

Green Infrastructure and Ecosystem Services Scoring at County level

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DLR County Wildlife Corridor Plan and Applying Ecosystem Services Scoring



EU Green Infrastructure

Green infrastructure is defined in the EU green infrastructure strategy as

`a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services.

It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas.

Green infrastructure is the ecological framework for environmental, social, and economic health – in short, our natural life-support system. (Benedict & McMahon 2006, p. 1)

https://ec.europa.eu/environment/nature/ecosystems/index_en.htm

Benedict, MA & McMahon, E 2006, Green infrastructure: linking landscapes and communities, Island Press, Washington, DC.

EU Green Infrastructure



- EU green infrastructure (GI) includes:
- the Natura 2000 network as its backbone,
- natural and semi-natural spaces outside Natura 2000,
- parks, private gardens, hedgerows, vegetated buffer strips along rivers or structure-rich agricultural landscapes with certain features and practices, and
- artificial features such as green roofs, green walls, or ecobridges and fish ladders.
- The annual economic benefits of ecosystem services provided by the Natura 2000 network alone have been estimated at EUR 300 billion across the EU.



Potential components of a Green Infrastructure



- Core areas of high biodiversity value which act as hubs for GI, such as protected areas like Natura 2000 sites



- Core areas outside protected areas containing large healthy functioning ecosystems



- Restored habitats that help reconnect or enhance existing natural areas, such as a restored reedbed or wild flower meadow



- Natural features acting as wildlife corridors or stepping stones, like small watercourses, ponds, hedgerows, woodland strips



- Artificial features that enhance ecosystem services or assist wildlife movement such as eco-ducts or eco-bridges, fish ladders or green roofs



- Buffer zones that are managed sustainably and help improve the general ecological quality and permeability of the landscape to biodiversity, e.g. wildlife-friendly farming



- Multi-functional zones where compatible land uses can join forces to create land management combinations that support multiple land uses in the same spatial area, e.g. food production and recreation



Potential Components of Green Infrastructure

EU Green Infrastructure

The EU definition of Green Infrastructure (EU, 2013) includes three important aspects:

- the idea of a network of areas,
- the concept of ecosystem services. Green Infrastructure is the tool by which ecosystem services can be provided,
- the component of planning and management.

EU Green Infrastructure

- GI deployment can be achieved through both the conservation of existing biodiversity-rich ecosystems in good condition and the restoration of degraded ecosystems, both inside and outside of the Natura 2000 network.
- GI is also implicitly addressed in instruments related to particular ecosystems, such as Ireland's National Peatlands Strategy.
- However, with the exception of Germany's 'national GI concept', Member States have not yet adopted national strategies specifically dedicated to GI. Some national strategies are being developed (e.g. in Spain).

Review of progress on implementation of the EU green infrastructure strategy EU 2019

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019DC0236&qid=1562053537296>

Ecosystem Services



As mentioned earlier GI is seen as a tool for delivering ecosystem services.



Ecosystem services are the benefits that flow from nature to people. They can be provisioning (e.g. the supply of food, clean air and water), regulating (e.g. regulating water flows and water quality), or cultural (e.g. recreation opportunities, or the inspiration we draw from nature).



Natural ecosystems are multifunctional.



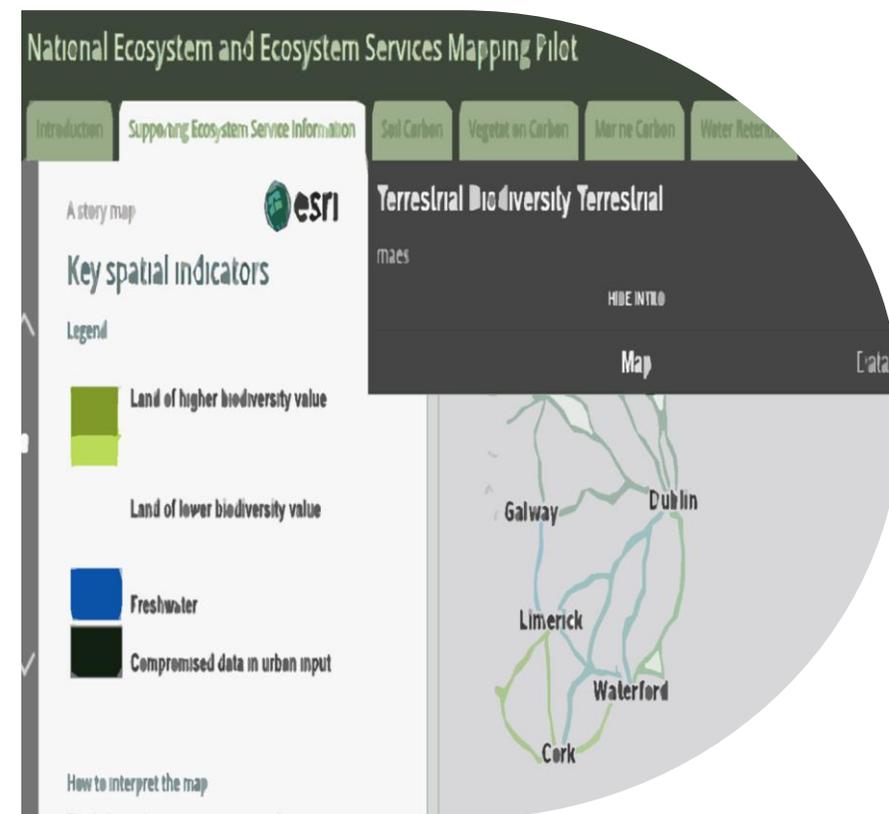
What services people benefit from depends largely on biodiversity and ecosystem condition.



Cost-effective alternatives to traditional 'grey' infrastructure, offering benefits to us and biodiversity.

Ecosystem Services Scoring

- Like all EU Member States, Ireland are implementing Action 5 of the EU Biodiversity Strategy and the subsequent MAES Process (Mapping and Assessment of Ecosystems and their Services)
- **Here in Ireland NPWS published its Mapping and Assessment of Ecosystem Services. National Ecosystem and Ecosystem Service (NEES) mapping pilot undertaken for the NPWS in 2016.**



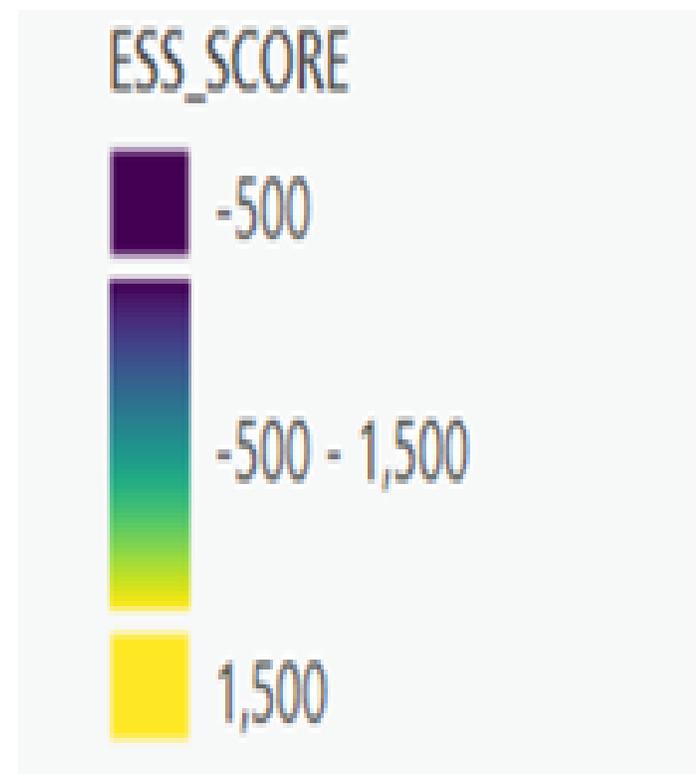
Ecosystem Services Scoring

The proposed scoring system for DLR wildlife corridors and associated areas is based on the ecosystem services scores (ESS) developed by Parker et al. (2016) during the mapping pilot undertaken for the NPWS -National Ecosystem and Ecosystem Service (NEES) .

We will take a look now at DLR

<https://www.npws.ie/research-projects/ecosystems-services-mapping-and-assessment>

<https://ecosystemsknowledge.net/sence-spatial-evidence-natural-capital-evaluation>





The DLR Wildlife Corridor Plan

Dun Laoghaire is urban in the east of the county and more rural in the west

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

The DLR Wildlife Corridor Plan ('Plan') aims to promote landscape connectivity and to provide information to decision makers, planners, developers and other land managers in order to integrate and consider wildlife corridors in plans, policies and projects.

The Plan will assist in identifying areas of habitat in the landscape, highlighting the quality and locations of existing connectivity, identifying gaps in connectivity and recognising the inherent value of a wildlife corridor for both mobile and non-mobile species, including resident species and the value of habitats both within and associated with our wildlife corridors.

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

This Plan is very important in an Urban County where these corridors are often the remaining areas for biodiversity – squeezed into narrow strips running along housing estates or along streams and verges or green areas scattered across the hardstanding.

It is also important for Climate Change – as increasing connectivity forms one of the main principles for adaptation to Climate Change in our DLR Biodiversity Action Plan to increase biodiversity resilience

We decided to also trial the Ecosystem Services Scoring to our wildlife corridors and habitats we can further understand how they contribute to green infrastructure in our county.

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

Ecosystem Services Scoring Table 1



The descriptions and the scores applied to each ESS by Parker et al. (2016) in the NEES.

Description	Score
Major negative	-300
Moderate negative	-200
Minor-moderate negative	-150
Minor negative	-100
Very low negative	-50
Negligible negative	-25
No effect on service	0
Negligible	25
Very low	50
Low	75
Low-Moderate	100
Moderate	150
Moderate-High	175
High	200
High-very high	250
Very high	300

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

Ecosystem The Habitat Asset Register produced during NEES allows the habitats that are mapped within DLR to be scored based on how they support the ecosystem services listed in Table 2 here.

Table 1 in previous slide, produced during the NEES project, was used to convert the assessment for each habitat across the five ESS and biodiversity into an overall ESS score that is used in the 'DLRCC_ESS Scoring_Draft' by BEC Consultants Ltd

Attribute	ESS
Land promoting good water quality (of freshwater)	Regulation of water quality
Soil carbon	Regulation of greenhouse gas CO ₂
Vegetation carbon	Regulation of greenhouse gas CO ₂
Land temporarily storing water	Regulation of water flow
Terrestrial food	Provision of food from crops and livestock
Terrestrial biodiversity	Supports natural systems and services and adds resilience

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

- Some habitats were not allocated a score in the NEES and so new scores for DLR were created.
- Some of the scoring required tweaking for various habitats.
- One important constraint highlighted by Parker et al, in the study was the absence of Habitat Condition for the scoring.
- Data quality varied

Example of ESS Tweeking

- Under the scoring system marsh (Fossitt code GM1) and the Annex I habitat 6430 have a score of 'very low' for terrestrial biodiversity, the same as improved agricultural grassland (Fossitt code GA1).
- The reason given was it was assumed as a mono species stand based on their national level assessment. Whereas at local level, as it is a habitat that we consider to have a fair to good diversity of species the scoring was increased.



Example of Habitat ESS

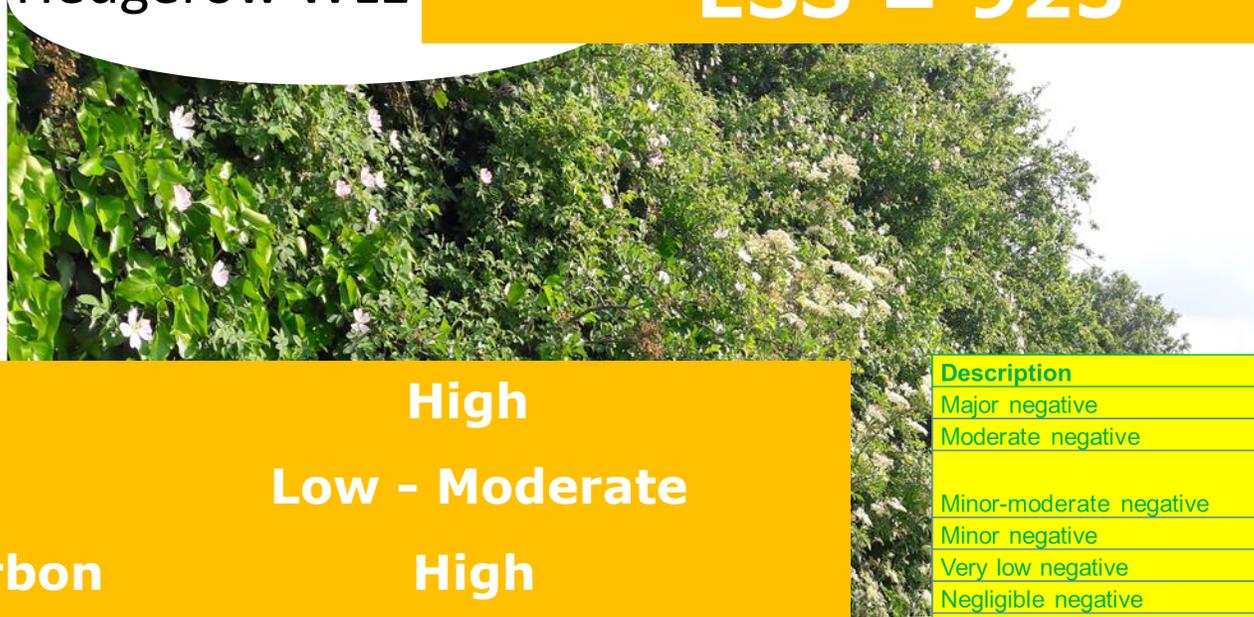
Score for Hedgerow WL1 (Fossit, 2000)



Example of Habitat ESS

Score for Hedgerow WL1

ESS = 925



- **Water Quality** **High**
- **Soil carbon** **Low - Moderate**
- **Vegetation carbon** **High**
- **Terrestrial biodiversity** **Moderate - High**
- **Food terrestrial** **Very Low**
- **Temporary water storage** **High**

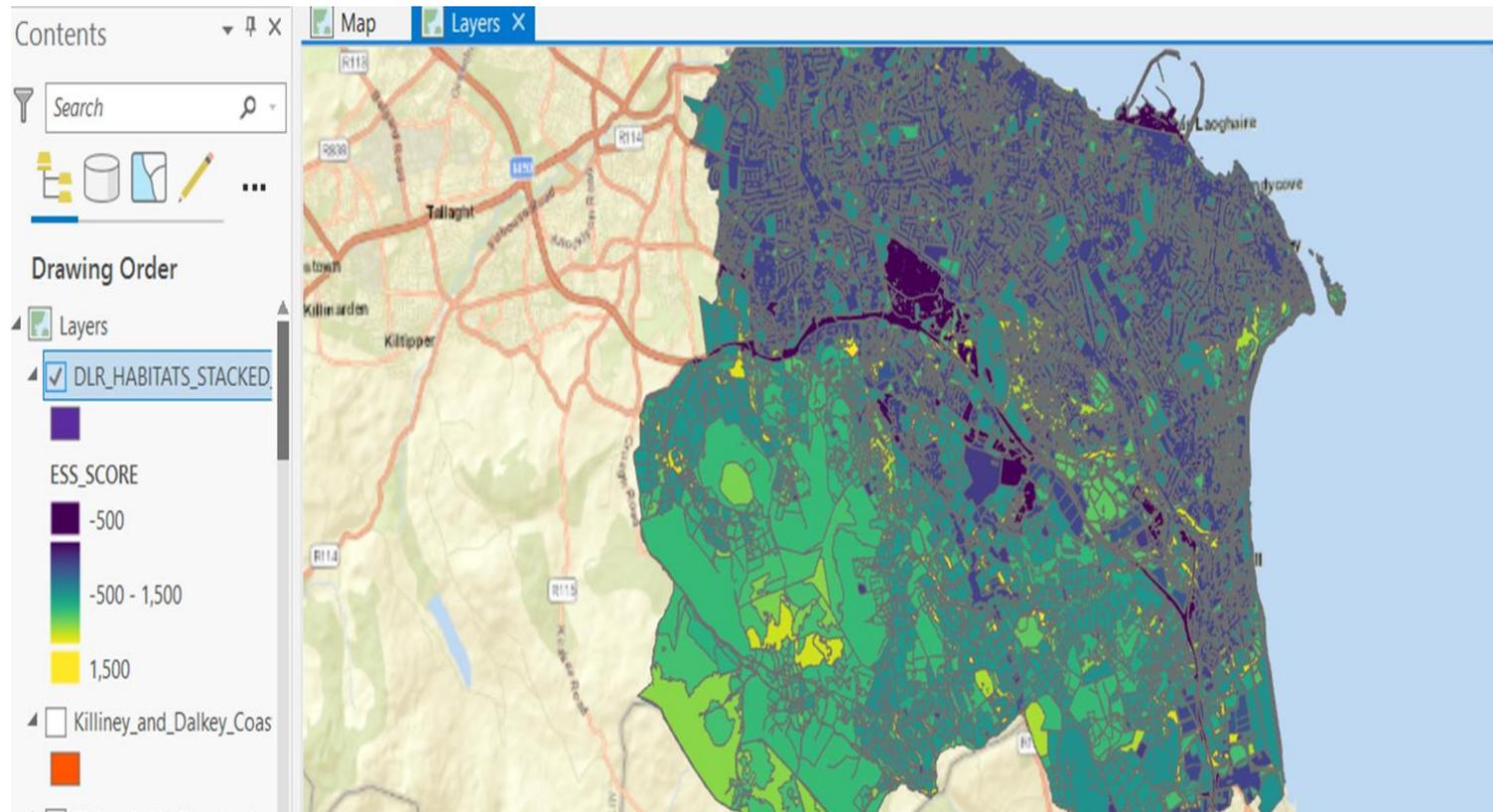
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DLR Wildlife Corridor Plan and Ecosystem Services Scoring

- One of the constraints highlighted in the NPWS work is the absence of information on the Condition of our Habitats and Species.
- This will be important in future calculations for Natural Capital and Ecosystem Services
- What is the Terrestrial Biodiversity value of a hedgerow that is intensively managed, or low in species diversity, or if it has not associated ditch, no field margin etc.

DLR Wildlife Corridor Plan and Ecosystem Services Scoring

- DLR are currently looking at our hedgerows to evaluate their condition which will hopefully add to understanding their ecosystem services and apply a scoring to them at a local level. We are also reviewing our county habitats also.



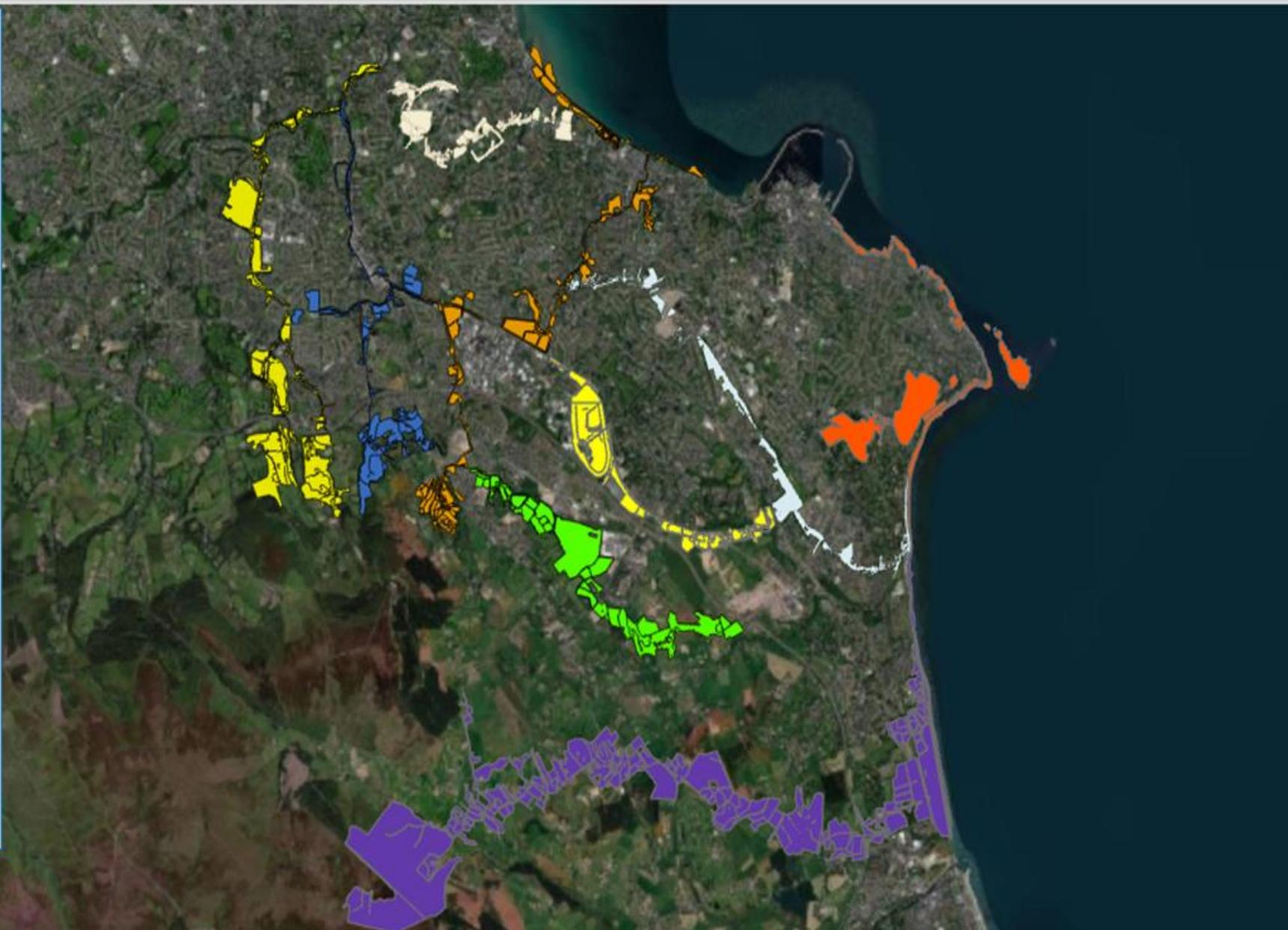
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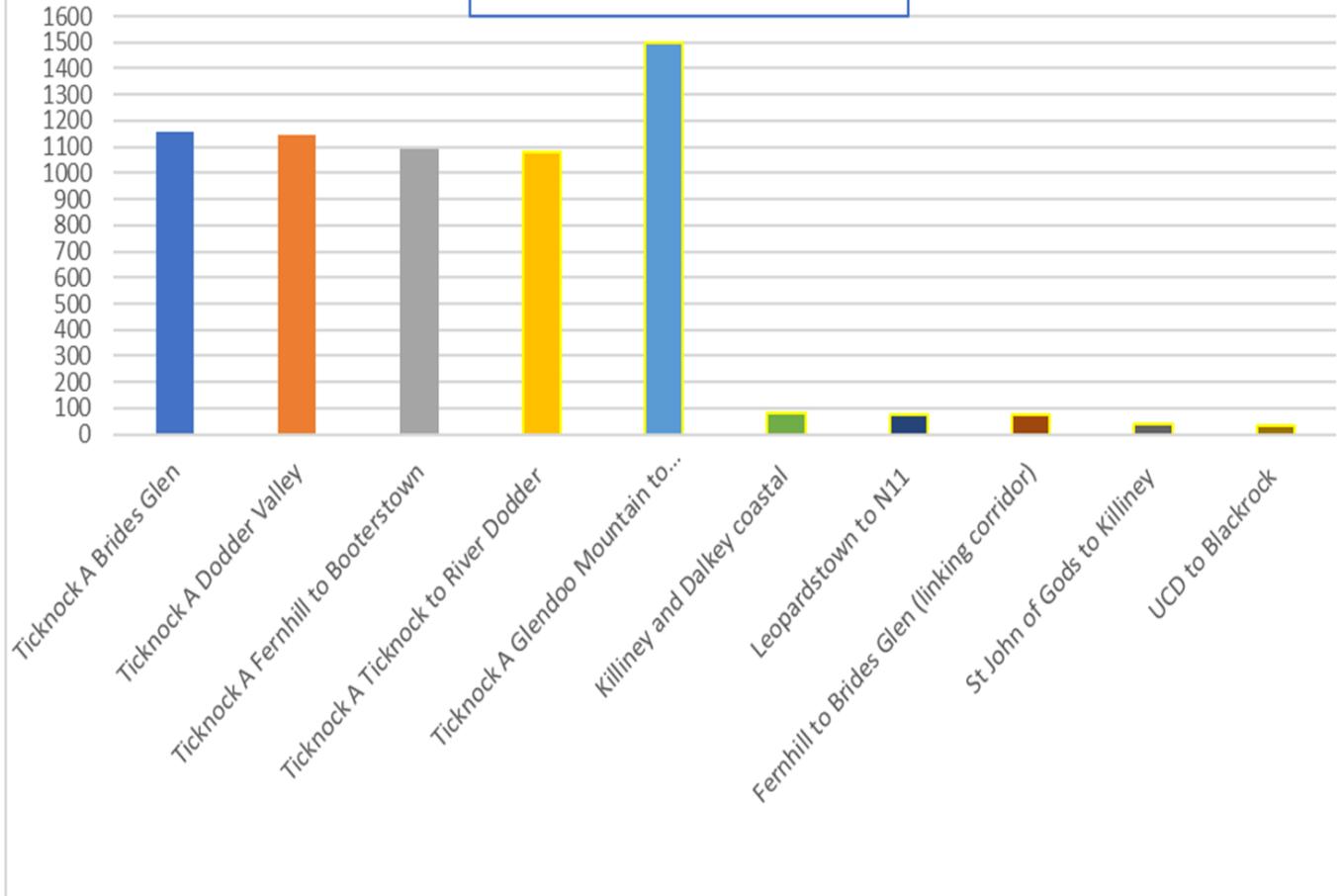


Drawing Order

- Leopardstown_to_N11_Wildlife_Corridor_Habitats
- Glendoo_Mountain_to_Shanganagh_Wildlife_Corridor_Habitats
- Fernhill_to_Brides_Glen_Linking_Corridor_Habitats
- Fernhill_to_Boosterstown_Wildlife_Corridor_Habitats
- Dodder_Valley_Wildlife_Corridor_Habitats



Ecosystem Services Scoring DLR Wildlife Corridors



DLR Wildlife Corridor Plan
and Ecosystem Services Scoring

Contents

Search



Drawing Order



Ticknock_Biodiversity_Area_Habitats



ESS_SCORE



-150



-150 - 1,400



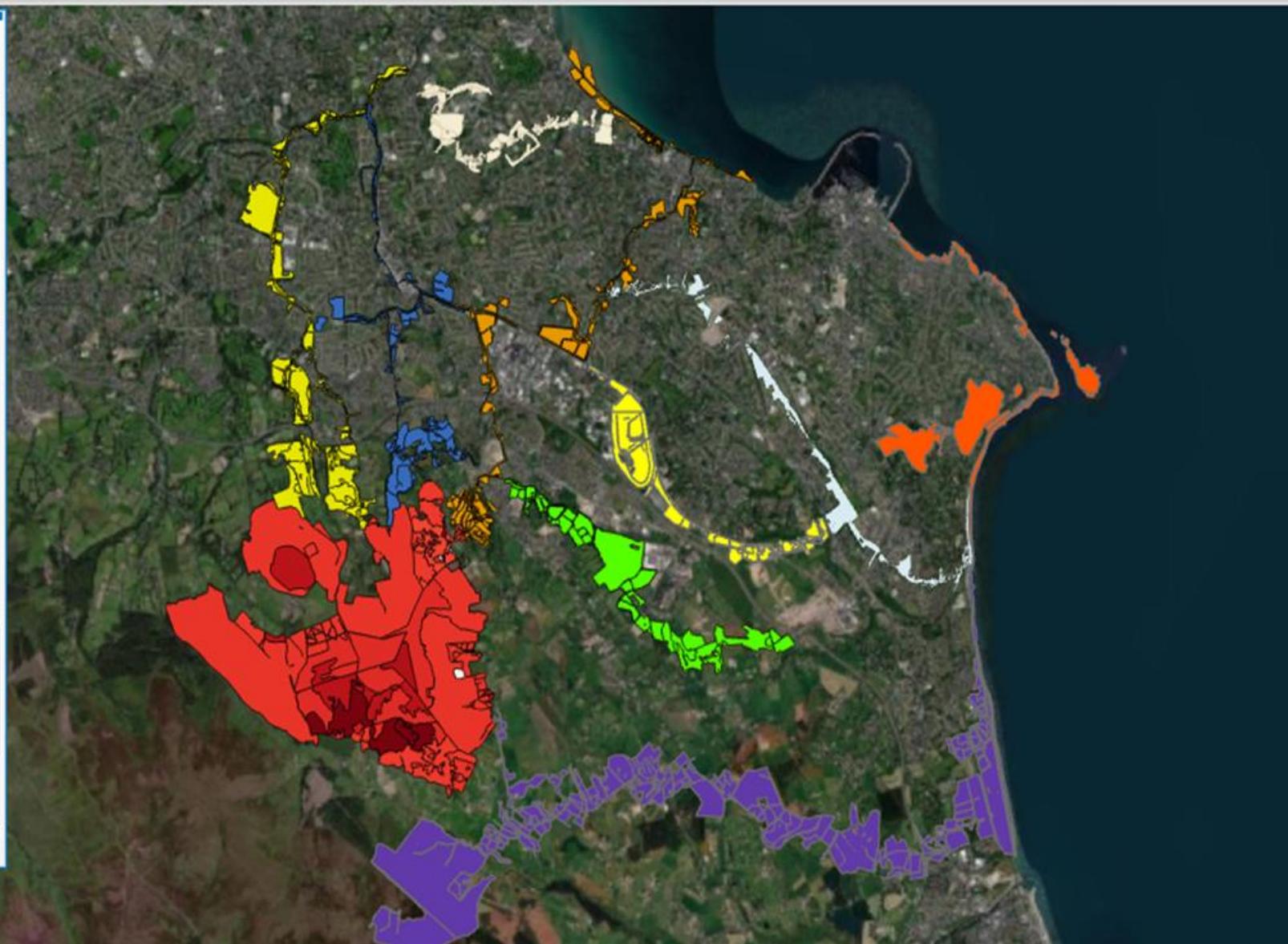
1,400

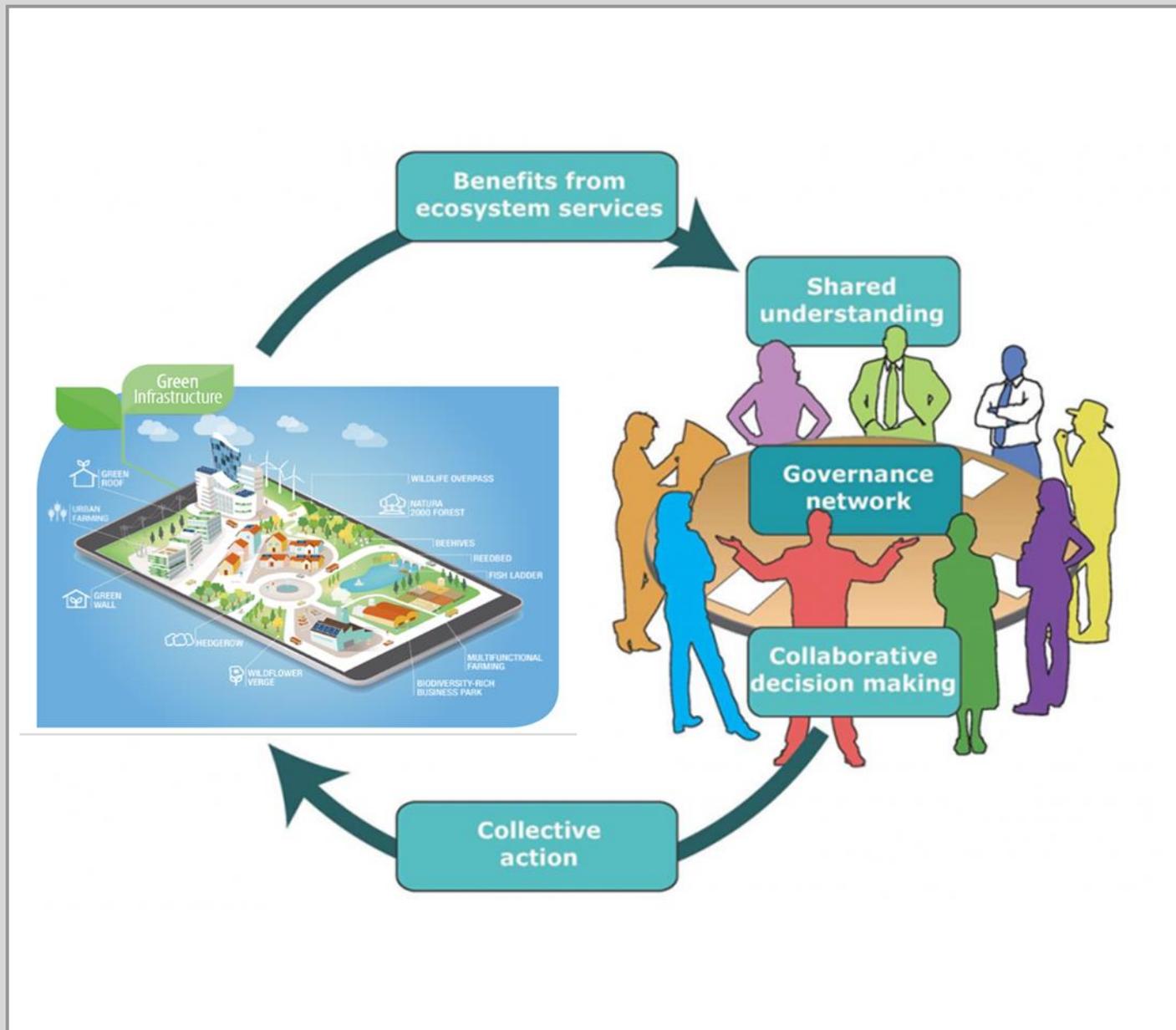
Charts



Comparison of Area_Ha, ESS_SCORE by

OS3020_D.TIF

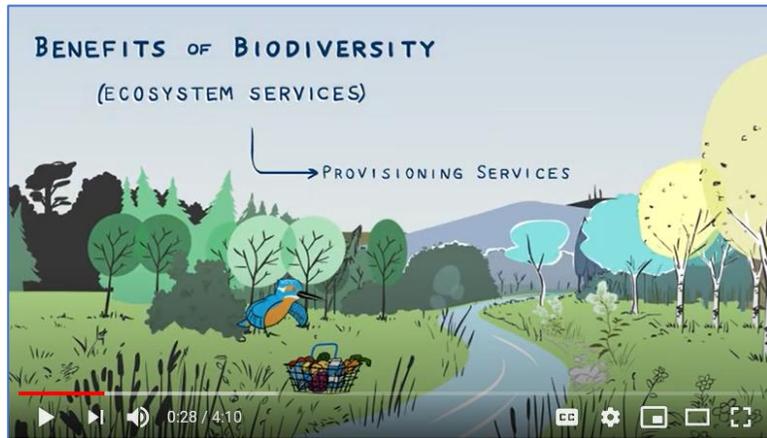




DLR Wildlife Corridor Plan
and Ecosystem Services Scoring

Planning and Decision- Making Tools

- Education and Raising Awareness
- Having the data – maps on Planning Browser internally
- Providing a value that can be understood
- Providing tools to decision makers to assist them in their decisions



<https://youtu.be/cAg0TVPsZdM>



DLR Wildlife Corridor Plan
and Ecosystem Services Scoring

Planning and Decision- Making Tools



DLR Wildlife Corridor Plan
and Ecosystem Services Scoring

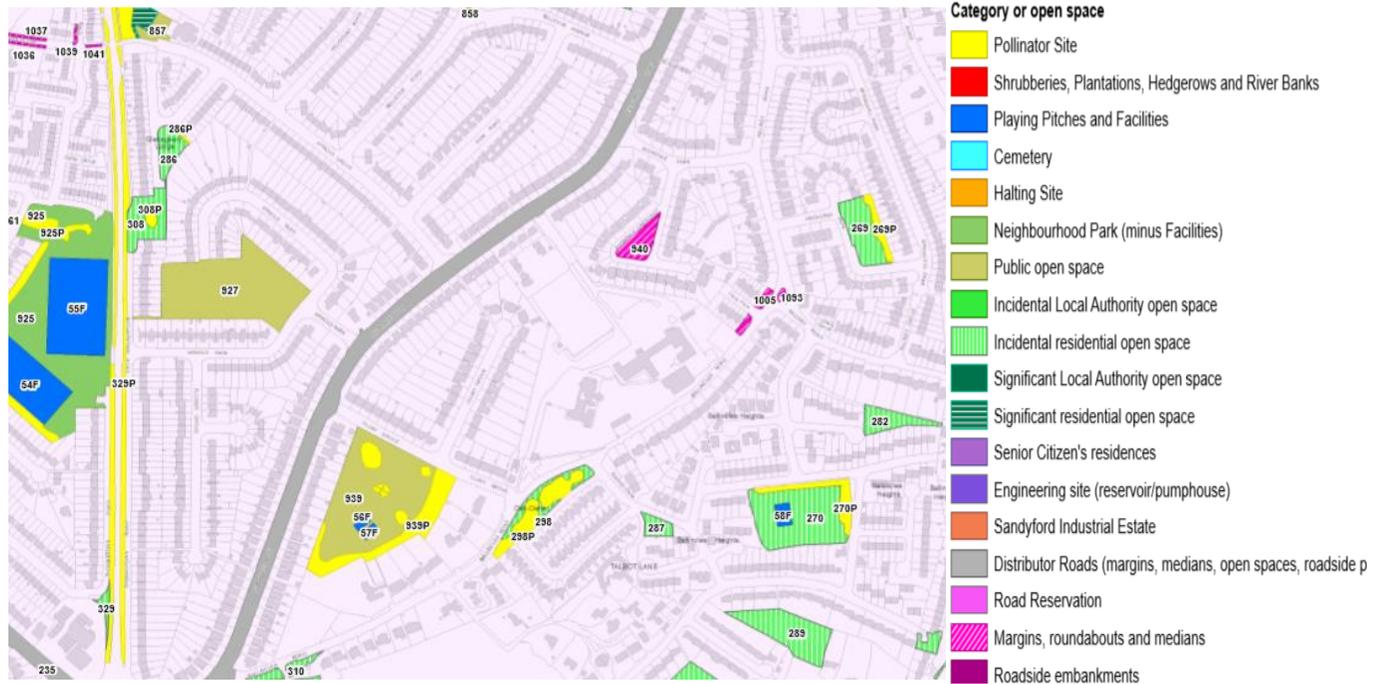
DLR Planning Map Browser

- EU Natura 2000 sites ✓
- NHAs and pNHAs ✓
- Important Habitats ✓
- Locally Important Areas **new 2020**
- Hedgerows ✓
- Important Species ✓
- Rare Plants ✓
- GI – Wildlife Corridors Buffer **new 2020**
- Ecosystem Services Scores **2018 - 2021**
- Adding Pollinator areas etc. ✓



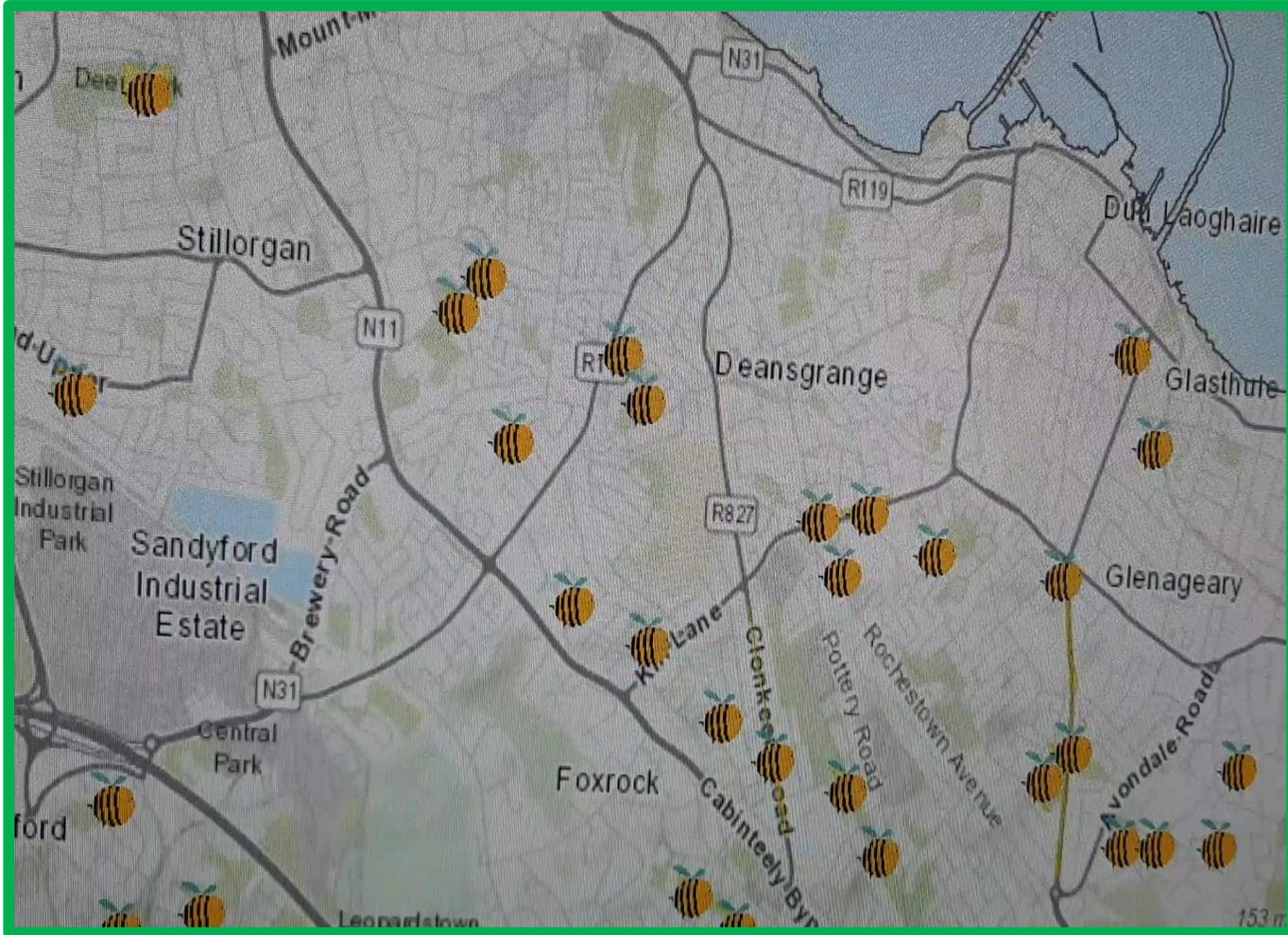
DLR Wildlife Corridor Plan
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DLR Landscape Management for Pollinators



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DLR Landscape Management for Pollinators



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Thank You



**DLR Wildlife Corridor Plan
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