecologically.

In Fingal County Council the strategy under the Biodiversity Plan to protect these is as follows:

‘Ecological corridors are usually linear landscape features such as rivers, hedgerows, road verges that connect various nature conservation areas. These corridors can also comprise of a series of smaller landscape features such as small woodlands, scrub, grassland, pools and freshwater marshland. They are to be developed in such way that plants and animals can move from one nature conservation site to the other. (Please note that the terrestrial corridors with hedgerows and grasslands are included in the farmland nature development areas and are not described in this section).

The key corridors through Fingal are the rivers, their floodplains and the adjacent farm- or parkland. The general width of the river corridors is 30m on either side of the river. This width is based on the habitat range of the Otter, the top predator in the river habitat. The distance is wider where extensive floodplains occur along the river corridor as identified under the FEMFRAMS project and these areas are included in the corridor too.

This wider corridor allows many other typical species associated with rivers such as the Atlantic Salmon, Brown & Sea Trout, Brook, Sea & River Lamprey, Kingfisher and Dipper to thrive. Many of these species are internationally or nationally protected or endangered species and the robust river corridors provide an important breeding and feeding habitat for these species. By including the adjacent farm and parkland along the rivers within the corridors, these corridors act as linear distribution lines for terrestrial plants and animals too. This means that the corridors not only function as an aquatic/wetland corridor, but they also link important countryside areas rich in wildlife species.

The river corridors play an important role in flood attenuation & protection, erosion control and water quality improvement.

Riparian habitat along the river can absorb a lot of nutrients from the adjacent farmland and will protect the riverbanks from erosion which will help to achieve the targets of the EU Water Framework Directive, while at the same time providing a suitable habitat for river related wildlife species. The floodplains with the wet grassland, scrub and marshland can hold water during heavy rainfall, thereby avoiding flooding in more sensitive urban areas.

### **Vision**

The river corridors in the future shall comprise of a natural meandering river or stream with a mosaic of typical riverside and floodplain habitats on either side of the river such as marshland, alluvial woodland, scrub and wet grassland with pools. Stepping stones of approx. 3-5ha comprising of alluvial woodland, marshland and wet grassland with ponds shall be developed at 2-5km intervals to provide resting and feeding sites for target species such as Otter, Kingfisher and Common Frog.

Straightened river channels will be restored to meandering courses and the water quality will be improved to Good Ecological Status. Where the river is cut off from the adjacent floodplain, the connection will be restored to increase the floodplain capacity of the catchment. The corridors will be free of obstacles such as impassible culverts, weirs or bridges to allow for free movement of wildlife through the countryside and urban areas. The ecological corridors within the urban areas shall also provide space for amenity & educational use and flood attenuation. Where access is provided for amenity purposes, it will be planned in such a manner that the ecological qualities are not impacted upon or improved where possible.

### **Strategy**

The first priority for the development of the ecological corridors is to undertake detailed ecological studies of the Corduff, Ballyboughal, Broadmeadow, Ward, Sluice and Mayne rivers. These studies shall identify the current habitat quality, potential stepping stone sites and the range of measures required to improve the river habitat, the corridor function and water quality of these rivers. The actual improvement works to the river and the corridor is likely to take several decades and is tied in closely with the implementation of the Eastern River Basin Management Plan.



Lands within or adjacent to the corridors in ownership of the County Council shall be maintained and developed to provide a mosaic of typical river valley habitats for all target species associated with the ecological corridors. Fingal County Council together with other nature conservation organisations will seek to lease or acquire the most strategic nature conservation lands within the corridors and work with private landowners to develop and manage the remainder of the lands within the ecological corridors.

The Tolka River Valley, Royal Canal and the Liffey Valley shall be developed as a multi-functional amenity corridor, forming a "GREEN Z" in the Dublin 15 area. Similarly the Ward River Valley and the lower reaches of the Broadmeadow river will be developed for nature conservation and amenity purposes for the community in Swords. Detailed masterplans are to be prepared within the plan period for each of these linear parks. The development of the ecological corridors in the countryside shall focus on flood protection, sustainable farming practices and nature conservation.

A 30m wide buffer zone on either side of the river will extend the length of the river corridor of the Liffey, Tolka, Pinkeen, Mayne, Sluice, Ward, Broadmeadow, Ballyboghil, Corduff, Matt and the Delvin. Previously impacted areas within this setback zone will be restored to a natural state where possible. New development and land-uses that may have a lasting negative impact on the corridor function and movement of flora & fauna shall be located outside the ecological corridors.

**Similar recommendations to those developed in Fingal need to be adopted and implemented in the protection of those linear local biodiversity areas previously identified in the Greystones area and in particular for the Three Trout Stream.**

**The Three Trout Stream, associated river corridor and adjoining lands are the most important area of natural habitat remaining in the Delgany/Greystones area.**

#### **5.1.1.6 Hedgerows, treelines and drainage ditches**

For linear hedgerows, treelines and drainage ditches a **buffer zone of a minimum of 6m from the treeline, drainage ditch or hedge (either side)** is recommended to ensure integrity of biodiversity.

These areas should generally be ungrazed or uncut grassland for much of the year, which provides additional habitat for wildlife.

These areas can be cut on annual rotation to preserve diversity in the sward and reduce dominance by single species such as bramble.

#### **5.1.1.8 A Community Forum for Nature**

It is recommended that the people of Greystones develop a Community Forum for Nature in collaboration with Wicklow County Council and other interested parties to develop a similar vision for the biodiversity of the town in advance of the development of the next LAP. This could be spearheaded by Greystones Tidy Towns and consist of a number of town hall type meetings and engagement sessions.

#### 5.1.1.9 A County Wide Strategy for Nature

**Wicklow County Council and the Irish State have declared and signed up to:**

- **A National Biodiversity Crisis**
- **A National Climate Crisis**
- **The National Pollinator Plan**

These declarations and signatories must no longer just be a photo-opportunity for local politicians and a sound bite for the media but must now be put into real action and delivered upon for both the people and biodiversity of Greystones and the County.

Although the grant for this report was applied for by Greystones Tidy Towns, the responsibility for biodiversity is much wider.

The Biodiversity Plan for Greystones has a much wider remit than just the Greystones Tidy Towns, it is for all Greystonians, their politicians and the future generations.

**County Wicklow has no Biodiversity Officer or Tree Officer and urgently requires same.**

The precedent for a new approach in how a local authority can react to the global biodiversity crisis and implement real change and action on the ground has been demonstrated in Fingal County Council.

**Wicklow County Council, it's staff (particularly in the planning department where the county development plan and local area plans are drawn up, but across the board including the County Manager and all other departments) and the citizens of County Wicklow urgently need to understand the drivers behind biodiversity loss. This will require targeted ecological education and understanding. All parties can then begin to act.**

## 5.2 Actions for the Local Biodiversity Areas in Greystones

### 5.2.1 Actions for the Local Biodiversity Areas Identified in 2020/2021

The 2020/2021 survey identified with several weaknesses in the protections (or lack of protections) given to those identified in the 2006 survey. These are presented in **Section 3.6** and in **Table 4.6.1** in **Section 4.6** above and actions to reverse some of these impacts or prevent further losses need to be implemented in full. Other actions recommended in the 2006 report should also be considered and implemented as appropriate.

**Table 5.2.1 Local Biodiversity Areas identified in 2006 and actions for same.**

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/ Actions
1	Seashore to and including railway from south to Rocky outcrop (329839/212244)	CC1 Seawalls Piers and Jettys BL2 Earth Banks ED2 Spoil and Bare Ground LS2 Sandy Beach BL1 Stone Walls and other Stonework FW3 Canals	Presence of habitats listed under Annex I of the EU Habitats Directive  Trampling pressure  Dog fouling  Increased rock armoury  Spread of non-native/ invasive species  Educational opportunity	Education & Signage  Reduction in trampling through awareness and diversion measures  Control and aim to eradicate invasive/non-native species
2	Rocky outcrop (329839/212244) to Greystones Harbour	LR1 Exposed Rocky Shores CS3 Sedimentary Cliffs CB1 Shingle and Gravel Banks	Sanitisation of area  Biodiversity impacted through development and coastal squeeze  Trampling pressure  Dog fouling	Education & Signage  Reduction in trampling through awareness  Ensure no further removal of vegetation in this area to ensure habitat for rock pipit and black redstart remains
3	North of Greystones harbour and part of Bray Head SAC	CB1 Shingle and Gravel Banks CS3 Sedimentary Cliffs HH1 Dry Siliceous Heath GS2 Dry Meadows and Grassy Verges	Majority of lands outside the SAC heavily impacted by the marina development and associated housing  Loss of large area of scrub adjoining the railway line  Loss of two rare plant populations  Ongoing cliff erosion  Threat of further rock armour/hard engineering/coastal defence measures	Reinstate native hedgerow along the railway line  Protect areas of existing scrub and allow development of same  Review land use as part of coastal erosion defences  Keep an eye out for new populations of toadflax, notify National Parks and Wildlife Service if found and ensure protection of same  Protect sand martin colony
4	Three Trout Stream and surrounding area (entire length from boundary to the sea)	GS4 Wet Grassland GM1 Marsh WS1 Scrub ED3 Recolonising Bare Ground WN1 Oak Birch	Development and loss of functioning floodplain and pressures on same  Trampling pressure	Designation as a Nature Development Area and implement recommendations set out for same include adequate buffer zones  Ensure protection of the extant areas of natural habitat within the

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/ Actions
		Holly woodland WL2 Treelines GA2 Amenity Grassland FW1 Eroding Upland Rivers FW2 Depositing Lowland Rivers BL1 Stone walls and other stonework WL1 Hedgerows	<p>Increase in non-native species</p> <p>Threats of further amenitisation through development of 'Greenway'</p> <p>Lighting impacts associated with Greenway</p> <p>Development of Farrankelly SHD increases pressure on this river corridor</p> <p>Moves to have fencing removed in Charlesland – this protects the river corridor and was a mitigation measure for the development from the perspective of ecology to prevent degradation of the river corridor and vegetation</p> <p>Loss of riparian habitat at United Caps premises</p> <p>Barriers to fish passage remain</p>	<p>three trout stream corridor from development and allow natural processes to occur (i.e. woodland to naturally develop).</p> <p>Protect scrub and immature woodland as bird nesting habitat and publicise same.</p> <p>In consultation with Inland Fisheries Ireland, the East Wicklow Rivers Trust and Wicklow County Council remove the barriers to fish migration on this watercourse</p> <p>Review lighting proposals for the proposed footpath below Farrankelly and determine if they are really necessary. If these must be installed ensure they are wildlife friendly and can be dimmed and then turned off to ensure a dark skies area along the stream.</p> <p>Retain the fencing protecting the river in Charlesland and repair and upgrade the broken fence to provide areas where local children have access to the river.</p> <p>Explore the possibility of restoring the floodplain of the river on the Charlesland Golf Course lands.</p> <p>Control non-native invasive species</p>
4a	Glacial meltwater channel	FW1 Eroding Upland Rivers WL2 Treelines (Enda Mullen NPWS Pers Comm.)	Not surveyed – outside study area	Review and implement the recommendations in the 2019 Delgany Tidy Towns report
4b	Oak, birch and holly woodland bordering Three Trout Stream	WN1 Oak, birch and holly woodland	Not surveyed – outside study area	Review and implement the recommendations in the 2019 Delgany Tidy Towns report
4c	Marsh areas that border Three Trout Stream	GM1 Marsh	Not surveyed – outside study area	Review and implement the recommendations in the 2019 Delgany Tidy Towns report
5	Small stream at Redford Bridge (328170/213579)	FW1 Eroding Upland Rivers WS1 Scrub	<p>Not surveyed – outside study area</p> <p>Loss of area of scrub based on satellite imagery on Google Maps</p>	Conduct field survey of same

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/ Actions
6	Ruins of Captain Tarrants Farmhouse and St. Crispins Cell, Rathdown 328692/ 213663	WS1 Scrub BL1 Stone walls and other stonework	Inappropriate grassland management  Inappropriate gardening/ planting of site  Cutting of ivy on trees  Herbicide use  Lack of ecological supervision and appropriate methodology for works to the river bank have resulted in damage to woodland habitat and adjoining vegetation  Dumping of garden waste is a serious issue  Invasive species  Damage to existing hedgerow  Loss of hedgerow	Implement the recommendations in the report prepared in 2018  See suggestions below in Section 5.3 and elsewhere in the report in relation to the grassland management  Remove dumped garden waste and educate locals regarding same - does a council service need to be provided for collection of same in the community?  Stop herbicide use  Allow the areas damaged during the works to revegetate naturally and protect from trampling and dumping  Tackle the spread of alexanders within this area  Strengthen and reinstate native hedgerow around perimeter  Stop cutting ivy on trees  Erect a barn owl box in of Captain Tarrants Farmhouse - this building was previously roofed in 2006 but had been vandalised
7	Redford Bridge Graveyard 328462/213222	WS1 Scrub BL1 Stone walls and other stonework	Invasive species - three cornered leek  Opportunity to implement less intensive mowing for pollinators  Dumping and disturbance of ground	Implement pollinator friendly mowing regime  Tackle three cornered leek

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/Actions
8	Stream from Redford Bridge to shore 328649/213500 to 328920/213625	FW1 Eroding Upland Rivers WS1 Scrub (20m wide) and 150m wide gorse dominated close to shore BL1 Stone walls and other stonework	Development of 'Dog Park'  Coastal erosion  Invasive species – winter heliotrope, Montbretia, alexanders  No reinstatement of native species to replace loss of scrub along the length of the railway line within the park  Dumping of old remnant building materials at the stream mouth with loss of ecological integrity  (See also comments for upstream section in St. Crispin's)  Important to retain scrub habitats in this area	Remove building materials at the stream mouth and replant native species here to restore scrub  Tackle invasive species  Replant native species along railway line within the park to restore scrub  Retain areas of scrub and allow natural processes to continue  No further sanitisation and amenitisation of this area
9	Small stream South of Redford	FW1 Eroding Upland Rivers WS1 Scrub (20m wide x 30m long)	Important to retain scrub habitats in this area	Protect scrub as bird nesting area and explain why it is important
10	Greystones Golf Course	WS1 Scrub (Gorse dominated) WD5 Scattered Trees and Parkland	Not surveyed – should be surveyed from the perspective of ecology  Trees here are protected by a Tree Protection Objective in the LAP	Engage with the Greystones Golf Course to see if biodiversity measures can be implemented
11	Treeline west of DART carpark (329996/211406)- (329893/211620)	WL2 Treeline	Not surveyed in detail – appears to have lost understorey  Under planting of treeline with native trees should be considered here to ensure long term retention of this feature in the landscape  Trees here are protected by a Tree Protection Objective in the LAP	Survey and determine appropriate management (i.e. if underplanting is required/suitable)  Ensure that not just the trees are protected but also the scrub and other understorey species
12	Treeline between R762 and sewage treatment works (330062/211014) - (329798/21187) - (329793/211558)	WL2 Treeline	Invasive species recorded at margins in arable fields – winter heliotrope  Not surveyed in detail  Trees here are protected by a Tree Protection Objective in the LAP	Survey and determine appropriate management  Ensure that not just the trees are protected but also the scrub and other understorey species

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/ Actions
13	Old Mill ruins (329068/210744)	WS2 Scrub BL1 Stone walls and other stonework	ALDI supermarket developed here  Loss of native vegetation and scrub cover  Poor planting design in landscaping from the perspective of biodiversity  Barn owl site permanently lost	Discuss biodiversity action plan for Greystones with ALDI and see if sponsorship could be sought for measures such as barn owl boxes  Improve existing planting with the creation of a native hedgerow
14	Charlesland House and surrounding farm buildings	WS2 Scrub BL1 Stone walls and other stonework BL3 Buildings and artificial surfaces	Not surveyed – outside study area  Some natural rewilding of the lands in the environs of this LBA (south of the R774) has occurred and forms a refuge for wildlife.	Try to protect from future development
15	Treeline at (328520/211598) - (328498/211761)	WL2 Treeline	These lands were surveyed for bats and badger by this author as part of planning compliance with the planning conditions for the development of these lands for housing by the Wood Group. Three species of bats were recorded using the site. These were common pipistrelle, soprano pipistrelle and Leisler's bat. No badgers were recorded here.  The planning process gave no legal protection to the area of grassland, immature woodland or scrub habitats in the development lands (only the trees within the treelines) and these habitats were lost through the provision of a car park for St. Laurence's School and access road to the development.  Ecological input into the landscape design proposals for the development resulted in the retention of scrub and other vegetation on the knoll, the strengthening and creation of a designated wildlife corridor along	Anti-social behaviour has damaged trees here in the past  Engage with local community and youth and kids especially to develop sense of value around the retained habitats

Site No.	Townland/site name	Habitats present in 2006	Additional comments/observations in 2020/2021	Observations/Recommendations/Actions
			<p>the western boundary of the site and a detailed lighting design was completed to reduce lighting impacts on wildlife.</p> <p>Bat boxes and bird boxes are to be erected here by the developer</p> <p>Trees here are protected by a Tree Protection Objective in the LAP</p>	
16	South of Kindlestown	WS2 Scrub FW1 Eroding Upland Rivers WL2 Treeline	<p>Not surveyed – outside study area</p> <p>Trees here are protected by a Tree Protection Objective in the LAP</p>	<p>Survey and determine appropriate management</p> <p>Ensure that not just the trees are protected but also the scrub and other understorey species</p>

### 5.2.2 Actions for the Local Biodiversity Areas Identified in 2020/2021

A number of additional local biodiversity areas were identified in 2020/2021 (see **Table 5.2.2** below) and actions for these are set out below.

**Table 5.2.2 Local Biodiversity Areas identified in 2020/2021 and actions for same.**

Site No.	Name	Habitats Present of Ecological Value	Observations/Recommendations/Actions
17	Charlesland Golf Course	FL8 Pond WS1 Scrub WS2 Immature Woodland ED3 Recolonising Bare Ground WL2 Treelines GA2 Amenity Grassland GS2 Dry meadows and grassy verges FW2 Depositing Lowland Rivers WL1 Hedgerows	<p>Future of these lands are now uncertain following the closure of the golf course. The Charlesland Golf course lands are currently zoned as Active Open Space under the current LAP. Biodiversity should form the core objective for the future management of these lands.</p> <p>Ecological survey recommended</p> <p>Sand martin formerly bred here. Farmland birds such as Yellowhammer and Tree Sparrow have disappeared from these lands within the last decade.</p> <p>Contains one of the few pond habitats in the Greystones area (outside private gardens).</p> <p>Investigate potential for restoration of the floodplain</p>
18	Charlesland Golf Course Scrub	WS1 Scrub GS2 Dry meadows and grassy verges	<p>Zone as a Nature Development Area.</p> <p>Ensure protection of these areas from development and allow natural processes to occur (i.e. woodland to naturally develop).</p> <p>Protect scrub as bird nesting habitat and publicise same.</p>
19	Charlesland Floodplain	WS1 Scrub GS2 Dry meadows and grassy verges	<p>Zone as a Nature Development Area.</p> <p>Ensure protection of these areas from development and allow natural processes to occur (i.e. woodland to naturally develop).</p> <p>Protect scrub as bird nesting habitat and publicise same.</p>



Site No.	Name	Habitats Present of Ecological Value	Observations/Recommendations/Actions
20	Charlesland IDA Land Scrub	WS1 Scrub GS2 Dry meadows and grassy verges	Ensure protection of these habitats from development and allow natural processes to occur (i.e. woodland to naturally develop).
21	Co. Co. Social Housing Field	From aerial imagery expected habitats include: WS1 Scrub GS2 Dry meadows and grassy verges WL1 Hedgerows FW2 Depositing Lowland Rivers	A Part VIII application for social housing on these lands has been approved.  This land could not be accessed during the survey. Ecological survey recommended  Ensure protection of a buffer zone of 30m from the river is implemented as a minimum.  Ensure protection of extant field boundaries on the site with adequate buffers.  Protect scrub as bird nesting habitat and publicise same.
22	Killincarrig Scrub	WS1 Scrub	Many non-native species here but provides habitat for a variety of fauna  Protect scrub as bird nesting habitat and publicise same.
23	Rathdown Park	From aerial imagery expected habitats include: WS1 Scrub WS2 Immature Woodland	Not surveyed.  Ecological survey recommended.  Protect for biodiversity in this housing estate.  Protect scrub as bird nesting habitat and publicise same.
24	The Grove	From aerial imagery expected habitats include: WS1 Scrub WS2 Immature Woodland	Not surveyed.  Ecological survey recommended.  Protect for biodiversity in this housing estate.  Protect scrub as bird nesting habitat and publicise same.
25	Killincarrig Marsh		Outside study area - ecological survey recommended
26	Farrankelly Slopes		Outside study area - ecological survey recommended
27	Charlesland IDA Lands N	BC1 Arable Crops WS1 Scrub	These lands are zoned for development which has been permitted.  Protect areas of existing scrub and develop a native hedgerow/shelterbelt 10m wide along the western boundary of these lands adjoining the R774.  Protect scrub as bird nesting habitat and publicise same.  Develop a compensatory habitat in conjunction with local farmers to support countryside birds such as Yellowhammer and wintering finch flocks through the provision of a wild bird crop.
28	Charlesland IDA Lands S	BC1 Arable Crops WS1 Scrub	These lands are zoned for development which has been permitted.  Protect areas of existing scrub and develop a native hedgerow/shelterbelt 10m wide along the western boundary of these lands adjoining the R774.  Develop a compensatory habitat in conjunction with local farmers to support countryside birds such as

Site No.	Name	Habitats Present of Ecological Value	Observations/Recommendations/Actions
			Yellowhammer and wintering finch flocks through the provision of a wild bird crop.
28	Golf Academy Lands	GA2 Amenity Grassland	Wintering bird counts recommended to determine ecological value.
29	Killincarrig Floodplain	WS1 Scrub GS2 Dry meadows and grassy verges	Review and implement the recommendations in the 2019 Delgany Tidy Towns report  Protect scrub as bird nesting habitat and publicise same.  Develop a wetland habitat here

These Local Biodiversity Areas are shown below on **Figure 43** below alongside the previously identified areas from 2006 and include lands which have not yet been developed including areas of developing scrub/wet woodland on the floodplain of the Three Trout Stream north of Charlesland (Site 19) and the remaining fields within the Charlesland IDA Lands (Site 20, 27 and 28).

The largest and most significant of these are the Charlesland Golf Course lands to the south of the town (Site 17). These lands have been surveyed annually since 1998 as part of the BirdWatch Ireland Countryside Bird Survey.

The Birds of Conservation Concern in Ireland review, or BoCCI for short, has revealed that 63% of Ireland's 211 regularly occurring wild bird species are now of serious conservation concern. 54 species, 26% of the Irish total, find themselves on the red list, meaning they are considered to be at the highest risk of extinction. The BoCCI traffic-light threat code system has revealed that a further 79 species, or 37% of the Irish total, are on the amber list, meaning that they are significantly threatened. Since the previous BoCCI assessment in just 2014, the number of red-listed bird species in Ireland has increased by 46%. The conservation status of Ireland's wildlife is deteriorating at a rapid pace.

Data gathered during the Countryside Bird Survey on bird populations from this area shows that these lands coupled, with the adjoining farmland to the south of the golf course, support a rich diversity of countryside birds (74 species in total) including many species, which are both red and amber listed, in the most recent Birds of Conservation Concern in Ireland review published in April 2021.

The golf course on these lands recently closed in December 2020 following the Covid 19 pandemic and will undoubtedly be the subject of rezoning pressure. It is recommended that a planning objective of a Nature Development Area is sought for these lands – see **Section 5.1** above.

One of the obvious gaps in the protection measures applied by the local authority for the Local Biodiversity Areas in the LAP that has become apparent is that only trees and treelines are protected under the Tree Protection Orders. There is no protection given to immature woodland, scrub, non-amenity grassland or other vegetation in and around trees within the Local Biodiversity Area on which biodiversity relies. The ongoing sanitisation and grubbing out of these areas can therefore go unchecked as was witnessed at St. Crispin's and is likely to occur at other Local Biodiversity Area sites such as 9 and 23.

The differences in structure between untended wild areas and mown and manicured areas can be seen along the access road (Woodlands Avenue) to Burnaby Woods, Woodlands and Charlesland Golf Course. This is shown below on Google Street View where the trees within the treelines on either side of the road, which form Local Biodiversity Area 11 can be seen – these are the only biodiversity features currently protected under the LAP.



**Plate 37. Local biodiversity area 11 – treelines either side of Woodlands Avenue.**

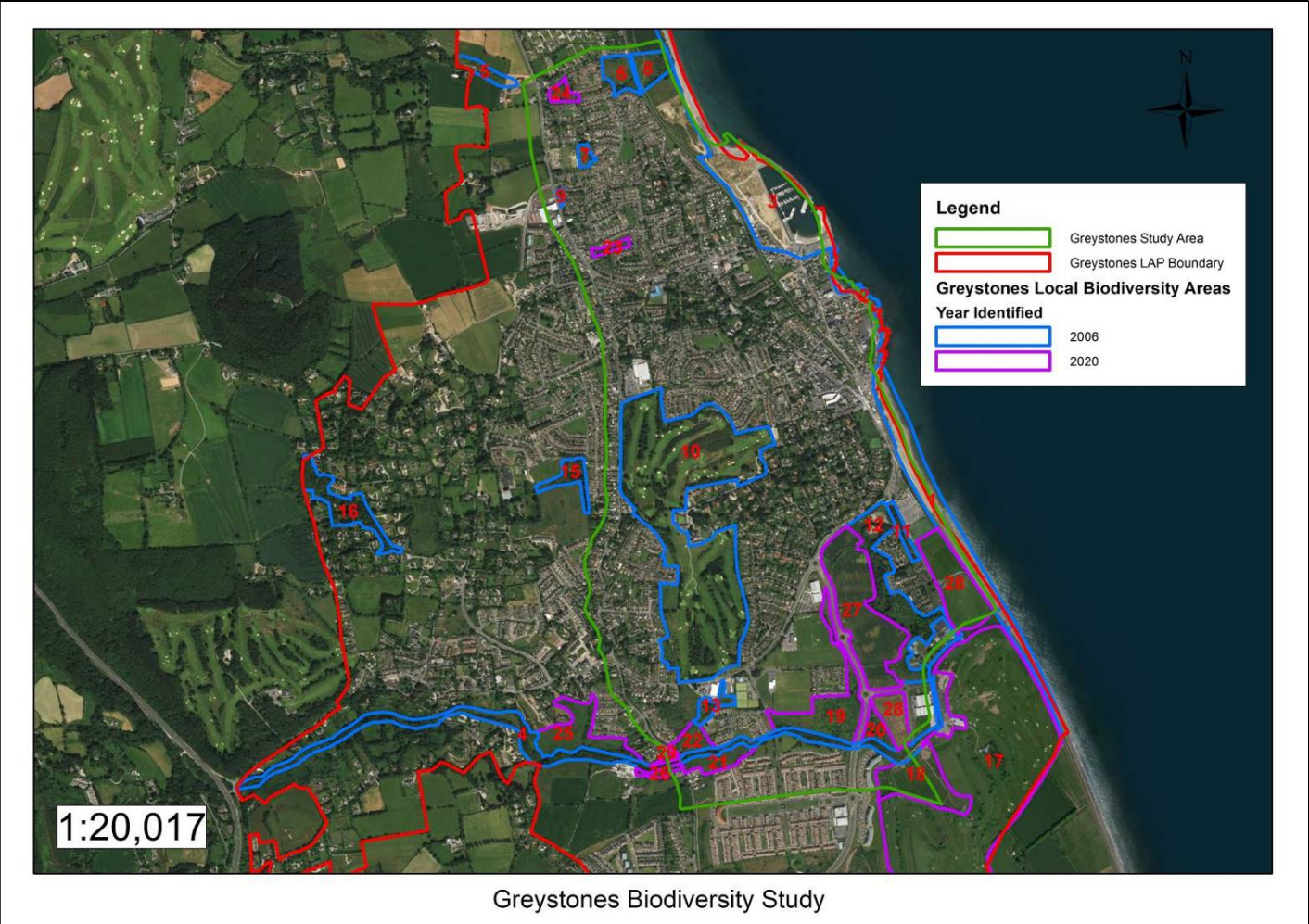


Figure 43. Additional Local Biodiversity Areas identified in 2020/2021 are shown in pink.

### 5.3 Implementation of Grassland Management Measures

Biodiversity actions for grassland habitats, which have been previously identified have to date either not been implemented or poorly implemented with ongoing losses for biodiversity.

A case in point is the management of the grassland habitats in St. Crispin's. This has no doubt occurred for a number of reasons and in some cases may be lack of funding, lack of ecological understanding, lack of appropriate machinery or equipment, change in people involved, or lack of will/interest.



Plate 38. Grass cuttings left in situ at St. Crispin's reducing grassland biodiversity.

#### 5.3.1 St. Crispin's Grassland Management

The previously recommended grassland management measures at St. Crispin's **must be implemented to restore the species diversity of this grassland**. This has not been implemented as is clearly shown on Plates 38 and 39 above. These measures are:

- A meadow mowing regime is proposed to promote a more diverse structure with more native flowering plants to encourage pollinators. It is not thought practical or economic to re-seed the grassland area, instead a gradual reversion to a meadow will be attained through an appropriate mowing regime. Reseeding with meadow species and / or disturbance of the ground layer is not envisaged.
- It is essential to remove cuttings, post mowing and to discourage dumping of garden clippings and waste around the margins of the grassland.
- County Council to seek a quotation for topping and baling on an interval of six to eight weeks, starting in mid-April and to include removal of all cut material from site, especially at the end of the grass growing season.

In order to implement grassland management, which requires the removal and disposal of cut material, from this site and many others appropriate equipment is required. The current grass cutting regime leaves the cuttings in situ which is decreasing the species diversity within the area.



Plate 39. The recommendations of the 2006 and 2018 reports needs to be implemented.

**Once the appropriate management measures are implemented annually the number one thing that is required to achieve results is patience – over a decade of nutrients take a long time to work their way out of the system!**

One local group - the Ennis Tidy Towns – took the management of their town roundabouts in charge for pollinators and faced similar albeit different problems. These roundabouts were previously intensively mown and although some wildflowers were present, these had no chance to flower and opportunities for pollinators and wildflower diversity was poor. Critical to the success of the project was the challenge of cutting and removing the material. They describe their approach below:

**“Cut & Collection Phase**

For many communities, the main obstacle to adopting pollinator-friendly grass management is the annual ‘cut *and* collect’ action. Cutting is simple; it is the follow-up collection exercise that can be very labour intensive and/or pose certain logistical issues. This is very much the case when managing roundabouts for biodiversity, given their location on often busy roads.

Firstly we made the decision to leave the roundabouts grow until early to mid-October, not mid- to end-September as outlined in the Pollinator Plan

guidelines. This had the two-fold benefit of providing a source of food well into the Autumn for pollinators as well as letting flowers naturally drop their seeds. This then removed the need to leave the cuttings lie for a few days so they would drop their seeds and then collect. We could now try and cut and collect at the same time, hopefully saving time and resources.

We had a number of options open to us in Ennis:

1. **Cut the grass and leave in situ:** This is the least preferred option as the decomposing grass will lead to a rise in nutrients which would lead to reduced floral diversity in subsequent years (as grasses do better in nutrient-rich soils at the expense of wildflowers).
2. **Cut the grass and then collect using hired agricultural plant:** Though our roundabouts are large by normal standards they are still not sufficiently large to allow for access by heavy duty farm machinery. The resultant rutting and impact to the grassed surface would also be unsightly and potentially have negative impacts on the grassland habitat by overly compacting the underlying soil.
3. **Cut and rake by hand:** This would only be feasible on one of our roundabouts as the others are far too large. This would have required significant voluntary hours and given the location on busy roads, possible health and safety implications. Also, what to do with the cuttings? Some of our roundabouts have ragwort which could be detrimental to livestock.

We then heard about a 'Zero Grazer' – a piece of plant commonly used by dairy farmers to cut and collect grass as feed. However, upon looking at the company's website and approaching several plant hire companies we soon learned that the size of these machines was much too large for our needs. We contacted the firm directly and learned about the ZB10 – a new, small scale Zero Grazer which was only launched at the 2019 Ploughing Championships".

The Zero Grazer – a single axle unit – was pulled by a 1,000 horsepower tractor and used to cut and collect grass that had been left uncut for over six months. The grass cuttings were then disposed of by the local authority and brought to their Central Waste Management Composting Facility. Once the fertility in the sward was reduced annual cutting and removal of vegetation has resulted in an increase in species diversity within the sward and the provision of an attractive pollinator rich grassland habitat. The Ennis Tidy Towns meet each year with Clare County Council staff and the contractor charged with maintaining the areas for that season on site visit to reinforce the type of management that is needed. Further information is available from:

<https://pollinators.ie/ennis-tidy-towns-transform-roundabouts-into-wildlife-havens/>

The grass in St. Crispin's is currently so rank that it is recommended that a minimum of two (and possibly three cuts) are required in the first year. A suitably qualified ecologist with expertise in grassland management should assess the impacts of each intervention on the sward and advise on the next course of action. It is recommended that the grassland management is discussed with Wicklow County Council and the contractor who was previously engaged to see what worked and didn't work and how best to progress matters, machinery available and what funding will be required/can be provided.

### 5.3.2 Grassland Management in open spaces in housing estates in Greystones

Many parts of Greystones, particularly in and around large housing estates, would benefit from more sensitive grassland management from the perspective of biodiversity. In many

cases this would involve a reduction in grassland mowing intensity (even if only at the base of trees or hedgerows) following the prescriptions of the 'Slow to Mow' or pollinator plan friendly mowing recommendations but in all cases the collection of grass cuttings is required to prevent the nutrients from entering the sward and favouring grass growth over wildflowers.



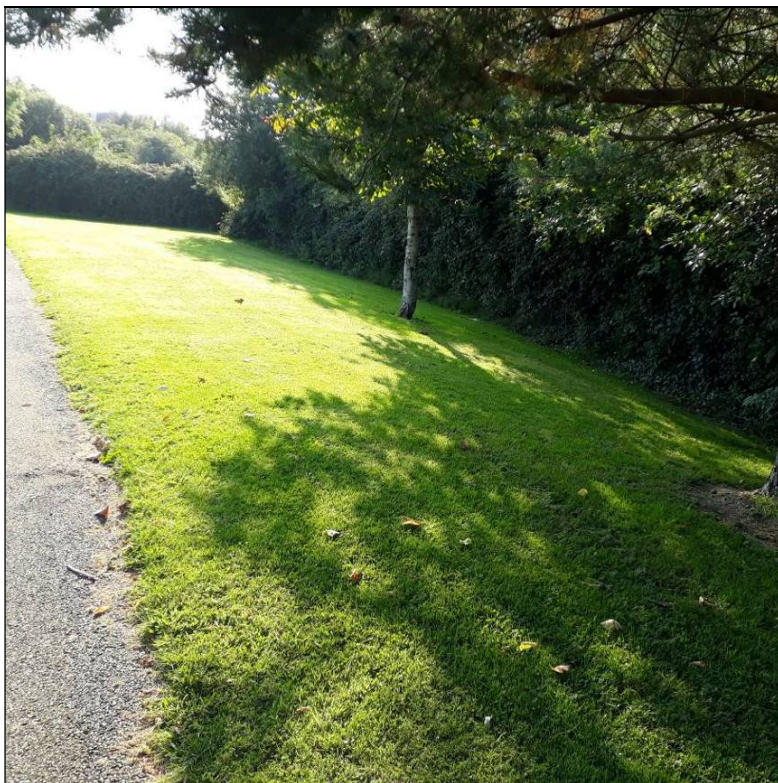
**Plate 40. A reduction in mowing during April and May preserves the dandelions, which form an important resource for pollinators early in the year.**

The grassland management at Charlesland Housing Estate was the subject of a separate review. Here the grassland management company had been approached by the residents and asked to leave some areas unmown over the summer of 2020. This had shown an immediate response with several flowers present in the sward including yarrow (*Achillea millefolium*) and knapweed (*Centaurea nigra*) which are both a fantastic pollinator plant and attractive looking.

A number of options were identified and proposed to member of the Charlesland Residents Association including linking areas of unmown grassland to other habitats such as the existing copses of trees as opposed to creating mown islands of habitat, a reduction of mowing around the tree copses and along the margins of the Three Trout Stream. Creating unmown linkages to the Three Trout Stream wildlife corridor was also recommended.

Roadside verges can be managed in a similar way with the area adjoining the roadside/paths mown more regularly which gives a tended appearance and the banks/verges allowed to flower with wildflowers and link to areas of scrub. These areas should then be subject to annual mowing and the cuttings removed.





**Plate 41. Intensively mown areas in Charlesland - management here could be altered to favour biodiversity.**



**Plate 42. Roadside verges at Charlesland on the R774.**

### 5.3.3 Grassland Management Equipment - Public Park, Road Side Verges and Open Spaces

Grassland management is the main habitat across the majority of areas taken in charge by either the local authority or residents associations such as public parks, road side verges and open spaces. There is an increasing appetite for grassland management to favour biodiversity. There is potential for co-operation between Greystones Tidy Towns and other Tidy Town groups across the county with Wicklow County Council to fundraise and purchase a machine such as a zero-grazer for the county to manage these areas which will require a co-ordinated plan.

In the immediate term and perhaps more affordably for Greystones Tidy Towns a sickle bar mower could be purchased, which could be used by the group locally. However the use of the latter still requires the manual collection and removal of the cut material, but gathering with a hay rake and pitchfork is surprisingly manageable once the vegetation is dry.

The retention of areas of long grass (then mown annually and the cuttings removed) and the diversification of grassland swards across Greystones will provide habitat for many invertebrates.

These are what our bird populations feed on and are critical for some of our endangered species which still remain in Greystones including swift, sand martin, house martin and swallow. Swift are a red list species, while the remaining three are amber listed. All have suffered huge declines as a result of loss of breeding sites and the widespread reduction in our native insect species, which they forage on.



Plate 43. Sickle bar mower.

### 5.4 Coastal Areas

The vegetation and plant communities on the South Beach contain a number of habitats which are of high local importance and correspond to habitat types listed on Annex II of the EU Habitats Directive and the shingle habitat for which The Murrough SAC is designated extends from Greystones south to Wicklow Town. The main threats on the south beach at present arise from trampling pressure and dog fouling but a longer term proposal for the development of an innocuous sounding 'Greenway' along The Murrough and ongoing hard engineering coastal defences or railway protection works also threaten these habitats.

Understanding the ecological implications of these development is a starting point in fighting for their protection but small efforts to divert people away from trampling on vegetation like that conducted by Mr Lewellyn on the South Beach has had a positive impact too by drawing

their attention to them... Develop signage to explain the local plants and habitats of importance. Tackling the spread of non-native species here is also recommended.



**Plate 44. Rock armoury and trampling pressure on the habitats of South Beach.**

### **5.5 Restore a Sense of the Wild Back to Greystones**

Members of Tidy Towns groups have traditionally been very focused on the 'tidy' and aesthetic look of a place and have done a wonderful job delivering same through enormous volunteer in Greystones and their communities.

Measures such as pollinator friendly planting can be a great addition to streetscapes and improve municipal plantings in planters, window boxes, and flower beds to make them nectar and pollen sources for many of our invertebrates.

However these actions need to be reconsidered when it comes to conserving our native plants and the species of insects, mammals and birdlife that they support.

It is easy to consider many plant species that are naturally self-established as a 'weed' and something that should be 'tidied up' but it would useful to learn a few wild plants and be able to identify them and understand their ecological value before they are cleared away by a well meaning hoe or even worse with herbicide. A good example of this would be to begin by identifying and recording where the native wildflower species, which support our native butterflies are in Greystones, and ensuring their conservation during any tidy towns works/events to ensure they are protected.

Here are three examples of the ecological importance and ecological requirements of various species:

- A pollinator - the Orange Tip Butterfly
- A bird - the Wren
- A plant - Ivy

**Let's look at the lifecycle and ecological requirements of the Orange Tip Butterfly as an example.**

The Orange Tip Butterfly is a true sign of spring, being one of the first species to emerge that has not overwintered as an adult. There is a single brood each year, with adults flying from the beginning of April, through May and into June. The eggs are a greenish-white when first

laid, but gradually turn orange and are one of the easiest eggs of all species to find, tucked away on a flower stalk of the food plant. The larva eats its eggshell on hatching and, given its cannibalistic tendencies, will also eat any other Orange-tip eggs it encounters. The main source of food is developing seed pods, although the larva will also eat flowers and leaves on occasion. The larva then travels extensively in search of a suitable pupation site. There are 4 moults in total and the larval stage lasts between 3 and 4 weeks. The pupa is formed upright on a plant stem or some other vertical surface that provides a suitable overwintering site, attached by a silk girdle and the cremaster. The pupa is green when first formed, with the majority eventually turning light brown to more-closely match its surroundings. This species overwinters in this stage.

The Orange Tip Butterfly requires native species to complete its lifecycle and uses a variety of native food plants. Many of these are found along road verges and ditches and are typically viewed by many as weeds and include a large number of plants which are members of the crucifer family. These include.

- Hairy bittercress ,
- Wavy bittercress, ,
- Lady's-smock/cuckoo flower (*Cardamine pratensis*),
- Watercress (*Rorippa-nasturtium aquatica*),
- Garlic Mustard (*Alliaria petiolata*),
- Hedge Mustard (*Sisymbrium officinale*),
- Winter-ress (*Barbarea vulgaris*),
- Turnip (*Brassica rapa*),
- Charlock (*Sinapis avensis*),
- Large Bitter-ress (*Cardamine amara*), and Hairy Rock-ress (*Arabis hirsuta*).

Within gardens it lays its eggs on Honesty (*Lunaria annua*) and Dame's-violet (*Hesperis matronalis*), but larval survival is thought to be poor on these plants.



Plate 45. Cuckoo flower in unmown grass beside the Shoreline Leisure Club.

The butterfly therefore requires a series of key items to be able to survive – a suitable food plant and a safe place for the adult to lay its eggs, food for the larvae across several weeks, a suitable place to overwinter as a chrysalis from which the adult emerges in the spring to begin the life cycle all over again.

Understanding this it becomes obvious how at any stage a well-meaning hoe, spade, mower, strimmer, or even worse - herbicide use, will result in death to the Orange Tip Butterfly and our spring will be poorer for it.

Unfortunately planting lavender for pollinators, although well intentioned, having grubbed out a suite of 'weeds' along the roadside verge or at the base of a hedge or wall, will provide be of no use to our Orange Tip Butterfly.



Plate 46. Six native wildflower species are present in this small patch at the bottom of a wall - how many can you name?

#### What about our songbirds?

Many of us enjoyed the incredible bird song during the first Covid19 lockdown in early 2020 when ongoing background traffic noise, business and plane journeys were much reduced. For many people this may have been the first time that they experienced this natural event. One of the loudest and most vociferous birds in our landscape is also one of our smallest - the wren.

So what does a wren need to live in our landscape and lift our hearts with it's song? Well like all species - somewhere to eat and forage, a place to breed, and a safe place to hide from predators or shelter from the weather. For many wrens and other small birds this means that large bramble tangle, a bit of dense scrub of gorse, briars and hawthorn, or a bit of overgrown hedgerow.

A landscape of mown grass with lollipop trees and no native plants which support the insects on which the wren hunts and feeds (being an insectivore) provides none of the above.

Even some good ivy cover on a wall provides a rich hunting ground for a wren.

**We need to adjust our thinking, our perceptions and our understanding and tolerate a little more wildness, scruffiness and unkemptness in the environs of our towns and villages if we want biodiversity loss to be halted and reduced. This gift is in our hands.**



**Plate 47. Which part of Charlesland supports a bird species like a dunnoek, robin or wren?  
The mown grass or the dense tangle of bramble and other species?**



**Plate 48. From the perspective of biodiversity this is a significant improvement on Plate 46 above with a graduation of habitats from the scrub providing cover, the long grass supporting insects to the mown edge giving a sense of management and maintenance.**

### **One plant – 140 different insect species**

Ivy is often considered to be a threat to buildings, trees and in need of 'tidying up'. The Jersey Biodiversity Centre gives an excellent explanation of its ecological importance, as presented below:

Ivy is, arguably, the most important flowering plant for pollinators in the autumn which is at a time when there is often less on offer for them to feed on. Many late-flying pollinators depend heavily on Ivy for pollen and nectar at this time of year. Ivy (*Hedera helix* spp *hibernica*) is a native evergreen plant which is widespread and common. Their flowers appear between early September to early November. As well as their flowers being vital in the autumn for many insect pollinators, their berries, which ripen in winter, are a very valuable food source for overwintering birds such as blackbirds and thrushes and they are largely responsible for dispersing the seeds which produce more plants elsewhere. Ivy is also an important winter hibernation site for many insects due to its dense foliage.



**Plate 49. Was it really necessary to remove all the ivy on this wall – could some of it have just been lightly cut back if it was growing onto the path – or a small patch trimmed to expose the stone work?**

Ivy is vital to a wide variety of native pollinators such as hoverflies, butterflies, flies, wasps, solitary bees and bumblebees with, for instance, as many as 140 different insect species feeding on Ivy in the autumn including many overwintering queen bumblebees which rely on this plant to help them survive the winter and also 89% of pollen collected by honeybees in autumn comes from Ivy.

**Ivy takes around 10 years of growing before it is able to flower and so for them to be available to pollinators then they must be left to grow for at least this amount of time.**

Often the Ivy seen growing in gardens, amongst flower borders and up trees, is the juvenile form of the plant and has lobed glossy leaves with no flowers but it is this plant that will eventually provide vital food sources for pollinators if allowed to grow until it matures and its leaves become an oval shape and it flowers.

So, given that this plant is so vital to many pollinators as a late-flowering food source enabling them, or their young, to survive the winter and that it also gives excellent winter protection to many other species it is very important that if you do have Ivy in your garden and up your trees then please do resist cutting it down!

Despite the common myth, Ivy does not kill trees. It has its own root system so does not tap into the tree's vital resources. It only uses trees in order to climb higher to get maximum sun exposure for photosynthesis. But if Ivy appears to be swamping trees, and it is getting into their leaf canopy where it can affect the tree's own ability to photosynthesize, then it can be thinned out, or reduced, but this should be kept to a minimum as complete removal does much more harm than good for insects and other wildlife.

## 5.6 Tackle Invasive Species within Greystones

A large number of non-native and invasive species were recorded in the Greystones area – these have mostly arisen as garden escapes, which threaten locally biodiversity. These include:

- Winter heliotrope (*Petasites fragrans*)
- Red valerian (*Centranthus ruber*)
- Alexanders (*Symyrium olusatrum*)
- New Zealand flax (*Phormium tenax*)
- Old man's beard (*Clematis vitalba*)
- Montbretia (*Crococsmia X crocosmiiflora*)
- Honey spurge (*Euphorbia mellifera*)
- Cherry laurel (*Prunus laurocerasus*)

Some invasive species are listed under the Birds and Natural Habitats Regulations 2011 and must be legally controlled and were recorded in Greystones. These include:

- Three cornered leek (*Allium triquetrum*)
- Japanese knotweed (*Fallopia japonica*)
- Himalayan balsam (*Impatiens glandulifera*)

**It is recommended that Greystones Tidy Towns encourage its members to begin to document where these species occur in the environs of the town particularly within the areas identified as being of importance for local biodiversity. They can then begin to control their spread and ideally eradicate them here.**

**The populations of red valerian and alexanders are particularly important to tackle as these species are spreading along the railway line and threatening the Natura 2000 sites north and south of the town (Bray Head SAC and The Murrough SAC). As a minimum the flowers of these species should be removed to prevent seed development and spread.**

The wide scale use of herbicide needs to stop and only be used in very targeted areas and for very specific purposes. A number of county councils now use organic weed control methods such as treatment with a strong solution of Vinegar, or acetic acid, (30% solution), in preference to the use of herbicides which can be carcinogenic and damaging to wildlife and would require professional application.

Various best practice guidance for the treatment of some of these invasive species is presented below.

### 5.6.1. Himalayan Balsam

Mechanical control, by repeated cutting or mowing, is effective for large stands, but plants can regrow if the lower parts are left intact. The plant must be cut below the lowest node to stop regeneration. Access to the sides of riverbanks can be difficult and inaccessible stands can quickly recolonise accessible cleared areas, so vigilance is needed if an area is to be effectively cleared. Regular grazing also suppresses this species.

Small infestations (most common in gardens) can easily be controlled by hand-pulling as the species is shallow rooted. Padded gloves should be worn to avoid risk of injury to hands. Seeds are not very robust and only survive for up to 18 months so a two year control



programmes can be successful in eradicating this plant if there is not further infestation from upstream or adjacent sites.

To avoid additional spread do not disturb plants if seeds pods are visible (usually sometime after May). Programmes should be undertaken in April or early May. If hand pulling after this time, bag plant tops to prevent seed spread.

The use of organic weed control methods in preference to the use of herbicides could also be trialled – this should be applied during the active growth in late spring (Late April to May).

### 5.6.2 Cherry Laurel

Cherry laurel is an issue as an invasive species when it threatens the diversity of native woodlands or other habitats of conservation value as it tends to form dense thickets and outcompetes native vegetation. It is an unpalatable species and is likely to be toxic to mammals and invertebrates due to the presence of cyanide in the leaves, stem and bark of the plant.

#### **Eradication/management of cherry laurel**

Cut and remove stems by hand or chainsaw, cutting as close to the ground as possible to remove above ground growth. Chip or remove the cut material from the area to allow for effective follow-up work and prevent regrowth. Chipped material can provide good weed barrier around ornamental garden areas.

The removal of above ground growth will not prevent regrowth as *Cherry laurel* will regrow from cut stems and stumps. There are four recommended methods to achieve successful management after the initial cut and removal:

1. Digging the stumps out. The effectiveness of this technique is increased by removing all viable roots. This can be done manually or with a tractor and plough. To avoid regrowth, stumps should be turned upside down and soil should be brushed off roots.
2. Direct stump treatment by painting or spot spraying freshly cut low stumps with organic weed control immediately after being cut. Use of a vegetable dye is recommended to mark treated stumps and all stumps should be targeted. A handheld applicator will help avoid spray drift onto surrounding non-target species.
3. A variation on the stump treatment method is stem injection, using a 'drill and drop' methodology, whereby, if the main stem is cut and is large enough for a hole to be drilled into it, the hole can be used to facilitate the targeted application of organic weed control.
4. Stump regrowth and seedlings can be effectively killed by spraying regrowth with a suitable organic weed control. Best practice spraying protocols should be carefully followed. General broadcast spraying is not as effective as stump spot treatment and has the potential to impact on surrounding non-target species. The leaves are thick and waxy. For such treatment to be effective **each individual leaf needs be thoroughly wetted with organic weed control to kill the plant.**

Normally Cherry Laurel is successfully treated using herbicide (usually glyphosate) but it is worth trialling an organic weed control and seeing how effective it is.

### 5.6.3 Old Man's beard

The long term impacts of uncontrolled Old man's beard on trees and hedgerows can be clearly seen at the southern end of the Glen of the Downs where it is rampant along the edges of the N11 and within the Nature Reserve clambering over, climbing up and smothering the trees and other vegetation.

Old man's beard can be controlled by both mechanical control and herbicides, though typically its control relies on a combination of both i.e. cut-stump application. In New Zealand, biological control has also been used with good effect. The NRA guidelines recommend the following methods for control/eradication:

#### **Physical Control**

Small seedlings can be readily pulled by hand. Larger stems have to be cut, the roots grubbed out and the material placed off the ground so it cannot take root again.

#### **Chemical Control**

Grubbing/ digging out of Old man's beard can be done at any time of the year when the soil is suitably dry. Small plants can be pulled by hand. Large stems should be cut and the roots then grubbed out. Regular follow-up is required to deal with re-growth or seedlings which can result from exposure of soil.

The use of organic weed control methods in preference to the use of herbicides could also be trialled. For large vines of old man's beard they should be cut at the base and the organic weed control applied to the cut surface.

#### **5.6.4 Snowberry Bush**

This species occurs in wooded areas and along the Three Trout Stream. In such locations it outcompetes native flora and suppresses natural regeneration thereby reducing functionality within the woodlands.

Its main method of spread is by means of its vigorous suckering habit; it does not appear to propagate much by seed. It can be spread from garden waste containing plant fragments. Therefore any prunings should be destroyed by incineration, or thorough shredding into small fragments. Do not discard into the countryside.

Grubbing/ digging out of Snowberry bush can be done at any time of the year when the soil is suitably dry. Small plants can be pulled by hand. Large stems should be cut and the roots then grubbed out. Regular follow-up is required to deal with re-growth or seedlings which can result from exposure of soil.

The use of organic weed control methods in preference to the use of herbicides could also be trialled. For large stands of Snowberry bush they should be cut at the base with a brush cutter and the organic weed control applied to the cut surface.

#### **5.6.5 Winter heliotrope**

This invasive species is widespread throughout Greystones and is found on roadside verges, at the base of woodland edges and treelines, within the ground flora of the Three Trout Stream river corridor and adjoining paths and trackways. I would recommend a targeted action to control and remove it.

The NRA Guidelines recommend the following for the physical removal of **winter heliotrope**:

'Due to the extensive rhizome network, physical removal of winter heliotrope is really only practical on a limited scale. Where mechanical means can be employed, it should be possible to deal with larger infestations but due to the potential for regeneration from fragments of roots, it may be best to tackle its control using a combination of excavation with follow-up treatment by herbicides. As with other plants with the potential to spread from small root

fragments, disposal of material should be undertaken with due caution to prevent accidental spread of the plant. Other means of disposal include burial of material at a depth of at least 2m, incineration or disposal to licensed landfill. There is no evidence that the material would withstand composting though this approach would probably only be suitable for limited infestations’.

If using organic weed control methods in preference to the use of herbicides application after flowering in February to March is recommended by Cornwall Nature Reserves (2008), though the Royal Horticultural Society (2008b) recommends spraying in midsummer or later but before the foliage begins to die back.

#### 5.6.6 Butterfly Bush

This species dominates the banks of the walking path from beside ALDI to the Three Trout Stream bridge. It provides nectaring for many species of insects including moths, butterflies and other pollinators but is also spreading down through the Three Trout Stream river corridor particularly where the banks suffered disturbance during the construction works associated with the United Caps development.



**Plate 50. Buddleia along the Three Trout Stream watercourse which should be removed.**

It is recommended that there is a targeted action taken by Tidy Towns and residents of Charlesland and other adjoining housing estates to removing buddleia along the Three Trout Stream river corridor. Funding could be sought from United Caps to assist with same.

The NRA guidelines outline the following:

‘As buddleia is a plant that favours disturbed sites, physical grubbing of plants can provide ideal conditions for the germination of seeds. Care needs to be taken to ensure revegetation of controlled areas is undertaken swiftly. The branches of buddleia are capable of rooting as cuttings, so care should also be taken to ensure material is disposed of in a manner to avoid this risk.

The species can be controlled by physical means as follows; 'Management methods such as digging it out are applicable only to minor infestations at the initial stage of invasion. Hand-picking of young plants is feasible but should be undertaken with care to avoid soil disturbance which can give rise to a flush of new seedling. Grubbing of mature stands as a sole attempt at control is not recommended for the same reason. After uprooting, it is essential to plant the ground in order to prevent a flush of new seedling growth. When it is cut, Buddleia grows back from the stump very vigorously. Mowing of young plants does not provide control as they re-sprout with vigour. Where removal of mature plants is not feasible in the short term, the flower heads should be cut off in June before seed set'. Regular follow-up is required to deal with re-growth or seedlings which can result from exposure of soil.

The use of organic weed control methods in preference to the use of herbicides could also be trialled. For large shrubs of Buddleia bush they should be cut at the base and the organic weed control applied to the cut surface.

#### **5.6.7 Montbretia**

Montbretia is easily recognised when in flower by the distinct shape and colour of the flower head with relatively short stems and orange flowers. When not in flower, Montbretia is more difficult to identify. Look for rusty brown dead leaves and remains of previous years flowering heads.

The NRA guidelines recommend the following methods for control/eradication:

##### **Physical Control**

Physical control of Montbretia is difficult as the corms break up from their chains very readily and can result in ready re-infestation or further spread. Where infestations are limited in extent, the entire stand can be excavated and buried at a depth of at least 2m, incinerated or disposed of to licensed landfill. The corms are very hardy and are not suitable for composting. Due to the potential for re-infestation from corms, regular follow-up will be required over a period of at least 2 years to deal with any re-growth.

##### **Chemical Control**

The use of organic weed control methods in preference to the use of herbicides could also be trialled. Application can be by either foliar spray or weed wiper during the growing season.

#### **5.6.8 Three cornered leek**

##### **Physical Control/digging**

Remove small and scattered plants first and then target outer edges of larger infestations by digging. Best removed prior to seed when plants are fully grown and parent bulb exhausted. Corms must be buried at a depth of at least 2m, incinerated or disposed of to licensed landfill. The contaminated soil should be disposed of to licensed landfill.

##### **Chemical Control**

The use of organic weed control methods in preference to the use of herbicides could also be trialled and should be done as a follow-up to deal with missed corms re-sprouting. This should be applied during the active growth period in late spring or summer and should be applied as foliar spray, wiper applicator or spot treatment.

## 5.7 What can you do in your immediate environs?

### ON ZONED LAND:

- Find out who the landowner or developer is.
- Engage with them to see what they are doing for biodiversity within their development lands and push for same.
- Could the new €150 million film studio and media campus in Greystones incorporate biodiversity measures within it's development – green roofs with wildflower meadows/sacrificial bird crops to compensate for the loss of arable crops in the IDA lands?

### AT HOME:

- Make your garden more interesting for wildlife by planting flowers to attract bees and butterflies, fruit-bearing trees and shrubs to attract birds, a garden pond to attract amphibians and damselflies. Even in the heart of the town, a window-ledge bird table or a bird box will attract a surprising range of birds or you could build a bat box to invite bats into your garden.
- Become a member of one of Ireland's nature conservation organizations.
- Participate in community based nature studies such as the Garden Birdsurvey (see [www.birdwatchireland.ie](http://www.birdwatchireland.ie)), Spring Alive ([www.springalive.net](http://www.springalive.net)), and the Seashore Survey ([www.coastwatch.org](http://www.coastwatch.org)). You don't need to be an experienced ecologist to participate in these surveys, so go and give it a try!
- From Grey to Green - cover your garden walls with plants for pollinators.
- Check out the All Ireland Pollinator Action Plan and see what you can do.
- Put up swift boxes on suitable buildings within your community.

### AT WORK:

- Manage your grounds for wildlife - plant trees, hedgerows, colourful plants and build bird & bat boxes as these will attract a range of wildlife species.
- Sponsor a biodiversity action for the community such as the purchase of a sickle bar mower for the grassland management at St. Crispin's.
- Organise a company nature conservation activity day or donate staff time to participate in practical nature conservation activities in association with Greystones Tidy Towns.

### AT SCHOOL:

- Go and explore wildlife in the schools grounds and nearby parks.
- Make school grounds more wildlife friendly by making a compost heap, bird boxes, a small meadow, an organic garden or planting trees.
- Connecting Children With Nature by making Living Willow Huts and tunnels within the school grounds to allow children interact with nature.
- Book a biodiversity Heritage in Schools Specialist to visit your child's class and bring them on a field trip.
- Get funding for transition year students to make a short video on biodiversity in Greystones and share on social media such as tik tok or other platforms.

### WITH YOUR LOCAL MENS SHED/WOODWORKING CLASS:

- Hold a community bat and bird box building day. This could become an annual event. Many trees in towns and gardens are young and do not provide sufficient nesting or roosting sites, so bird and bat box installation is crucial in these areas.

### IN PUBLIC/COMMUNITY SPACES/OPEN AREAS WITHIN HOUSING ESTATES

- Create a pond/wetland habitat to support freshwater invertebrates and amphibians as well as local birds.

- Develop a pollinator friendly mowing plan with local sports clubs for the areas around their pitches and in collaboration with the Greystones Golf Course.
- Get Greystones Buzzing through identifying where the food plants of our native butterflies are and where our invertebrates overwinter!
- Develop a garden waste campaign – promote responsible disposal of garden waste.
- Identify where a native hedgerow could be planted – perhaps to cover a bare wall or fence in your housing estate...

**IN THE WIDER LANDSCAPE/IN CONJUNCTION WITH LOCAL LANDOWNERS & FARMERS**

- Commission a hedgerow survey and see how hedgerow structures within local farms could be protected and strengthened – particularly in the lands zoned for agriculture to the north, west and east of the town.
- Develop a compensatory habitat in conjunction with local farmers to support countryside birds such as Yellowhammer and wintering finch flocks through the provision of a wild bird crop.
- Commission a barn owl survey of farms and suitable lands in the environs of the town.
- Erect barn owl boxes with the collaboration of farmers to compensate for the loss of the two nesting sites in the town – perhaps ALDI could sponsor them – the zoning and subsequent development of those lands resulted in the loss of one historic barn owl breeding site. Erect a barn owl box in Captain Tarrant’s farmhouse.

## 6. APPENDIX 1. Sites of Geological Interest in Greystones

(Source: <https://www.gsi.ie/en-ie/publications/Pages/The-Geological-Heritage-of-Wicklow.aspx>)

### WICKLOW - COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	Greystones (Appinite)
Other names used for site	Greystones Harbour
IGH THEME	IGH11 – Igneous Intrusions
TOWNLAND(S)	Rathdown Lower
NEAREST TOWN/VILLAGE	Greystones
SIX INCH MAP NUMBER	8
ITM CO-ORDINATES	729690E 712610N (appinite outcrop)
1:50,000 O.S. SHEET NUMBER	56 GSI BEDROCK 1:100,000 SHEET NO. 16

#### Outline Site Description

A section of rocky coastline on the scenic and popular Greystones waterfront.

#### Geological System/Age and Primary Rock Type

The predominant rock type at Greystones are the Cambrian age meta-sedimentary Bray Group greywackes. The coarse-grained hornblende-rich appinite rocks were emplaced into the Cambrian rocks either at the same time as, or just before, the emplacement of the main Leinster Granite, 405 million years ago (Devonian). The Greystones appinites are described as hornblende lamprophyre dykes in some geological literature.

#### Main Geological or Geomorphological Interest

Part of a suite of Late Caledonian appinite intrusions associated with the Leinster Granite, the Greystones appinites are dark-grey coloured igneous rocks that occur (for about 50m, east-west) within the rocky Greystones waterfront, to the south of the harbour. The location of the appinite dykes is marked by a conspicuous eroded gully cut into the rocky coastline at the north end of the 'grey stones'. The appinites were intruded (squeezed into bedrock or crust) into the greywackes around 405 million years ago. Appinites are ultrabasic igneous rocks that crystallise from molten magma that is rich in water. The intrusion appears as two sills that are separated by a U-bend fold (syncline) in the greywackes, and roughly follows the same bedding patterns of the greywackes.

The appinitic rocks comprise dark medium-to-coarse textured rock composed of the minerals hornblende and biotite, set in a groundmass of the minerals plagioclase, orthoclase, and quartz. Contact (thermal) metamorphism (when hot rocks are squeezed into and alter or 'bake' the cooler rocks) is evident in the greywacke rocks alongside and in contact with the appinites. The appinite dykes occur around five kilometres east of, and quite remote from, the eastern margin of the Leinster Granites. Xenoliths (large rock fragments torn from the walls of the magma chamber) up to a metre in length are present in the Greystones appinites. The Cambrian greywackes are understood to be the origin of the town's name.

#### Site Importance – County Geological Site

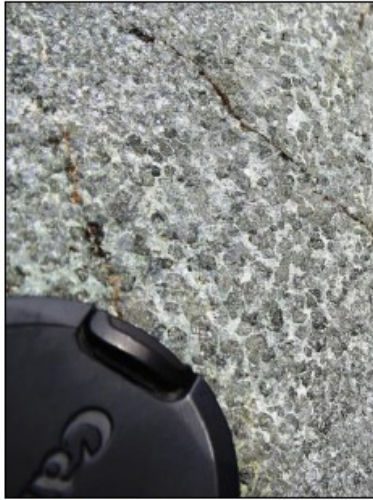
Easy to access at low tide, the appinites at Greystones are fine examples of igneous rocks intruded into older (immediately adjacent) meta-sedimentary rocks. The appinites exhibit very well-developed hornblende crystals which are clearly visible with the naked-eye. One of at least 18 appinites bodies that comprise a sub-group of Caledonian igneous intrusions in the region, Greystones represents one of the best sites for appinite rocks in Wicklow.

#### Management/promotion issues

The site is on the rocky section of the Greystones waterfront, alongside a scenic and popular amenity area. The features are not deemed to be of significant public interest, as access to the appinite outcrops requires a shoreline scramble. There are no apparent threats to this site. However, a smaller appinitic body previously exposed near the harbour to the north has been obscured by harbour developments.



Appinite outcrops (dark) in the gully below road level.



Appinite – close-up.



View eastwards from the head of gully where appinites are exposed on both sides.



View westwards at gully (left) where appinites are exposed. Strata folded into syncline to right (north).



The "Grey Stones" – looking south along coast towards Cobbler Bulk.



Bray Head, viewed looking north along coast from near location of appinite outcrop.





## WICKLOW – COUNTY GEOLOGICAL SITE REPORT

NAME OF SITE	Greystones beach
Other names used for site	Greystones
IGH THEME	IGH7 Quaternary
TOWNLAND(S)	Rathdown
NEAREST TOWN/VILLAGE	Greystones
SIX INCH MAP NUMBER	8
ITM CO-ORDINATES	728770E 713920N (centre of section)
1:50,000 O.S. SHEET NUMBER	56
GSI BEDROCK 1:100,000 SHEET NO.	16

### Outline Site Description

Along the beach just north of Greystones, a 2 kilometre-long coastal section exposes a succession of several units of glacial till, separated in places by sand and gravel.

### Geological System/Age and Primary Rock Type,

The till itself was deposited at the base of the last ice sheet to cover the area, during the late Quaternary Period, approximately 20,000 years ago. This till is deep in the locality but the sediments overlie greywacke, slate and quartzite bedrock of Cambrian age.

### Main Geological or Geomorphological Interest

This sequence of sediments is one of the most renowned in Irish Quaternary literature and has been controversially interpreted as 'glaciomarine' in origin (*i.e.* deposited under a floating ice sheet in the sea) by some academics. However, the general consensus is that the sediments are the product of a terrestrial ice sheet, interpreted as 'subglacial' tills deposited at the base of an ice sheet on land. They now form part of a prominent moraine ridge in the cliff.

Examining the sedimentology of the cliff shows that there are a number of till units stacked on top of each other. The tills include gravel beds, sand pockets and clay lenses, and are dominated by erratic limestone rocks. Large boulders of Leinster granite and small pebble erratics of Ailsa Craig microgranite (from Scotland), and Cretaceous chalk, flint and Tertiary basalt (all from Antrim) can also be seen both in the section and on the beach.

The southern portion of the section, just north of the new marina at Greystones, is dominated by bedded sands and gravels.

Coastal erosion is a continued threat at Greystones, despite attempted human control of this, which involves erection of baffles and mesh-wire structures to stop recession of the cliffs. This means many portions of the exposure at Greystones are heavily slumped.

### Site Importance – County Geological Site; recommended for Geological NHA

This is a particularly impressive exposure into deep glacial tills, with several sedimentological characteristics well exposed. The site is effectively included within the existing Bray Head SAC and proposed NHA (Site Code 000714).

### Management/promotion issues

The site is accessible through public beach access and is therefore easily visited. The cliffs are prone to slumping, however, and care must be taken when close to the faces. The importance of the section could be highlighted in promotional material for the Bray Head SAC and proposed NHA.



The section at Greystones, looking south from the beach area just south of Cable Rock.



Left: Gravel beds resting on top of stiff, muddy glacial till sediment in the section. Note the slumping at the base of the cliff.

Right: Looking north along the section towards Cable Rock and Bray Head. The large boulders emplaced to stop erosion are clearly seen.



## WICKLOW – COUNTY GEOLOGICAL SITE REPORT

<b>NAME OF SITE</b>	Glen of the Downs
Other names used for site	<i>Gleann da Ghrua</i> , The Valley of the Two Brows
<b>IGH THEME</b>	IGH7 Quaternary
<b>TOWNLAND(S)</b>	Bellevue Demesne, Woodlands
<b>NEAREST TOWN/VILLAGE</b>	Delgany
<b>SIX INCH MAP NUMBER</b>	8, 13
<b>ITM CO-ORDINATES</b>	725990E 711250N (centre of channel)
<b>1:50,000 O.S. SHEET NUMBER</b>	56
<b>GSI BEDROCK 1:100,000 SHEET NO.</b>	16

### Outline Site Description

The Glen of the Downs comprises a deep channel that was formed by meltwater erosion on the northeastern flank of the Wicklow Mountains. The channel is oriented generally northwest–southeast, and extends for a distance of approximately 2 kilometres.

### Geological System/Age and Primary Rock Type,

The feature is formed in an area of bedrock outcrop and subcrop and bedrock outcrops along the majority of the channel sides, giving the feature its 'scalped' appearance. The feature was etched out by meltwater during deglaciation at the end of the last Ice Age, about 12,000 years ago.

The bedrock in the locality is dominated by greywackes and quartzites of Cambrian age.

### Main Geological or Geomorphological Interest

The Glen of the Downs is up to 100m deep and has a V-shaped profile. The base of the channel hosts a small stream, which seems tiny given the depth of the channel itself. Such streams, flowing through deep, relict glacial meltwater channels, are thus called 'misfit' streams.

The Glen of the Downs is considered to have formed completely in the Late-Glacial Period. Initially the glen was a subglacial channel, formed under the ice, but later carried surface glacial outwash from Glacial Lake Enniskerry southwards. As well as this, the channel carried huge amounts of subglacial meltwater draining the ice sheet which extended into Wicklow from the Irish Sea Basin. This very high energy meltwater flow resulted in the Glen of the Downs' unusual depth and size.

Much of the sides of the channel are very steep, and are nowadays covered in broadleaf forestry. The glen has an irregular long profile, which means that meltwater was under huge pressure from ice above, thus proving that the channel was initially subglacial in origin. The channel probably extended further southwards but its southern portion was blocked by ice marginal sediments which forced drainage from the later glacial lake to flow eastwards towards Delgany.

### Site Importance – County Geological Site; recommended for Geological NHA

This is a site with excellent teaching potential on glacial meltwater erosion, as the feature is accessible, spectacular, and easily viewed from roads. The N11 passes through the feature and the glen is already an SAC and proposed NHA (Site Code 000719).

### Management/promotion issues

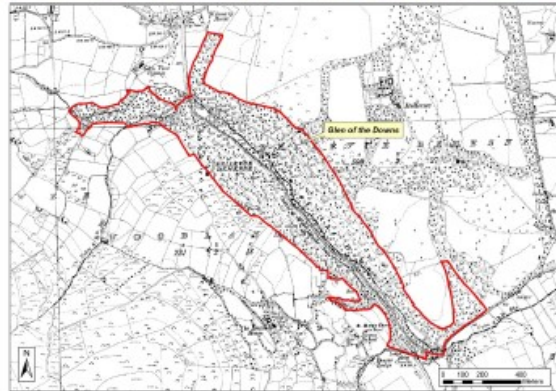
The location of the channel with a road passing through it means it is easily accessible, although the flanks are located presumably in private ownership or in commonage. However, there is no parking in the centre of the channel and it is inadvisable to stop on the N11 road. There is a car park in the glen off the N11 from which its northeast slopes can be accessed, but its size and context can probably be better appreciated viewing it from the narrow road which climbs from Delgany to cross the hill immediately southeast of the glen. This is best approached on foot from Delgany as it is narrow and there are no convenient parking spaces.



The Glen of the Downs, viewed from the south.



The Glen of the Downs, viewed from the northeast.



## WICKLOW - COUNTY GEOLOGICAL SITE REPORT

<b>NAME OF SITE</b>	Wicklow - Greystones Coast
Other names used for site	Wicklow Coast, The Murrough, The Breaches
<b>IGH THEME</b>	IGH13 – Coastal Geomorphology
<b>TOWNLAND(S)</b>	<i>Numerous townlands border this coastline</i>
<b>NEAREST TOWN/VILLAGE</b>	Wicklow, Greystones
<b>SIX INCH MAP NUMBER</b>	11
<b>ITM CO-ORDINATES</b>	731670E 703870N (at Six Mile Point)
<b>1:50,000 O.S. SHEET NUMBER</b>	56 GSI BEDROCK 1:100,000 SHEET NO. 16

### Outline Site Description

An uninterrupted shingle beach extending for over 17km between Greystones and Wicklow.

### Geological System/Age and Primary Rock Type

The shingle ridge (beach) is a Quaternary (Holocene) feature, and is understood to have formed around 5,000 years ago. At this time, a rise in sea-level carried eroded sea-floor glacial deposits into a shingle ridge.

### Main Geological or Geomorphological Interest

The low and flat terrain coastal landscape between Greystones and Wicklow town is underlain by Cambrian bedrock, which is not widely exposed between the two towns. Wicklow Head is a bold headland of slopes descending to rocky cliffs of grey schist. At Greystones, Cambrian greywacke rocks outcrop along the esplanade coastline.

Between the two towns is 'the Murrough'. This 15km long coastal wetland area borders the Irish Sea with an uninterrupted shingle ridge consisting of smooth rounded pebbles interspersed with sand particles. Sediment size increases from north to south, being dominated by sand along its northern stretch near Greystones, and by larger pebbles nearer Wicklow. The variation is understood to be a result of wave-induced grading of the ridge deposits by longshore drift.

At Six Mile point, a salient point (land jutting seaward) on the shingle coast has been armoured with a rampart of large boulders dumped to protect the railway. The shingle ridge carries the Dublin-Rosslare railway line. To the north, the Breaches are small inlets where the Kilcoole Marshes drain to the sea. Saltmarsh is present at the Breaches and further south at the brackish, partly tidal Broad Lough near Wicklow.

### Site Importance – County Geological Site; may be recommended for Geological NHA

This is an important County Geological Site that could be considered for a geological NHA status under the IGH13 Coastal Geomorphology theme. The site is located within the Murrough Wetlands SAC (002249), the largest coastal wetland complex on the east coast of Ireland and supports a number of habitats listed on Annex I of the EU Habitats Directive.

### Management/promotion issues

The site is publicly accessible from access points at e.g. Kilcoole Railway Station, Six Mile Point and Five Mile Point. Coastal protection works have been carried out by Iamród Éireann to protect the railway line, with the installation of rock armour on the seaward side of the line such as at Six Mile Point. Any future promotion of the Murrough Wetlands SAC should make reference to the natural processes of coastal erosion affecting this coastline, and also to the extensive shingle shoreline and greywacke boulders (defence walls).





Shingle beach and coastal defences (greywacke boulders) at Six Mile Point, looking north.



Railway bridge and shingle accumulations at the Breaches, looking north.



Coastal Defence Works sign at Six Mile Point.



Proximity of railway line to shore at Six Mile Point.



Coastal defences at Kilcoole Railway Station, looking north.



## WICKLOW - COUNTY GEOLOGICAL SITE REPORT

<b>NAME OF SITE</b>	Bray Head
Other names used for site	
<b>IGH THEME</b>	IGH 2 Precambrian to Devonian Palaeontology
<b>TOWNLAND(S)</b>	Newcourt, Ballynamuddagh, Rathdown Upper
<b>NEAREST TOWN/VILLAGE</b>	Bray
<b>SIX INCH MAP NUMBER</b>	8
<b>ITM CO-ORDINATES</b>	728020E 717060N (summit of headland)
<b>1:50,000 O.S. SHEET NUMBER</b>	56
<b>GSI BEDROCK 1:100,000 SHEET NO:</b>	16

### Outline Site Description

Coastal headland with extensive natural exposure and sea cliffs, plus railway cuttings.

### Geological System/Age and Primary Rock Type

Bray Head is composed of Cambrian rocks classified as the Bray Group. Most of the rock is greywacke slate, but the best exposed rocks are large sections of quartzite. These thick sandy units were formed as channels during original deposition. They are now more resistant to erosion and form the summit ridges.

### Main Geological Interest

Bray Head is a prominent landmark, an important public amenity area and a designated conservation area for its heathland. The scientific and other characteristics result from the geological foundation of hard Cambrian slates and quartzite rocks, for which this is the best place to see them in eastern Ireland. The site is interesting because of a variety of trace fossils found and described first from Bray Head. Although the animals that made them are not known, these traces left behind are now recognised throughout the world. The most notable is *Oldhamia*, a probable feeding trace, which has a radial pattern or a fan shaped pattern. The site is very important for the Irish fossil record it provides from Cambrian rocks, at a time when common invertebrate life forms were just beginning to proliferate.

### Site Importance - County Geological Site; recommended for Geological NHA

In terms of Cambrian palaeontology, the Irish record is very sparse. The numerous trace fossils found on Bray Head, which is the type locality for some species, are an important element of Cambrian faunas, best represented on Bray Head. The site should receive protection as a Natural Heritage Area for the palaeontological interest.

### Management/promotion issues

The site is relatively robust against most operations. Commercial fossil collecting should not be allowed, but in any case most museum specimens collected were probably found when fresh rock exposure was available in rail cuttings, as it is very difficult to find any fossils today. Any rock operations which compromise the railway line cuttings should be strictly forbidden. Any work on footpaths or other development which is permitted for any reason and which provides new exposures of fresh rock should be notified to GSI or the National Museum by NPWS. The walking path along the coast is very popular and surface upgrades make the site more accessible to all. The summit and paths on the top are well managed by the Council for amenity and recreation.



From the summit area looking south.



Bray Head from the seafront in Bray.



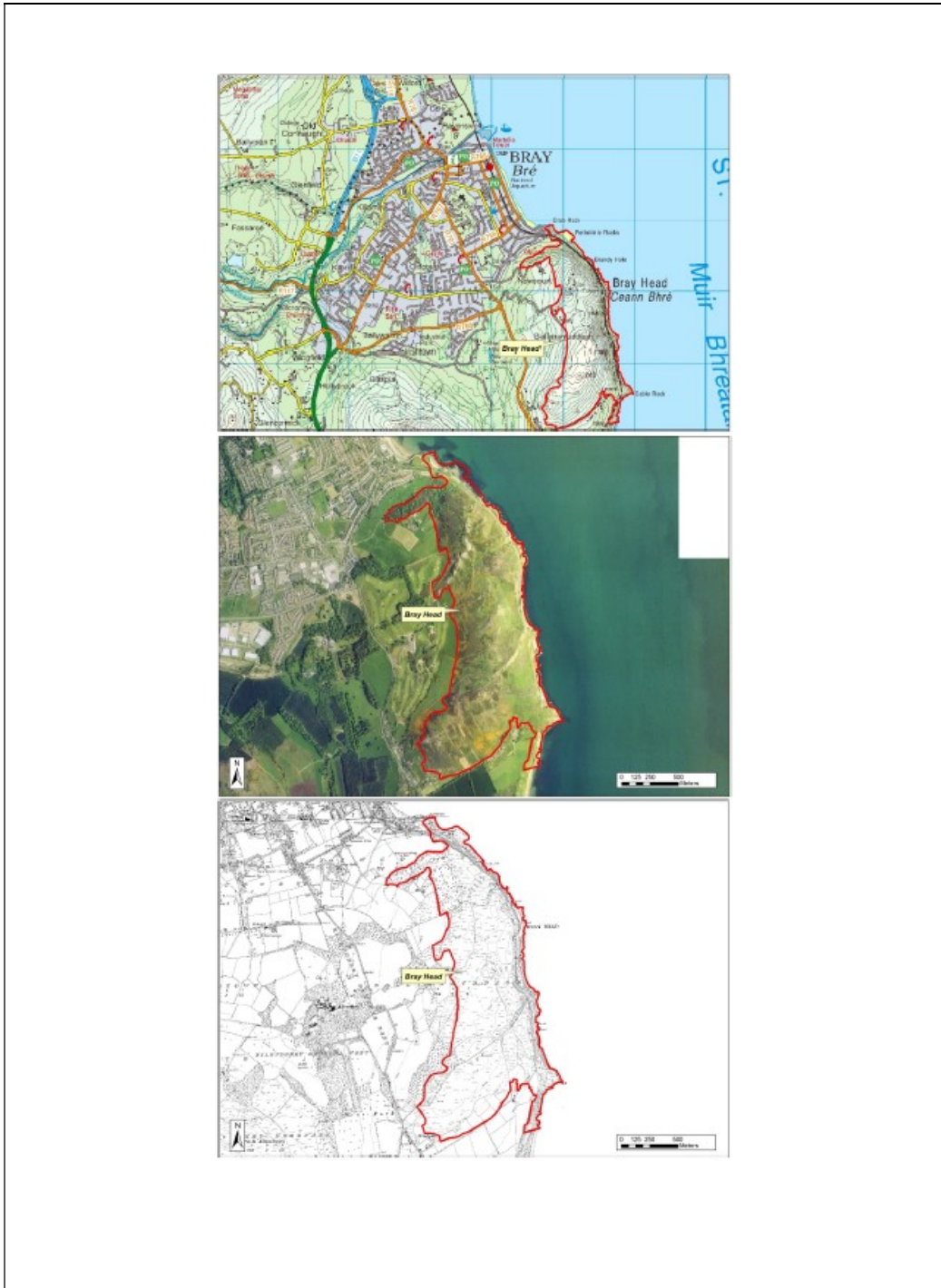
Looking north along the cliff path, with footpath above the railway line.



On the cliff path.



Looking north towards the summit.



## 7. APPENDIX 2 - Biodiversity Resources & Linkages

The following is a list of useful links to guides on a range of common biodiversity subjects.

Subject	Link(s)
Bats	<a href="http://www.batconservationireland.org/">www.batconservationireland.org/</a> <a href="https://www.facebook.com/dublinbatgroup/">www.facebook.com/dublinbatgroup/</a>
Birdwatching	<a href="http://www.birdwatchireland.ie/irelands-birds-birdwatch-ireland/">www.birdwatchireland.ie/irelands-birds-birdwatch-ireland/</a> <a href="http://www.irishbirding.com">www.irishbirding.com</a>
Children's Biodiversity Activities	<a href="http://www.birdwatchireland.ie/our-work/fun-learning/for-kids/">www.birdwatchireland.ie/our-work/fun-learning/for-kids/</a> <a href="http://www.woodlandtrust.org.uk/blog/2020/03/kids-nature-activities-self-isolation/">www.woodlandtrust.org.uk/blog/2020/03/kids-nature-activities-self-isolation/</a> <a href="http://www.rspb.org.uk/fun-and-learning/">www.rspb.org.uk/fun-and-learning/</a>
Garden Biodiversity	<a href="https://laois.ie/wp-content/uploads/Garden-Wildlife-Booklet-WEB-17MB.pdf">https://laois.ie/wp-content/uploads/Garden-Wildlife-Booklet-WEB-17MB.pdf</a>
General Biodiversity Issues	<a href="http://www.biodiversityireland.ie">www.biodiversityireland.ie</a> <a href="http://www.npws.ie">www.npws.ie</a>
Habitat and Nest Boxes	<a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-1-ALT_FINAL.pdf">www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-1-ALT_FINAL.pdf</a> <a href="http://www.birdwatchireland.ie/app/uploads/2019/09/Nestboxes-factsheet.pdf">www.birdwatchireland.ie/app/uploads/2019/09/Nestboxes-factsheet.pdf</a> <a href="http://www.batconservationireland.org/wp-content/uploads/2015/05/BCIrelandGuidelines_BatBoxes.pdf">www.batconservationireland.org/wp-content/uploads/2015/05/BCIrelandGuidelines_BatBoxes.pdf</a>
Hedgerows	<a href="http://www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-3-FINAL-1.pdf">www.biodiversityireland.ie/wordpress/wp-content/uploads/Pollinator-How-to-Guide-3-FINAL-1.pdf</a> <a href="https://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf">https://www.heritagecouncil.ie/content/files/conserving_hedgerows_2mb.pdf</a> <a href="https://63273-649646-raikfcquaxqncofqfm.stackpathdns.com/wp-content/uploads/2019/04/Hedgerow-CasestudyASPau121-Send-for-New-Website.pdf">https://63273-649646-raikfcquaxqncofqfm.stackpathdns.com/wp-content/uploads/2019/04/Hedgerow-CasestudyASPau121-Send-for-New-Website.pdf</a> <a href="https://mosart.ie/wp-content/uploads/2016/02/Irish-Hedgerows-Networks-for-Nature.pdf">https://mosart.ie/wp-content/uploads/2016/02/Irish-Hedgerows-Networks-for-Nature.pdf</a> <a href="http://www.hedgelaying.ie">www.hedgelaying.ie</a>
Interpretative Signage	<a href="https://www.nature.scot/sites/default/files/2019-11/Guidance%20-%20Natural%20heritage%20interpretation_1.pdf">https://www.nature.scot/sites/default/files/2019-11/Guidance%20-%20Natural%20heritage%20interpretation_1.pdf</a> <a href="https://www.heritagecouncil.ie/content/files/bored_of_boards_1mb.pdf">https://www.heritagecouncil.ie/content/files/bored_of_boards_1mb.pdf</a> <a href="https://pollinators.ie/resources/signage-templates/">https://pollinators.ie/resources/signage-templates/</a>
Invasive Alien Species	<a href="https://invasivespeciesireland.com/">https://invasivespeciesireland.com/</a> <a href="https://www.fisheriesireland.ie/Invasive-Species/invasive-species.html">https://www.fisheriesireland.ie/Invasive-Species/invasive-species.html</a>
Orchards	<a href="http://www.irishseedsavers.ie/blog/wp-content/uploads/2014/10/CreatingAnOrchard.pdf">http://www.irishseedsavers.ie/blog/wp-content/uploads/2014/10/CreatingAnOrchard.pdf</a> <a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/11466/1973262.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/11466/1973262.pdf</a> <a href="http://www.wetlandsystems.ie/goephow.html">http://www.wetlandsystems.ie/goephow.html</a> <a href="https://www.theorchardproject.org.uk/">https://www.theorchardproject.org.uk/</a>
Pollinator Friendly Planting Schemes	<a href="https://pollinators.ie/resources/">https://pollinators.ie/resources/</a> <a href="https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Planting-Code-2018-WEB.pdf">https://pollinators.ie/wordpress/wp-content/uploads/2018/04/Planting-Code-2018-WEB.pdf</a> <a href="http://www.rhs.org.uk">www.rhs.org.uk</a>
Pollinators	<a href="https://pollinators.ie/">https://pollinators.ie/</a>
Recording Biodiversity	<a href="https://www.biodiversityireland.ie/record-biodiversity/">https://www.biodiversityireland.ie/record-biodiversity/</a>

Subject	Link(s)
Reducing Herbicide Use	<a href="https://greensideup.ie/16-natural-alternatives-to-herbicide-why-you-should-use-them/">https://greensideup.ie/16-natural-alternatives-to-herbicide-why-you-should-use-them/</a>
Schools & Biodiversity	<a href="https://greenschoolsireland.org/biodiveristy/">https://greenschoolsireland.org/biodiveristy/</a> <a href="https://pollinators.ie/schools/">https://pollinators.ie/schools/</a> <a href="http://www.heritageinschools.ie/teachers-resources/strand/living-things-science/p3?q=&amp;c=">http://www.heritageinschools.ie/teachers-resources/strand/living-things-science/p3?q=&amp;c=</a>
Swifts	<a href="https://birdwatchireland.ie/our-work/surveys-research/research-surveys/swift-surveys/">https://birdwatchireland.ie/our-work/surveys-research/research-surveys/swift-surveys/</a> <a href="http://www.swiftconservation.ie/">www.swiftconservation.ie/</a>
Tree Identification & Selection	<a href="http://www.treecouncil.ie/nativeirishtrees">www.treecouncil.ie/nativeirishtrees</a> <a href="http://www.clarecoco.ie/services/planning/publications/tree-design-guide-for-towns-and-villages-in-co-clare-2017-28115.pdf">www.clarecoco.ie/services/planning/publications/tree-design-guide-for-towns-and-villages-in-co-clare-2017-28115.pdf</a>
Urban Watercourses	<a href="https://www.fisheriesireland.ie/extranet/fisheries-management-1/1756-ifi-urban-watercourses-planning-guide-2020-update.html">https://www.fisheriesireland.ie/extranet/fisheries-management-1/1756-ifi-urban-watercourses-planning-guide-2020-update.html</a>
Water Quality	EPA Maps - maps with details about soils, water quality, habitat <a href="http://gis.epa.ie/EPAMaps/EnvironmentAndWellbeing">http://gis.epa.ie/EPAMaps/EnvironmentAndWellbeing</a> <a href="https://gis.epa.ie/EPAMaps/Water">https://gis.epa.ie/EPAMaps/Water</a>
Wildflower Meadows	<a href="https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Wildflower-Meadows-2018-WEB.pdf">https://pollinators.ie/wordpress/wp-content/uploads/2018/04/How-to-guide-Wildflower-Meadows-2018-WEB.pdf</a>
Wildflowers	<a href="http://www.wildflowersofireland.net/index.php">www.wildflowersofireland.net/index.php</a> <a href="http://www.bsbi.org">www.bsbi.org</a>
Wildlife Ponds	<a href="https://www.wildlifetrusts.org/actions/how-build-pond">https://www.wildlifetrusts.org/actions/how-build-pond</a> <a href="https://invasivespeciesireland.com/wp-content/uploads/2017/10/AQUATICS_BOOK5.pdf">https://invasivespeciesireland.com/wp-content/uploads/2017/10/AQUATICS_BOOK5.pdf</a>
Woodland	<a href="http://www.woodlandsofireland.com/sites/default/files/Management%20Guidelines%20for%20Ireland%27s%20Native%20Woodlands%202017.pdf">http://www.woodlandsofireland.com/sites/default/files/Management%20Guidelines%20for%20Ireland%27s%20Native%20Woodlands%202017.pdf</a> <a href="https://www.forestryfocus.ie/social-environmental-aspects/biodiversity-and-nature-conservation/biodiversity-in-forests/conservation-and-restoration/">https://www.forestryfocus.ie/social-environmental-aspects/biodiversity-and-nature-conservation/biodiversity-in-forests/conservation-and-restoration/</a> <a href="http://www.woodlandsofireland.com/sites/default/files/Silvicultural%20Guidelines%20for%20Native%20Trees.pdf">http://www.woodlandsofireland.com/sites/default/files/Silvicultural%20Guidelines%20for%20Native%20Trees.pdf</a>