

Grass to Gas

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Department of Housing,
Local Government and Heritage



Session : Grass to Gas

Contents

- **Context**
- **Methods and Modelling**
- **Results**
- **Cost-Benefit**
- **Ecosystem Services and Accounting**
- **Sustainable Urban Neighbourhoods**

Kildare County Council

‘What can we do with our waste grass?’

Challenge:

Kildare County Council, along with other local authorities and public agencies, are faced with challenges around sustainably managing their public spaces into the future (cost, biodiversity etc).

Opportunity:

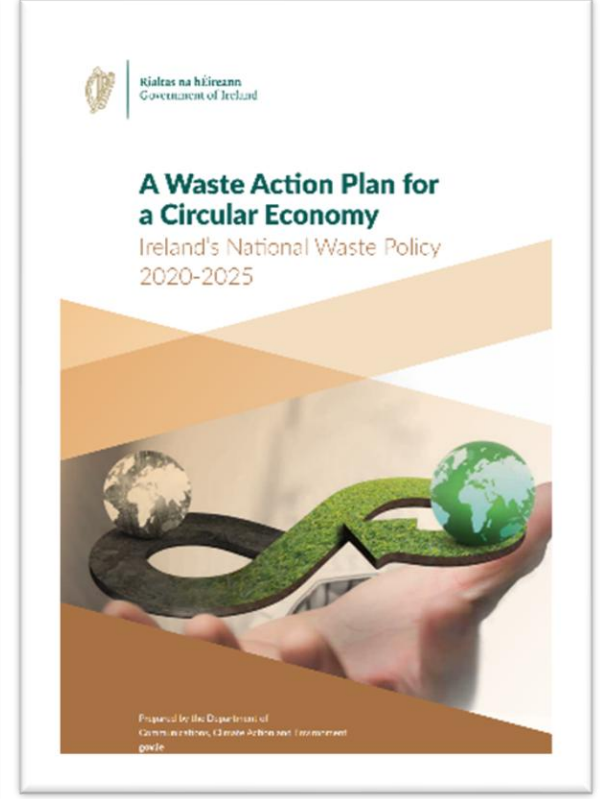
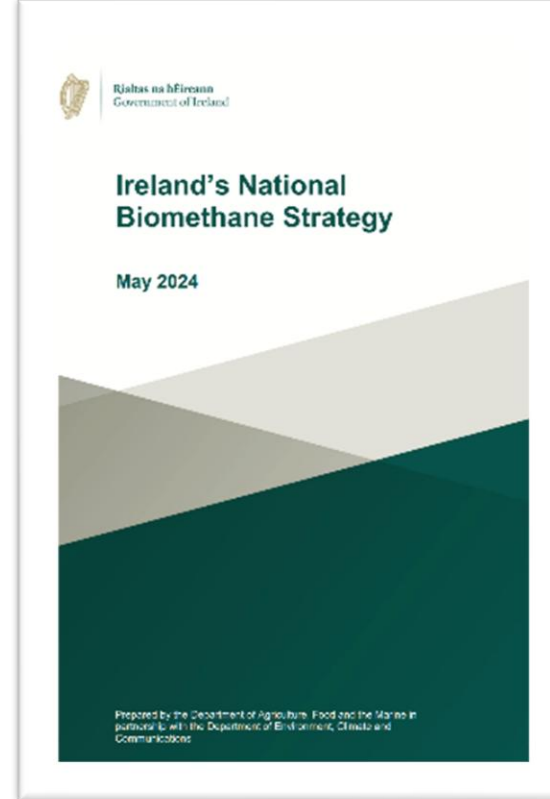
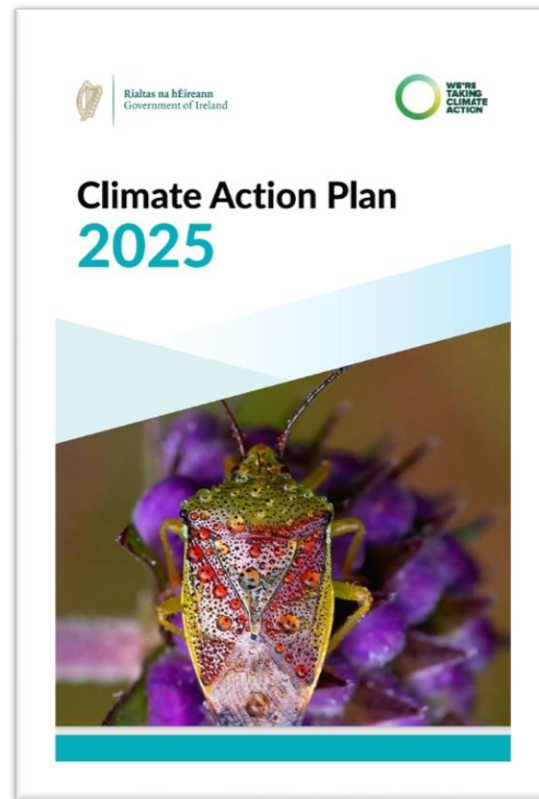
- Ireland identified by the European Commission as having the highest per capita biomethane production potential in Europe
- 28th May 2024, Ireland introduced its first-ever **National Biomethane Strategy**, setting ambitious targets to develop the country’s biomethane industry. The government aims to produce **5.7 terawatt-hours (TWh)** of biomethane annually by 2030, **tripling the target** set in 2019
- Kildare is a prime area for Biomethane injection owing to the dense gas pipeline network and biomethane injection site at Cush
- Multiple co-benefits: enhance biodiversity, contribute to climate mitigation through fossil fuel substitution, support rural economy



Gas Networks Ireland existing Gas Pipeline Network Map

Session : Grass to Gas

Relevant Local and National Policies and Plans



How to better meet the needs of international/EU, national and regional policies and targets including National Climate Action Plan 2025, National and EU Biomethane Strategy, EU Biodiversity Strategy, Waste Action Plan for a Circular Economy etc.

Aims & Objectives

The overall aim is to bring together a wide group of stakeholders (KCC, Teagasc, Green Generation and GNI) – **to research, design, build and test a prototype county-scale biomethane decision support toolset** to support the management of biomass to biomethane production at county scale.



The objectives of 'Grass to Gas' were to:

- Establish a stakeholder group including main partner KCC as well as Teagasc, Green Generation AD & Gas Networks Ireland) who all have shared interests in biomethane production
- Utilise the outputs of earlier studies in 2023/2024 to explore how these models can be scaled to operate at County scale considering biomass growth computation over the growing season
- Consider broader sustainable, environmental (including biodiversity), societal and economic benefits of developing a biomethane production ecosystem in Kildare
- Demonstrate how lessons learnt in this KCC collaborative project could be adopted by other LAs and State bodies.

Methods & Modelling

- County Scale
- Representative Area Polygons (RAPS)
- Parcel Area Polygons (PAPs)

Terrestrial Modelling for Sustainability (TeMS)

A reporting tool for farms and other land environments.





KCC Data Catalogue

Terrain-AI - Kildare County Council | Data Platform

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Data Catalogue Apps

Active Filters

Reference

ALL SPACEBORNE AIRBORNE UAV GIS IN-SITU

JUPYTER MODELLED ML

Text Search

Search for a word or exact phrase

Location

Start typing or select from below

All

Sort by Title ascending

Results per page 10

Grass 2 Gas Main Areas
GIS | Grass | Biomass Generation
This layer and the associated "Grass 2 Gas Pilot Areas" layer were created to be sent out with KCC's tender documentation for Grass Maintenance contracts across the county. The grass maintenance contract includes for provision of grass cutting, litter picking, associated traffic management and maintenance of shrubs and bulb planting. KCC created 2 layers on the GIS system - the main grass cutting layer defined by areas where grass will be cut a number of times as specified in the attribute table (ranging from once per year up to 16 times in the season). KCC have also noted any other items such as litter picking, strimming, shrub pruning mulching and specified any other restrictions or requirements in the Other or notes column in the attribute table.
14-03-2024 to 14-03-2024
Details

Grass 2 Gas Pilot Areas
GIS | Grass | Biomass Generation
This layer and the associated "Grass 2 Gas Main Areas" layer were created to be sent out with KCC's tender documentation for Grass Maintenance contracts across the county. Kildare County Council Pilot Maps show biodiversity focused areas where the grass has been allowed to grow longer into meadows. In this selection, some meadows only to be mown at the end of the maintenance season (September/October) with others being cut 5 times a year, beginning after April 15th. KCC have also noted any other items such as litter picking, strimming, shrub pruning mulching and specified any other restrictions or requirements in the Other or notes column in the attribute table.
14-03-2024 to 14-03-2024
Details

In-Situ Grass Growth Data for Monread Park
In-situ | Grassland | Grass Growth
Summary filtered grass plate data for Monread Park taken on 2023-09-06 and 2023-10-13. Included files also give individual readings within the survey site, returning the following variables: Hight(mm), Time, Date, Latitude, Longitude, Temperature(deg C), Battery(%), and Calibration.
05-09-2023 to 12-10-2023
Details

In-Situ Grass Growth Data for Pairc na nÓg
In-situ | Grassland | Grass Growth
Summary filtered grass plate data for Pairc na nÓg taken on 2023-10-13. Included files also give individual readings within the survey site, returning the following variables: Hight(mm), Time, Date, Latitude, Longitude, Temperature(deg C), Battery(%), and Calibration.
12-10-2023 to 12-10-2023
Details

Showing 1 to 10 of 17

Reference

154 11 3 9 104 5

ALL SPACEBORNE AIRBORNE UAV GIS IN-SITU

JUPYTER MODELLED ML

TerrainAI Maynooth University

Products Types Explore

home >> products >> s2_i2a

s2_i2a: Sentinel-2a and Sentinel-2b imagery, processed to Level 2A (Surface Reflectance) and converted to Cloud Optimized GeoTIFFs

All years

REGIONS DATASETS

s2_i2a whole collection

In-Situ Grass Growth Data for Monread Park

Resource abstract

Summary filtered grass plate data for Monread Park. Included files also give individual readings within the survey site, returning the following variables: Hight(mm), Time, Date, Latitude, Longitude, Temperature(deg C), Battery(%), and Calibration.

Reference

In-situ

Topic category

Grassland

Sub Category

Grass Growth

Resource type

Dataset

Resource language

CSV

Keyword

Grass Growth, grass plate, biomass, grass

Instrument

Grasshopper Grassplate

Supplemental Datasets

There are no supplemental data listed for this dataset.

Data preview

Preview example data for this dataset.

TeMS Modelling Tool

Responsible organisation

National Centre for Geocomputation (NCGC)

Terrain-AI - Kildare County Council | Data Platform

Log out

Data Catalogue Apps

UAV MSI survey for Monread Park on 2023-09-06

Back to search

Resource abstract

UAV MSI data collected for Monread Park using a DJI Phantom 4 Pro V2. The data was collected on 2023-09-06 and covers the area of the park. The data was processed using TeMS Modelling Tool and is available as a GeoTIFF file. The data was collected using a DJI Phantom 4 Pro V2 and is available as a GeoTIFF file. The data was collected using a DJI Phantom 4 Pro V2 and is available as a GeoTIFF file.

Reference

UAV

Topic category

Grassland

Resource type

Dataset

Keyword

Grass Growth, grass plate, biomass, grass

Instrument

Grasshopper Grassplate

Supplemental Datasets

There are no supplemental data listed for this dataset.

Data preview

Preview example data for this dataset. (5 available)

SDVI - Red, NIR

VIEW

Responsible organisation

National Centre for Geocomputation (NCGC)

Lineage

Processing: TeMS Modelling Tool

Download metadata

Metadata download is not currently available

Metadata date

14-10-2023

Metadata language

English

Conditions

Access restricted to authorized researchers

Limitations

Public access limited according to Article 17(1) of the GDPR Directive

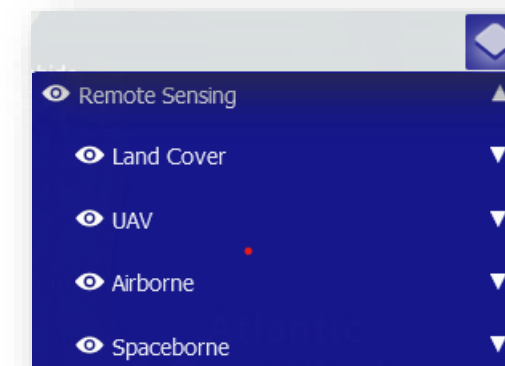
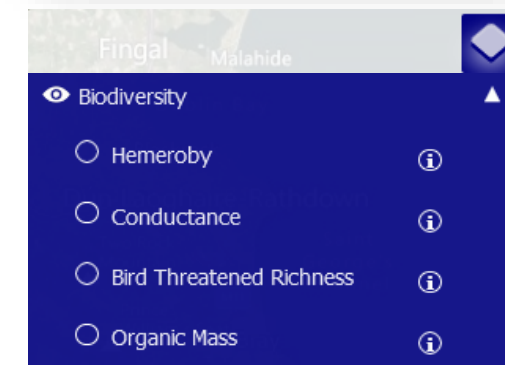
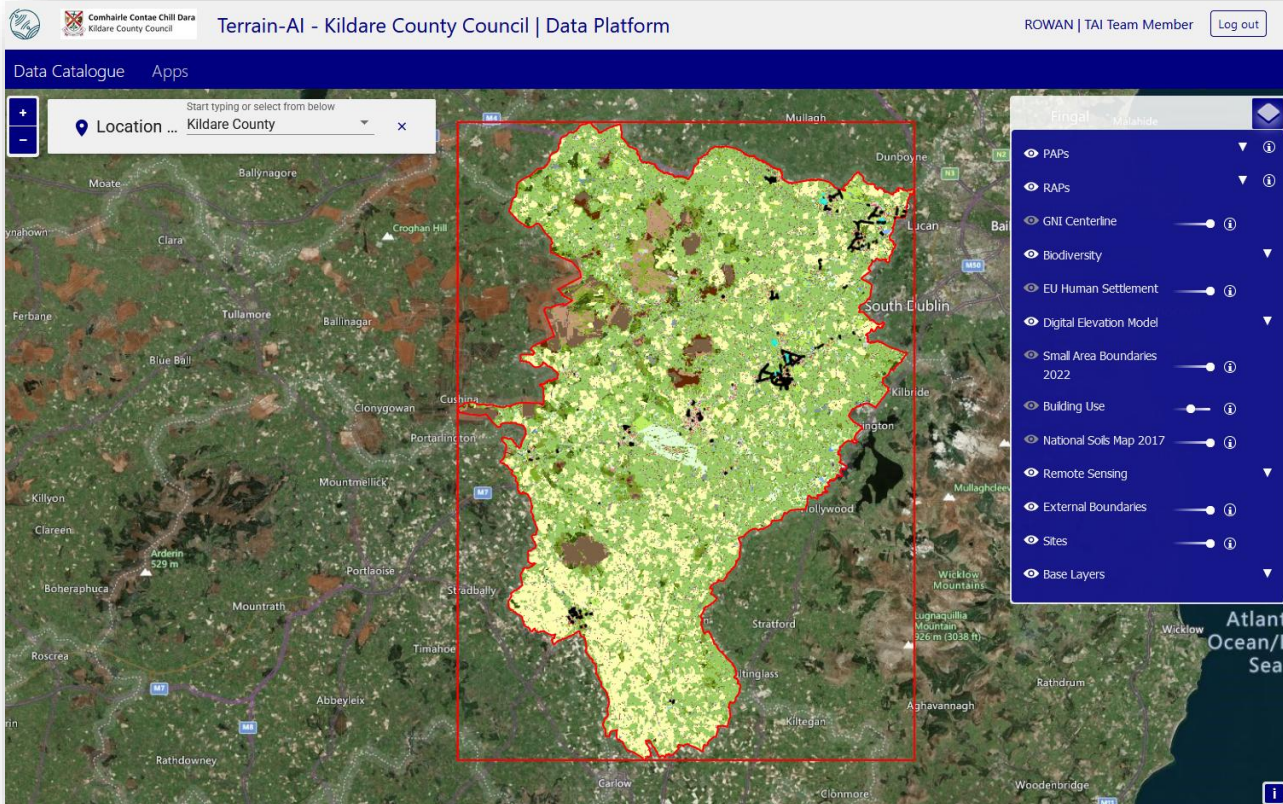
More than 150 datasets catalogued and indexed on the KCC Data Platform



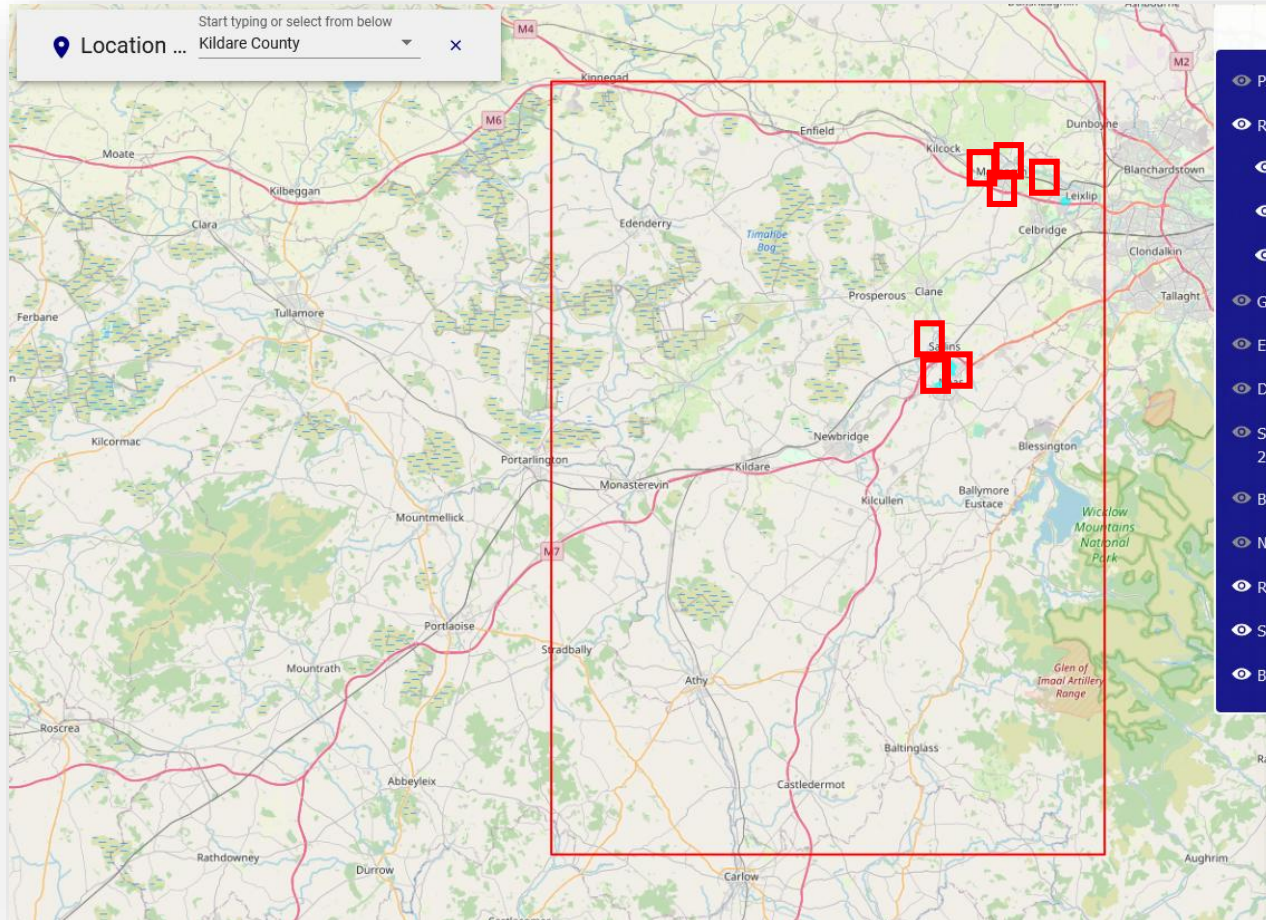
Data Catalogue

Apps

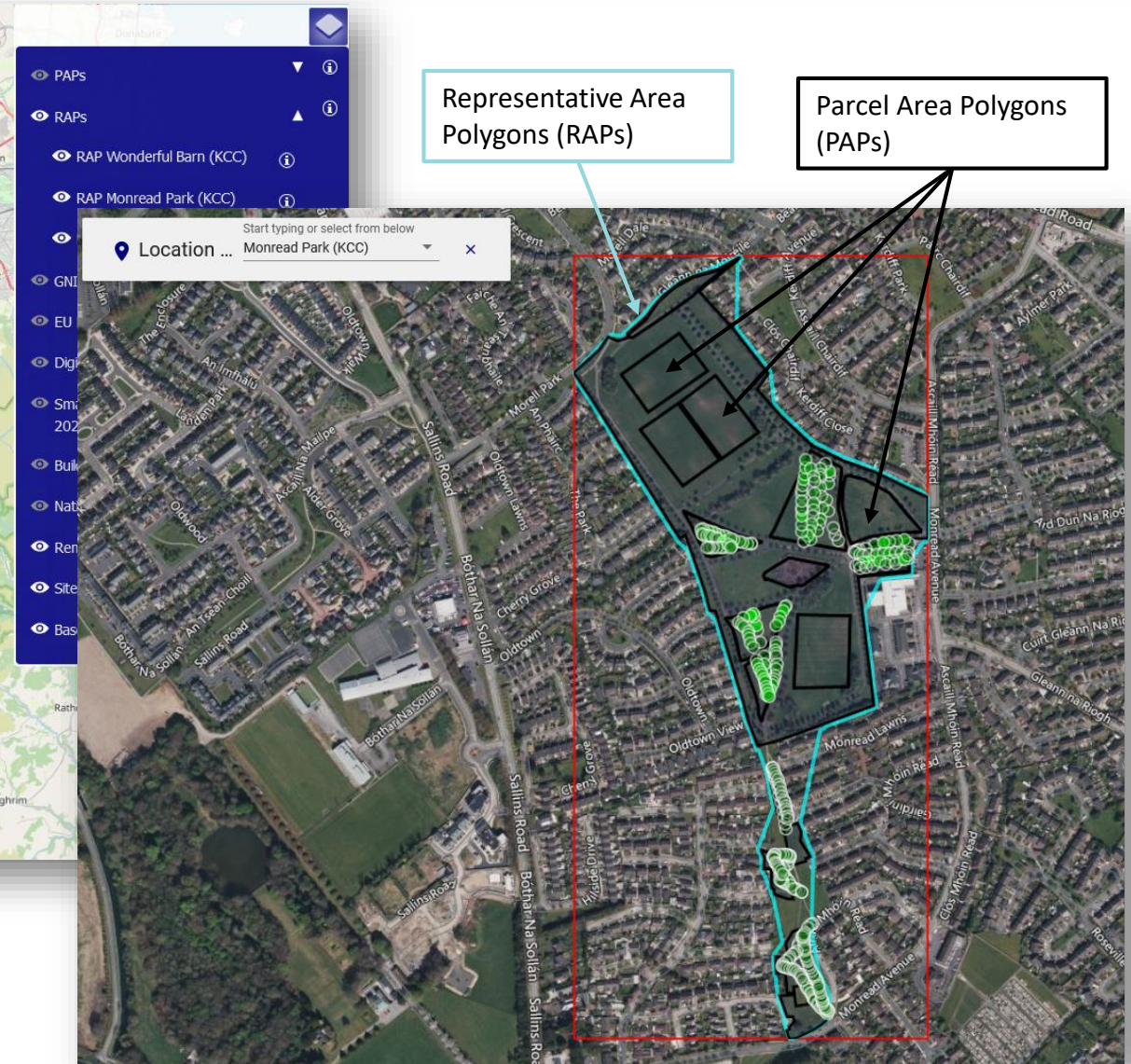
KCC TEMS



KCC Visualisation App



From county scale to test sites or Representative Area Polygons (RAPs)





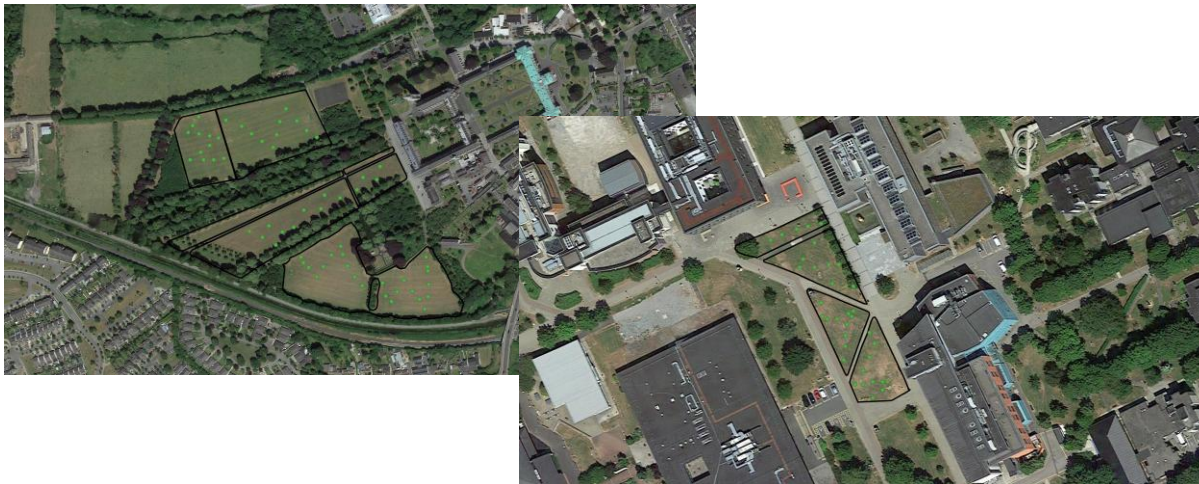
Test Sites - Representative Area Polygons



Wonderful Barn



Pairc na nOg



Maynooth University Campus – multiple sites



Kilcock Road

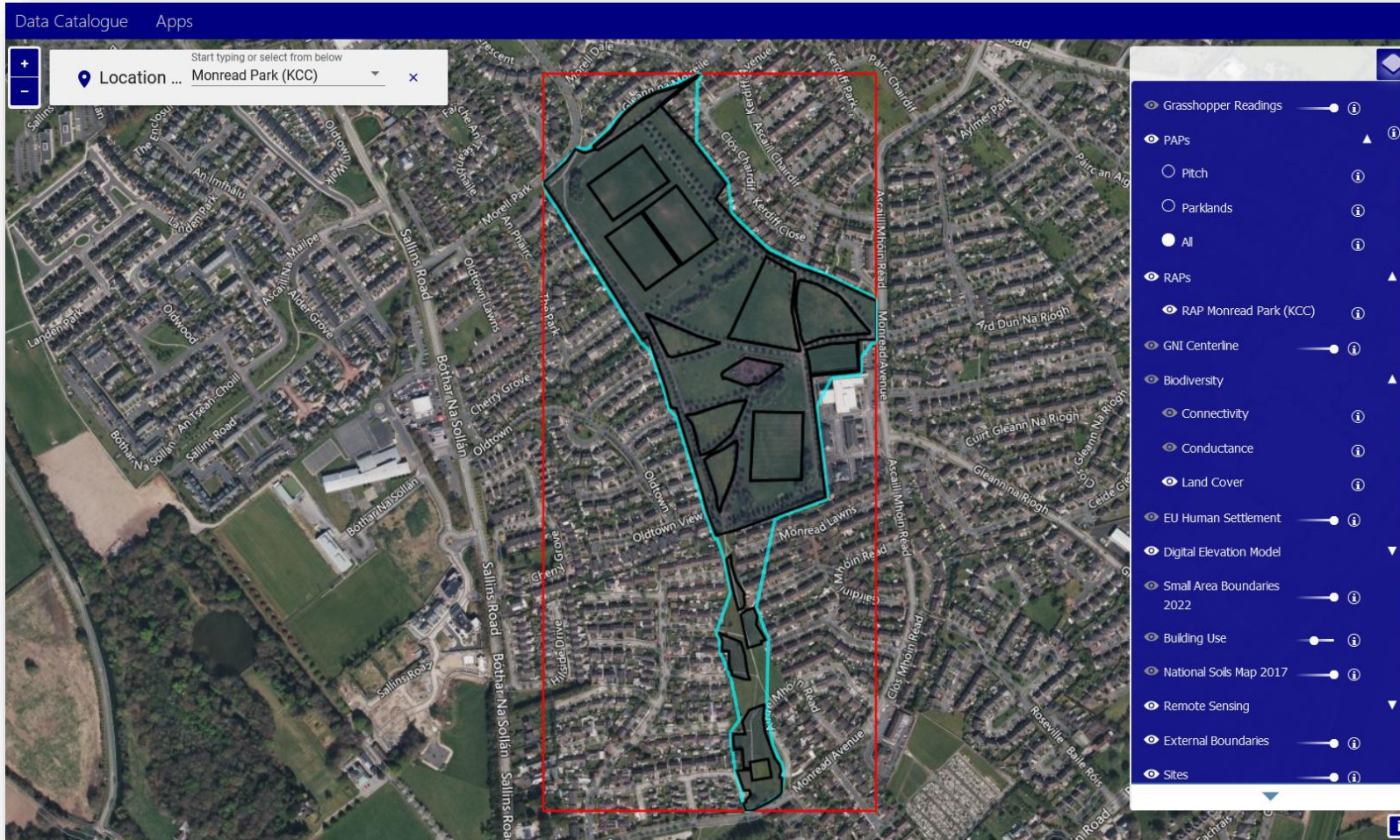
Representative Area Polygons (RAPs) for Kildare County Council

Site/RAP name	PAP type	Site location	Grass Cut Frequency/Season*	Grass Management (Lifted/left/baled)	Anaerobic Digestion (AD)	Potential for AD	Drone acquisition	Grass Hopper acquisition (Fortnightly)
Monread Park	Parklands	Naas	Multi					
			1. Fortnightly cuts (16/season)	Grass left	No	Yes	Yes	Yes
			2. Weekly cuts (Pitches – 32/season)	Grass left	No	No		
			3. Biodiversity (5/season)	Grass left	No	Yes		
	Verges		4. Fortnightly cuts (16/season)	Grass left	No	Yes		
The Wonderful Barn	Parklands	Leixlip	Multi					
			1. Fortnightly cuts (16/season)	Grass left	No	Yes	Yes	Yes
			2. Annual cut (1/season)	Grass lifted & baled	No (To farmer)	No		
			3. Biodiversity (5/season)	Grass left	No	Yes		
Parc na nOg	Canal/Lakes/ Wetlands	Naas	Multi					
			1. Fortnightly cuts (16/season)	Grass left	No	Yes	Yes	Yes
			2. Annual cut (1/season)	Grass left	No	No		
			3. Biodiversity (5/season)	Grass left				
Kilcock Rd	Verges	Maynooth	Fortnightly cuts (16/season)	Grass left	No	Yes	Yes	Yes
Straffan Rd	Verges	Maynooth	Fortnightly cuts (16/season)	Grass left	No	Yes	Yes	Yes
North Campus - (Iontas) Maynooth University	Verges (Proxy)	Maynooth	Fortnightly (16/season)	Grass lifted along managed areas	NA	NA	Yes	Yes (weekly)
South Campus (The Graf) – Maynooth University	Parklands Pitches Agricultural Site	Maynooth	1. Fortnightly cuts (16/season) 2. Weekly cuts (Pitches – 32/season) 2. Annual cut (1/season)	Grass lifted Grass left Grass lifted and baled	NA NA NA (To farmer)	NA	Yes	Yes
Sallins Agri Site	Agricultural Site	Sallins	1. Annual cut – (1/season)	Grass grazed or lifted and baled	NA (To farmer)	No	No	No

* Grass cutting season typically begins mid-March each year to end of September



Monread Park RAP



Monread Park RAP (blue outline) and associated Parcel Area Polygons (PAPs) (black outline).

PAPs are the smallest management units (e.g. soccer pitch) within the larger RAPs

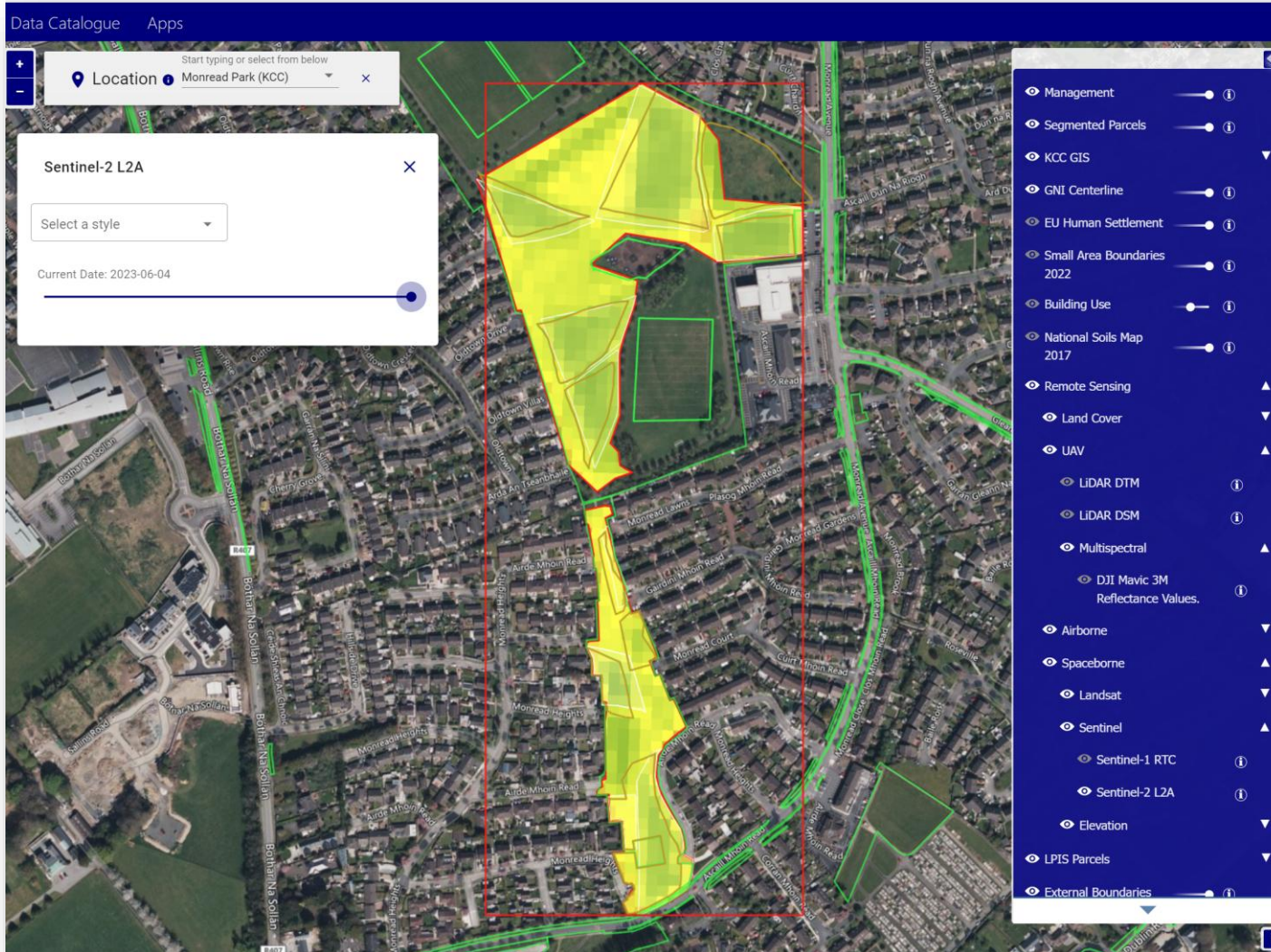
(A RAP is similar to a 'farm', with different management activities, while a PAP represents a 'paddock' or smallest management unit)



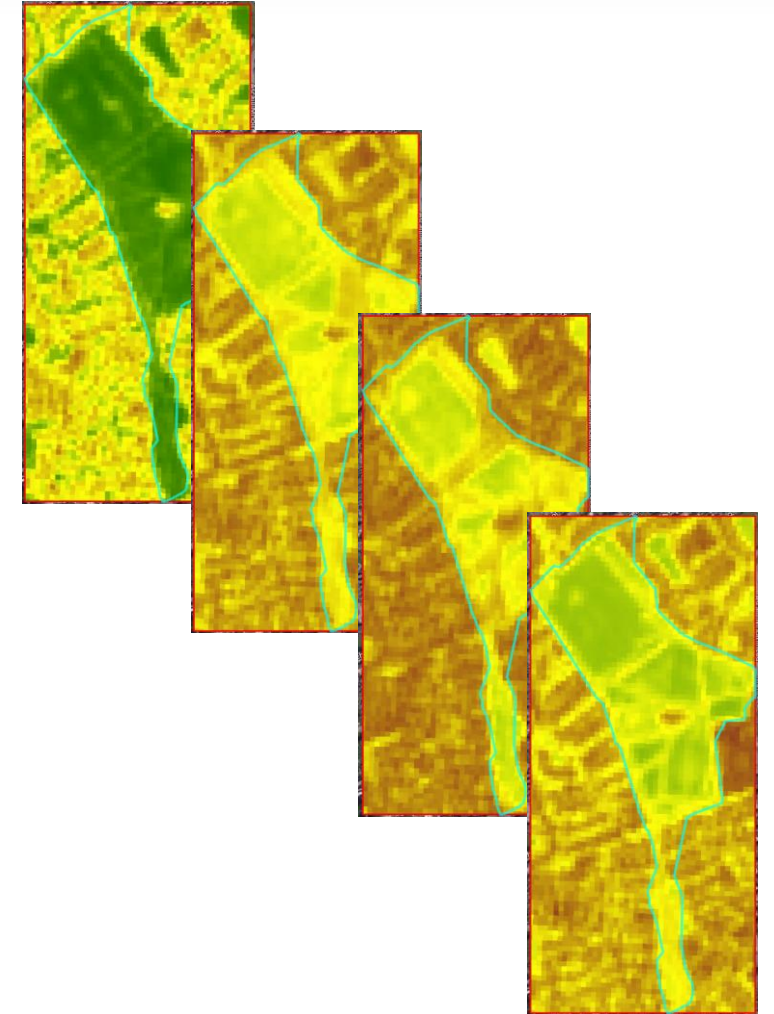
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Monread Park RAP



KCC Monread Park: S2 Time-series



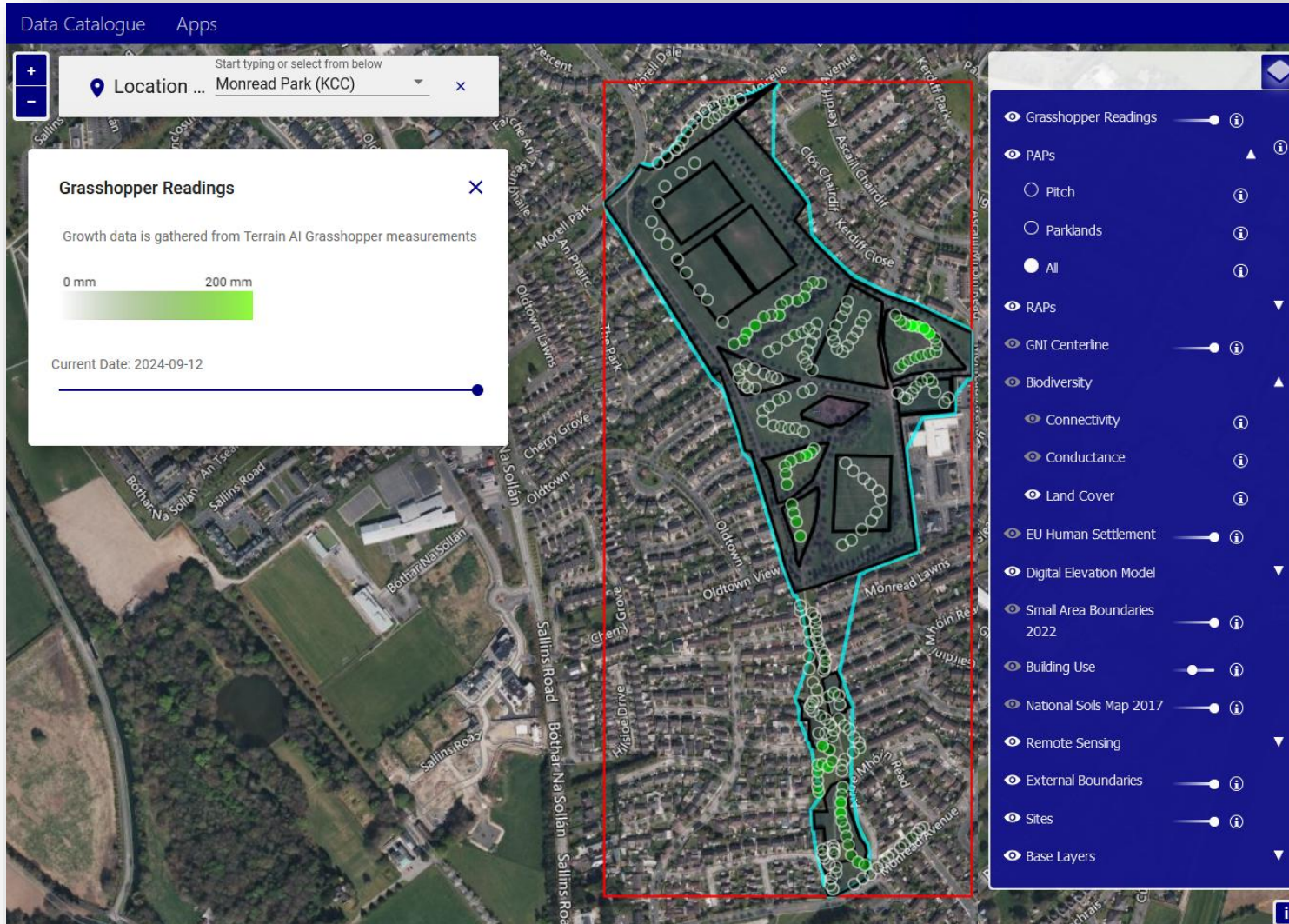
Vegetation timeseries - Sentinel 2 data covering the period from 2021 to 2024



Data Catalogue

Apps

Monread Park RAP



KCC Monread Park: In-situ measurements

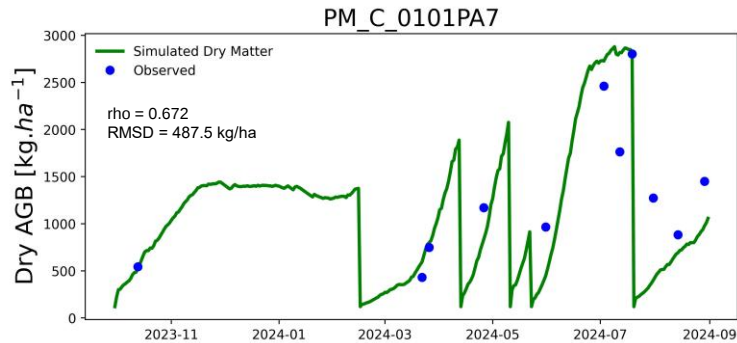
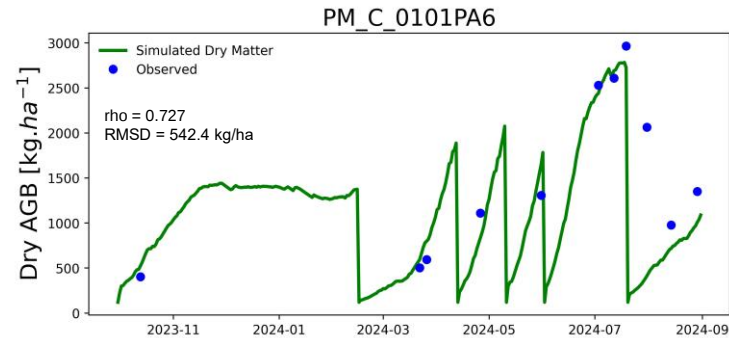


Vegetation height and biomass timeseries

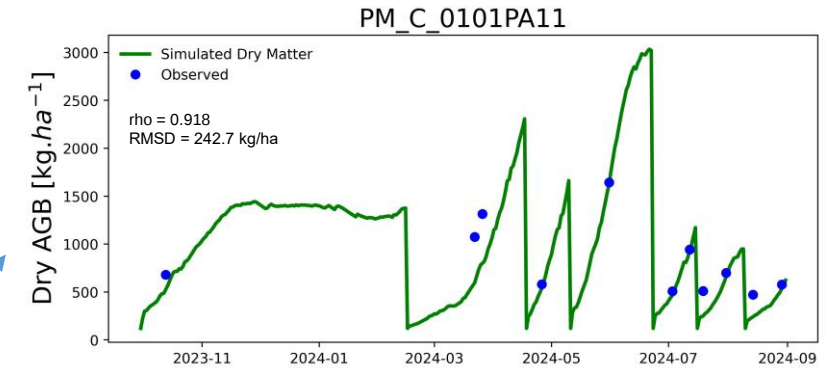


Monread Park RAP

Biomass Model to estimate grass growth based on weather and management



Monread Park



- The model runs from Oct 2023 last cut to Aug 2024
- Model outputs agree broadly with grasshopper measurements
- Errors are averagely RMSD = 424.2 kg/ha and rho = 0.77

The biomass model, originally developed for agricultural grasslands, performs well over intensively managed, non-agricultural, grasslands



Monread Park RAP

Terrain-AI - Kildare County Council | Data Platform TIM | TAI Team Member Log out

Data Catalogue Apps

Location Monread Park (KCC)

Report for feature

PAP DETAILS MODELLING MANAGEMENT

Parcel Area Polygon

Parcel ID
GC_C_0101A1

Parcel Type
Parklands

Area (m2)
No data

Grass Management
Left

Grass goes to Anaerobic Digester
No

Potential for grass to go to Anaerobic Digester
Yes

Notes
To be read with PILOT MAP 1P where boundaries cut x 2 times per month - PILOT areas cut every 6 weeks post April 15th. Meadow - Fial late October after seed dispersal - ref PM_A_0101PA1 & PM_A_0101PA2

- Management
- Segmented Parcels
- KCC GIS
- GNI Centerline
- EU Human Settlement
- Small Area Boundaries 2022
- Building Use
- National Soils Map 2017
- Remote Sensing
- Land Cover
- UAV
 - LIDAR DTM
 - LIDAR DSM
 - Multispectral
 - DJI Mavic 3M Reflectance Values.
- Airborne
 - Thermal
 - Celcius
 - MultiSpectral
 - RF Reflectance Values
 - Digital Number Values.
 - Aerial Imagery RGB
- Spaceborne
 - Landsat

Park Field Details

FIELD DETAILS MODELLING MANAGEMENT

Field Details

Parcel Area
No data

Soil Type
Fine loamy

Soil Detail
Fine loamy drift with limestones

Soil Depth
40-80

Drainage
Poor

LPIS Parcel ID
Not available

DOWNLOAD REPORT

Park Field: Management

FIELD

Activity for Paddock PM_C_0101PA6

Date	Area	Activity	Traffic Mg	Grass Cut	Strimming
15/04/2024		Cut 1		5	3
27/05/2024		Cut 2		5	3
08/07/2024		Cut 3		5	3
19/08/2024		Cut 4		5	3
30/09/2024		Cut 5		5	3

Rows per page: 15 1-5 of 5

DOWNLOAD REPORT

Park Field: Grass Growth

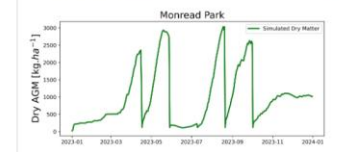
FIELD DETAILS MODELLING MANAGEMENT

Growth Models

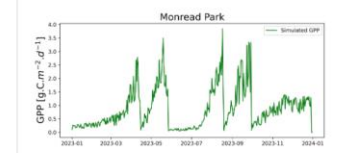
Grass growth models for multiple seasons

2023

1: Dry Matter 2023



2: Simulated GPP 2023



3: Simulated Growth 2023



Results

- Biomass estimates
- Conversion to Biomethane
- Management Scenarios to evaluate **Cost-Benefit**
- Reporting at RAP and County Scale



County-Scale Multi-Annual Biomass Estimates

PAP type*	No. of cuts	Biomass Estimate (kg)			Biomethane Estimate (- L CH ₄ volatile kg ⁻¹ solids (VS))		
Year		2024	2023	2022	2024	2023	2022
Meadow	1	4,168	8,776	9,153	988	2,080	2,169
	5	37,989	53,051	46,812	9,003	12,573	11,095
Other-Housing Estate	1	1,668	3,512	3,662	395	832	868
	2	3,178	5,461	4,701	753	1,294	1,114
	5	21,663	30,252	26,694	5,134	7,170	6,327
	16	184,096	207,332	200,397	43,631	49,138	47,494
Parklands	1	15,056	31,704	33,066	3,568	7,514	7,837
	2	494	848	730	117	201	173
	5	187,018	261,169	230,457	44,323	61,897	54,618
	16	427,403	481,347	465,245	101,294	114,079	110,263
	32	9,297	9,648	10,046	2,203	2,287	2,380
Total for County (PAPs: 982, Total Area: 168ha)	1,2,4,5,8, 16,32	892,029	1,093,101	1,030,965	211,411	259,065	244,339

Biomass estimates were converted to biomethane following the standard conversion procedure (e.g. McEniry and O'Kiely, 2013) which applies a scaling factor (237 L CH₄ kg⁻¹ VS)

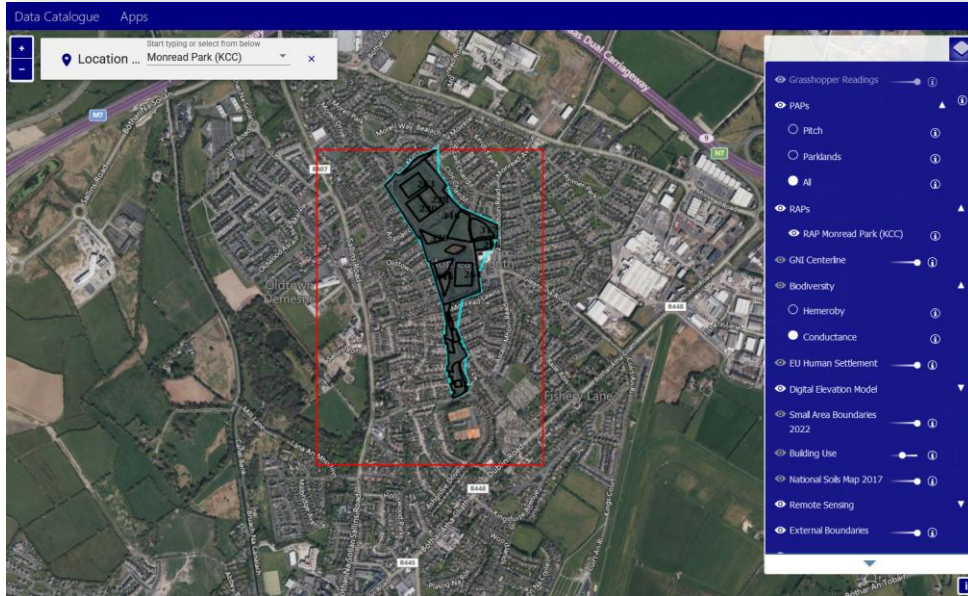
*Grass volumes cut at Parcel area polygons (PAPs) categorised as Graveyards, Allotments and Pitches are not sufficient for collection, therefore they are not included in annual biomass and biomethane estimates here.



Management Scenarios

- Scenario A – Current Management + Costs
- Scenario B – Current Management + Grass Collection for Biomethane Production + Costs
- Scenario C – High Intensity Management + Grass Collection for Biomethane Production + Costs
- Scenario D – Low Intensity Management + Grass Collection for Biomethane Production + Costs





RAP Scale

RAP Monread Park (KCC)

Details for this Representative Area Polygon (RAP)

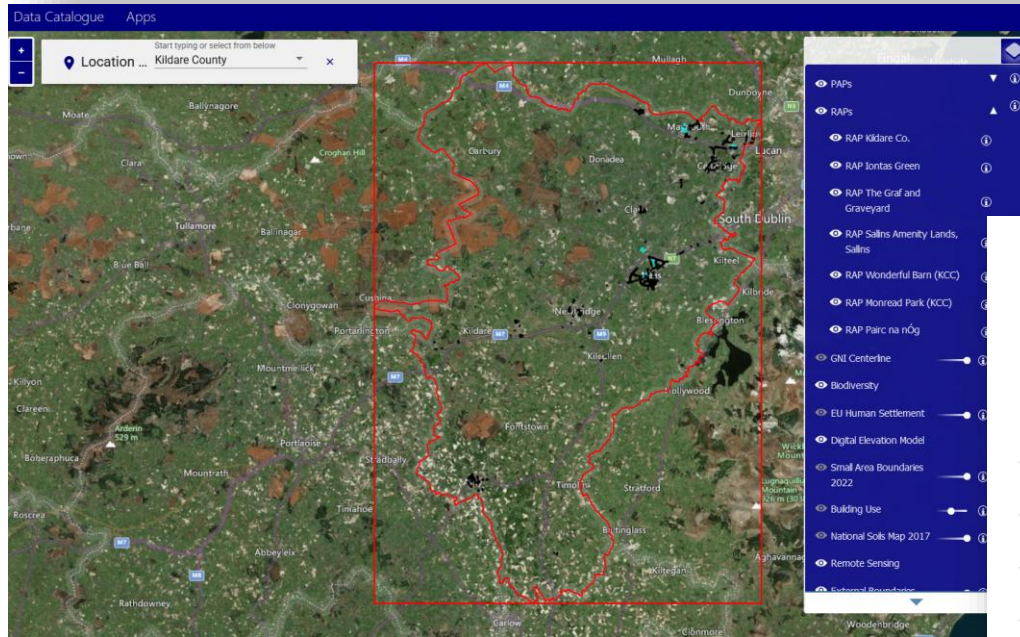
	A	B	C	D
Scenario Description	Current grass cut frequency - grass is cut	Current grass cut frequency but grass is cut and collected	Grass is cut and collected more frequently	Grass is cut and collected less frequently
Total No. of PAPs	17	17	17	17
Total Area (Ha)	13.4685	13.4685	13.4685	13.4685
Total Biomass (Kgs)	0	132,914	144,501	129,378
Total Biomethane (Litres)	0	31,501	34,247	30,663
Costs				
Total Depot Costs (Trip A)	0	€6.77	€17.05	€5.33
Total AD Costs (Trip B)	0	€227.64	€662.22	€206.94
Total AD Processing (€0.03/ Kg)	0	€3,987.41	€4,335.04	€3,881.35
Total Contractor Costs	€31,807	€129,133	€150,409	€52,142
Total Costs	€31,807	€133,355	€155,423	€56,236



Data Catalogue

Apps

Cost-Benefit



County Scale

RAP Kildare Co.

Details for this Representative Area Polygon (RAP)

	A	B	C	D
Scenario Description	Current grass cut frequency - grass is cut	Current grass cut frequency but grass is cut and collected	Grass is cut and collected more frequently	Grass is cut and collected less frequently
Total No. of PAPs	982	982	982	982
Total Area (Ha)	168.2323	168.2323	168.2323	168.2323
Total Biomass (Kgs)	0	1,254,183	1,716,883	1,245,042
Total Biomethane (Litres)	0	297,241	406,901	295,075
Costs				
Total Depot Costs (Trip A)	0	€2,530.07	€3,368.51	€1,043.22
Total AD Costs (Trip B)	0	€8,955.11	€12,468.26	€3,842.45
Total AD Processing (€0.03/Kg)	0	€37,625.49	€51,506.48	€37,351.27
Total Contractor Costs	€229,162	€1,072,658	€1,622,056	€442,181
Total Costs	€229,162	€1,121,769	€1,689,399	€484,418

KCC Monread Park: Reporting Tool at county scale

Cost-Benefit

County Scale

Scenario D - Low intensity management delivers relatively high volume of biomethane for lower cost when compared to Scenarios B & C

Lower intensity management = more optimal conditions for biodiversity

Scenario Name	A	B	C	D
Scenario description	Current Management	Current Management + Grass Collection	High Intensity Management + Grass Collection	Low Intensity Management + Grass Collection
COSTS				
Total Depot Costs (Trip A)	€0	€2,530	€3,368	€1,043.22
Total AD Costs (Trip B)	€0	€8,955	€12,468	€3,842
Total AD Processing (€0.03/Kg)	€0	€37,625	€51,506	€37,351.27
Total Contractor Costs	€229,162	€1,072,658	€1,622,056	€442,181
Total Costs	€229,162	€1,121,769	€1,689,399	€484,418
BENEFITS				
Renewable energy generated (Biomethane in Litres)	0	297,241	406,901	295,075
Renewable energy generated (Biomethane in Kgs)	0	1,254,183	1,716,883	1,245,042
Biomethane tonnes of CO2e (tCO2e)	0	13	17	12
Diesel equivalent (tCO2e)	-	158	216	157
Potential tCO2e saving relative to Diesel	0	146	199	145
Potential tCO2e saving(%)	0	92	92	92
Potential carbon credit value (@€65/tCO2e)	0	€9,463	€12,955	€9,394

Ecosystem Services and Accounting

- System of Environmental Economic Accounting (**SEEA**) framework
- County Scale Indices
- RAP Scale Indices

The System Environmental Economic Accounting (SEEA) framework

Applications of SEEA indicators

- SDG monitoring
- Biodiversity
- Climate change
- Policy making

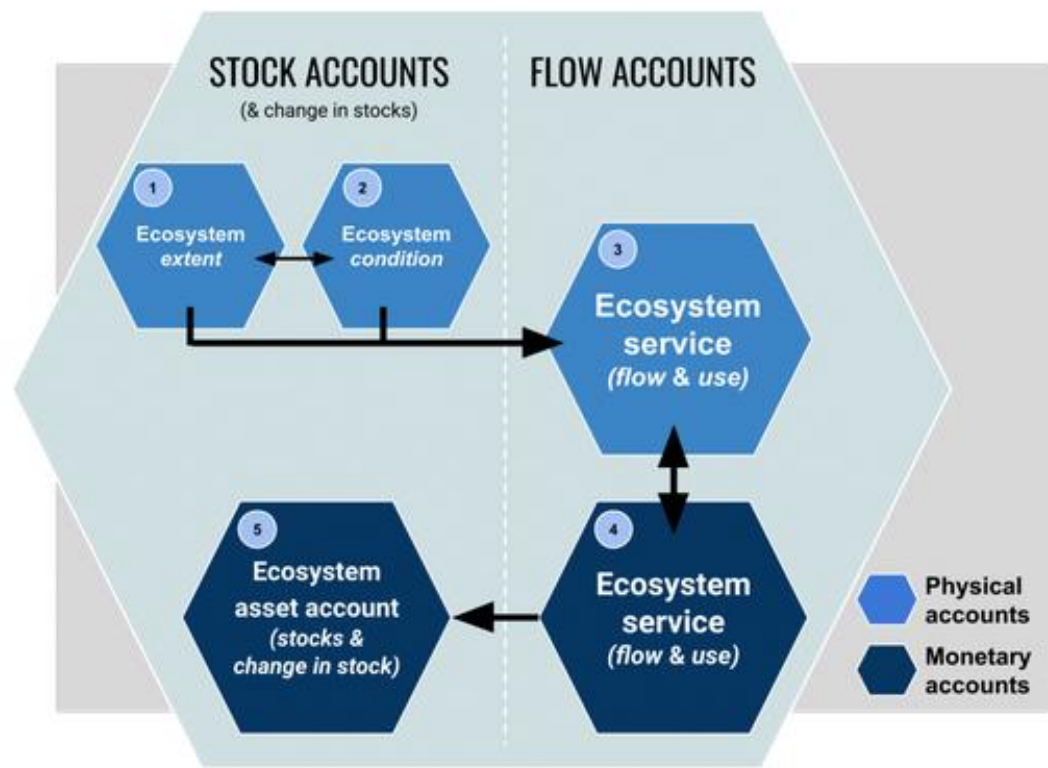


Figure 1: Ecosystem accounts and how they relate to each other

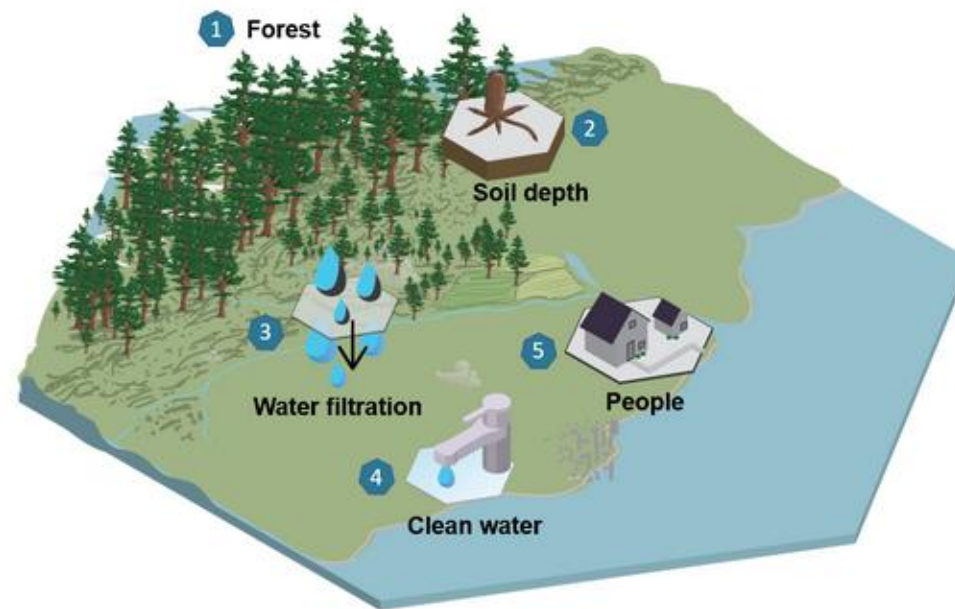


Figure 2: How ecosystem assets generate ecosystem services to beneficiaries in a spatial relationship



SEAA for Kildare

Progressing from physical to monetary accounts

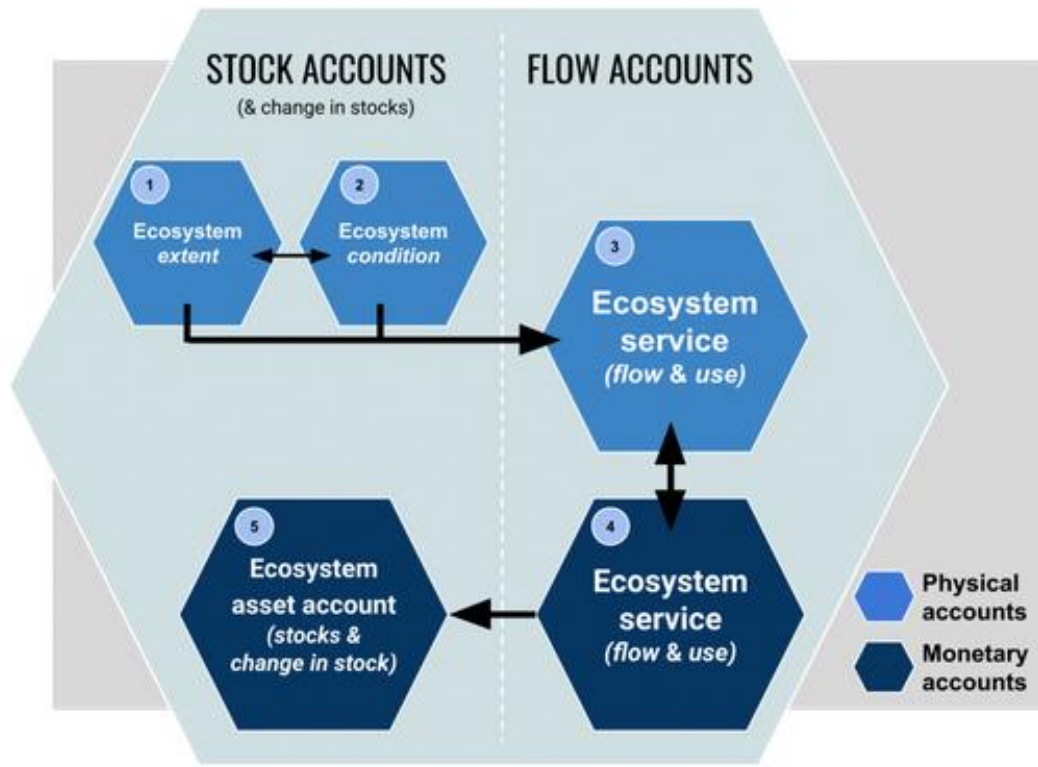


Figure 1: Ecosystem accounts and how they relate to each other

Ecosystem: Public open greenspace

Ecosystem extent and condition – indicators are derived from satellite/drone data, in-situ surveys etc...

Ecosystem services

- 1) Provisioning – renewables energy/biomass
- 2) Regulating – clean air, pollination, flood management
- 3) Supporting – space for wildlife, photosynthesis
- 4) Cultural – recreation, heritage, well-being

Grass-to-Gas moves towards Monetary Accounting of the Public Open Greenspace Ecosystem



Layers Active Legend Reports

Add a new species

Admin Boundaries

National Grids

Grid 100km

Grid 10km

Grid 2km

Grid 1km

Habitats

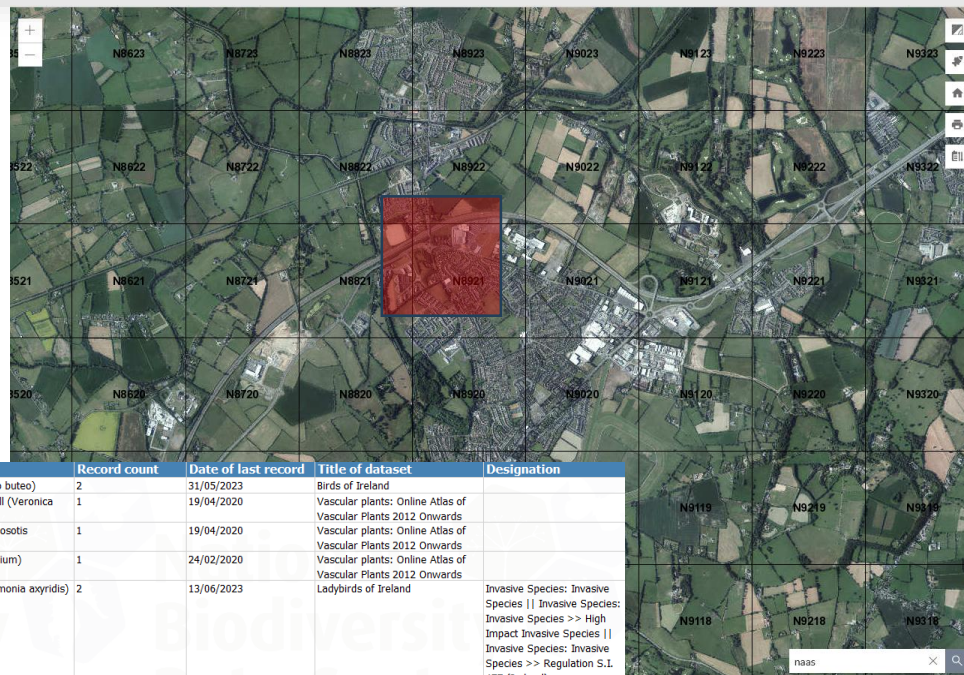
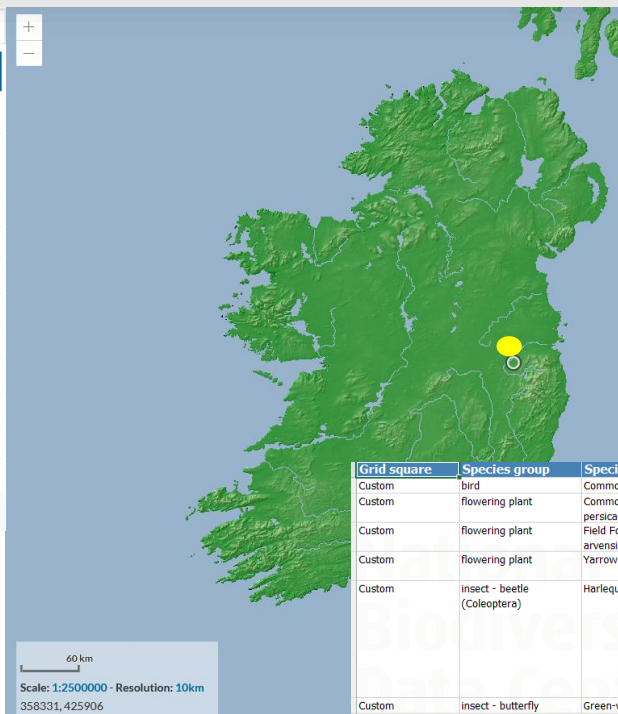
Bat Landscapes

Birdwatch Ireland

Forestry

Protected Areas

Geology



Grid square	Species group	Species name	Record count	Date of last record	Title of dataset	Designation
Custom	bird	Common Buzzard (<i>Buteo buteo</i>)	2	31/05/2023	Birds of Ireland	
Custom	flowering plant	Common Field-speedwell (<i>Veronica persica</i>)	1	19/04/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
Custom	flowering plant	Field Forget-me-not (<i>Myosotis arvensis</i>)	1	19/04/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
Custom	flowering plant	Yarrow (<i>Achillea millefolium</i>)	1	24/02/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	
Custom	insect - beetle (Coleoptera)	Harlequin Ladybird (<i>Harmonia axyridis</i>)	2	13/06/2023	Ladybirds of Ireland	Invasive Species: Invasive Species Invasive Species: Invasive Species >> High Impact Invasive Species Invasive Species: Invasive Species >> Regulation S.I. 477 (Ireland)
Custom	insect - butterfly	Green-veined White (<i>Pieris napi</i>)	4	23/07/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Holly Blue (<i>Celastrina argiolus</i>)	15	26/08/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Large White (<i>Pieris brassicae</i>)	3	19/08/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Meadow Brown (<i>Maniola jurtina</i>)	2	23/07/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Orange-tip (<i>Anthocharis cardamines</i>)	1	04/05/2020	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Peacock (<i>Inachis io</i>)	7	07/04/2023	Butterflies of Ireland post 2021	
Custom	insect - butterfly	Red Admiral (<i>Vanessa atalanta</i>)	11	04/10/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Small Tortoiseshell (<i>Aglais urticae</i>)	7	26/08/2021	Butterflies of Ireland pre-2022	
Custom	insect - butterfly	Speckled Wood (<i>Pararge aegeria</i>)	8	19/09/2021	Butterflies of Ireland pre-2022	
Custom	insect - dragonfly (Odonata)	Common Hawker (<i>Aeshna juncea</i>)	3	22/07/2021	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Hairy Dragonfly (<i>Brachytron pratense</i>)	1	06/05/2020	Dragonfly Ireland 2019 to 2024	
Custom	insect - dragonfly (Odonata)	Migrant Hawker (<i>Aeshna mixta</i>)	8	14/08/2022	Dragonfly Ireland 2019 to 2024	
Custom	insect - hymenopteran	Bombus (<i>Bombus</i>) terrestris	1	25/04/2020	Bees of Ireland	
Custom	insect - mayfly (Ephemeroptera)	Baetidae	1	20/04/2018	Mayflies (Ephemeroptera) of Ireland	
Custom	insect - moth	Humming-bird Hawk-moth (<i>Macroglossum stellatarum</i>)	1	23/09/2022	Moths Ireland	
Custom	terrestrial mammal	European Rabbit (<i>Oryctolagus cuniculus</i>)	1	21/10/2013	Atlas of Mammals in Ireland 2010-2015	Invasive Species: Invasive Species Invasive Species: Invasive Species >> Medium Impact Invasive Species
Custom	terrestrial mammal	Red Fox (<i>Vulpes vulpes</i>)	1	21/02/2013	Atlas of Mammals in Ireland 2010-2015	

Step 2: Selected area

● Square N8921 was selected.

Change

Generate report

Report generated. (Click to download)

N8921

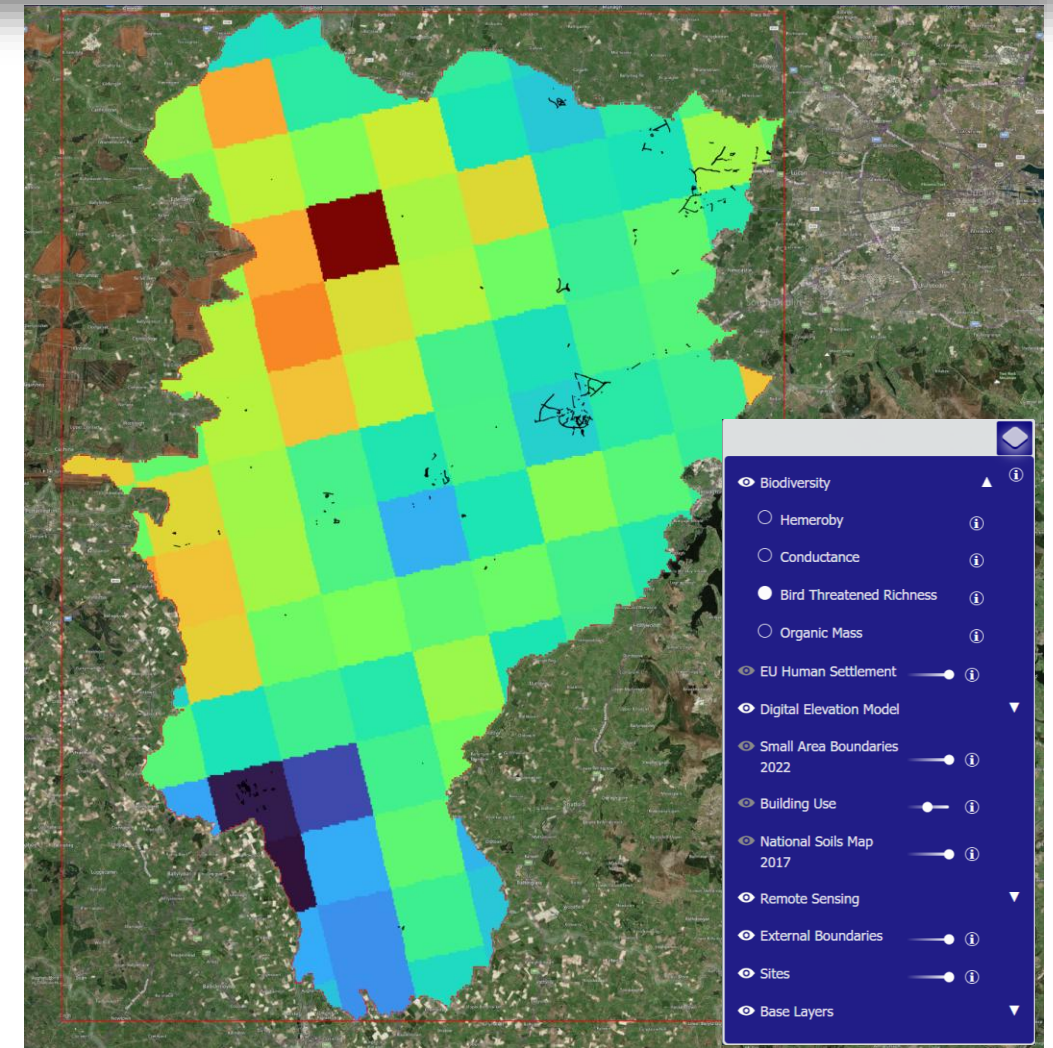


Species Richness for Threatened Birds

Refers to the modelled spatial patterns of bird species richness for 2000-2018 period.

Species richness of threatened birds refers to the number of unique species – higher numbers associated with Peatland areas.

Derived using **Aries SEAA Platform**

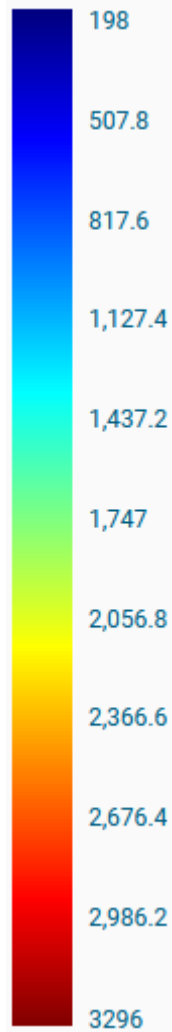




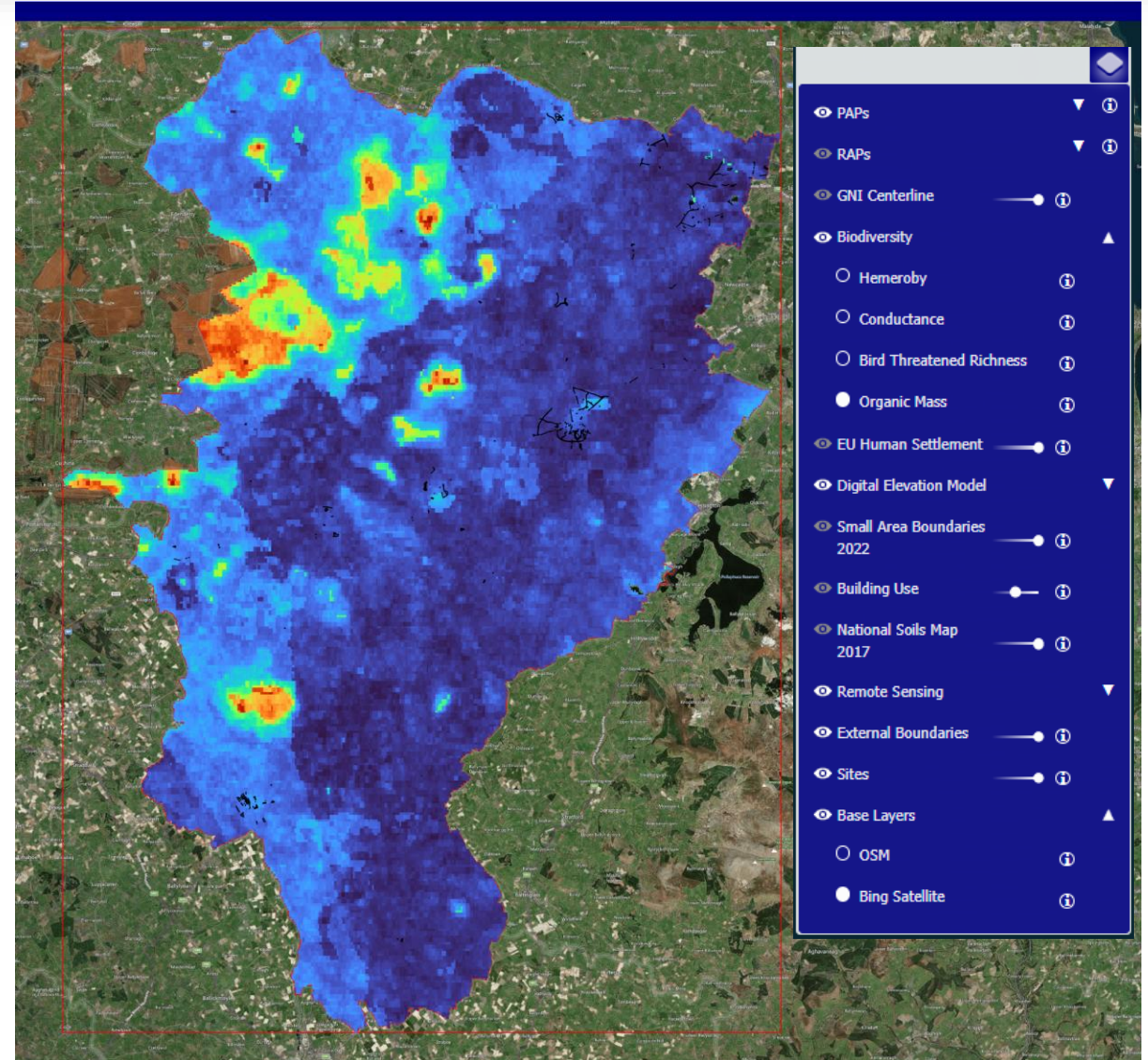
Carbon - Organic Mass in Tonnes per Hectare (tC/Ha)

Peatland areas = Very High tC/Ha

Derived using **Aries SEAA Platform**



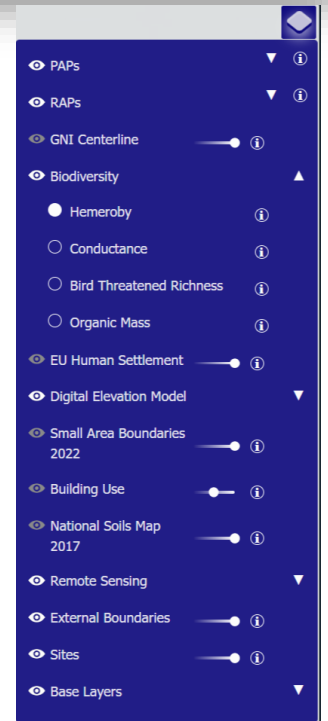
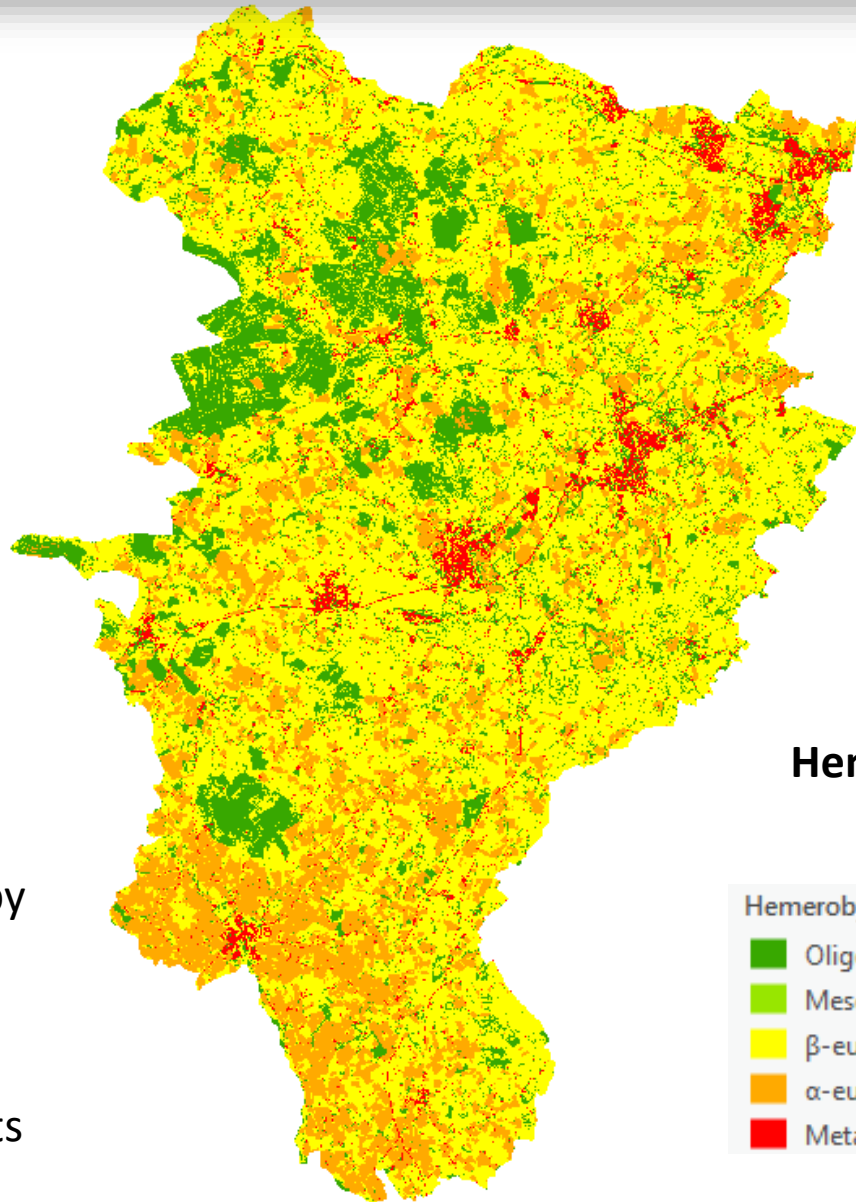
tC/Ha





Assess the **naturalness** within a landscape by measuring the magnitude of **human intervention** on natural vegetation.

Important for new planning & developments



Hemeroby Index for Kildare Co. = **4.01**

Hemeroby degree	
	Oligohemerobic
	Mesohemerobic
	β -euhemerobic
	α -euhemerobic
	Metahemerobic

HemeDegree	
	2
	3
	4
	5
	7

Weak human impacts

Strong human impacts

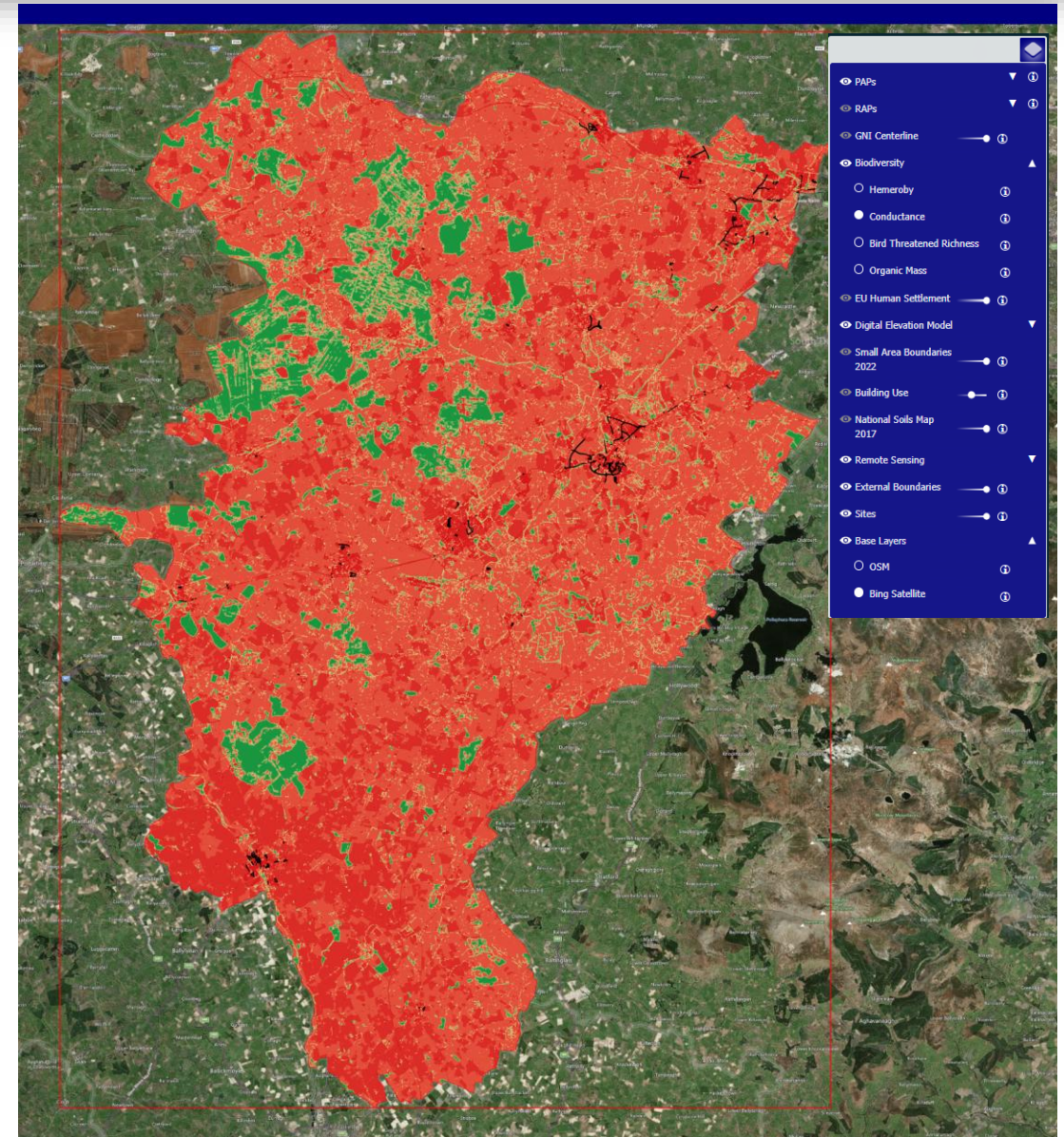
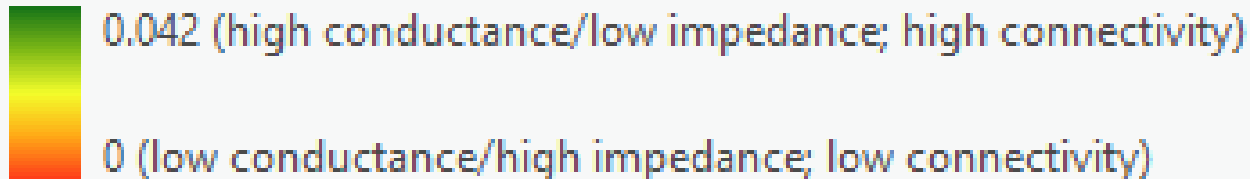


Conductance

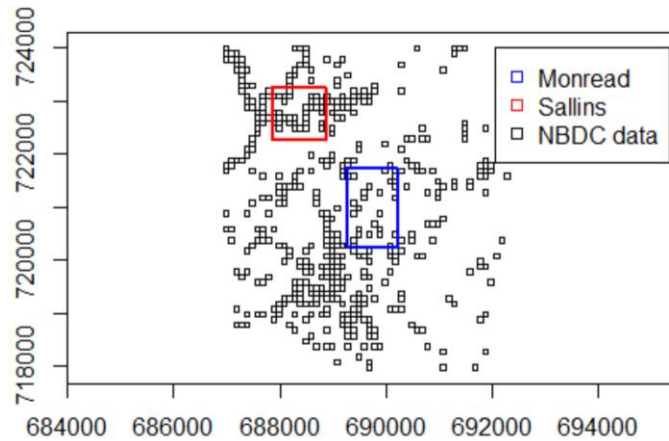
Refers to the **facilitation** or **impedance** of ecological flows (e.g. organisms, materials, energy) across the landscape in space and/or time, and it is process-dependent.

Assess provision of animal mobility pathways / connected greenspaces

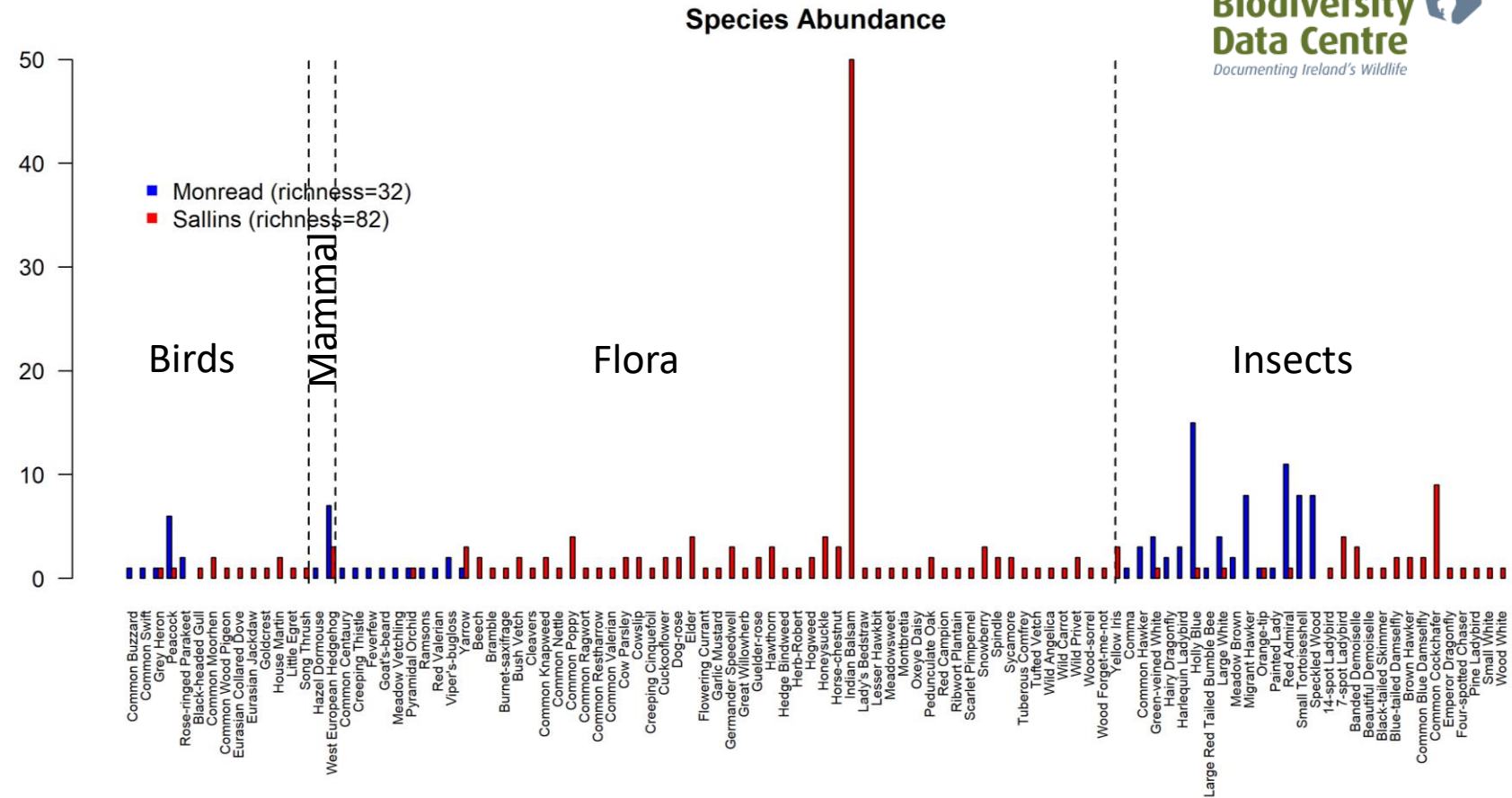
Conductance index



Species Abundance & Richness



- Flowers/ Insects dominated dataset
- More birds in Sallins (Monread is lagging across groups)
- Mammals only in Monread Park (Observation bias)
- More bees/insects in Sallins- high floral abundance link



Records grouped by common names present in 100m grid only. Note: alternatives are scientific names (Genus-Species); Older records are removed

Sustainable Urban Neighbourhoods

- Suitability for Residential PV Rollout
- Building Energy Assessment

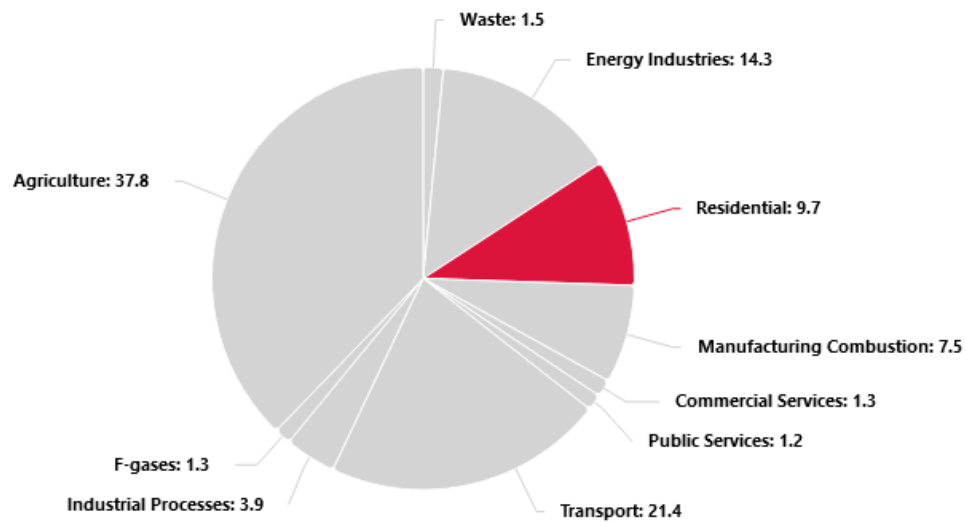


- Establish relationship between CSO Small Areas, Building Footprints and SEAI BER Data to explore automated, standardised, approach to estimating building energy rating
- Building and roof geometry to evaluate solar (PV) potential – street level



Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Residential sector share in 2023

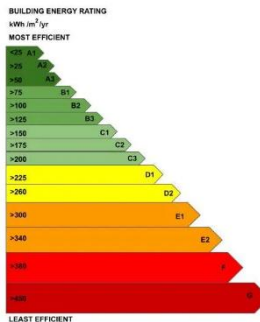
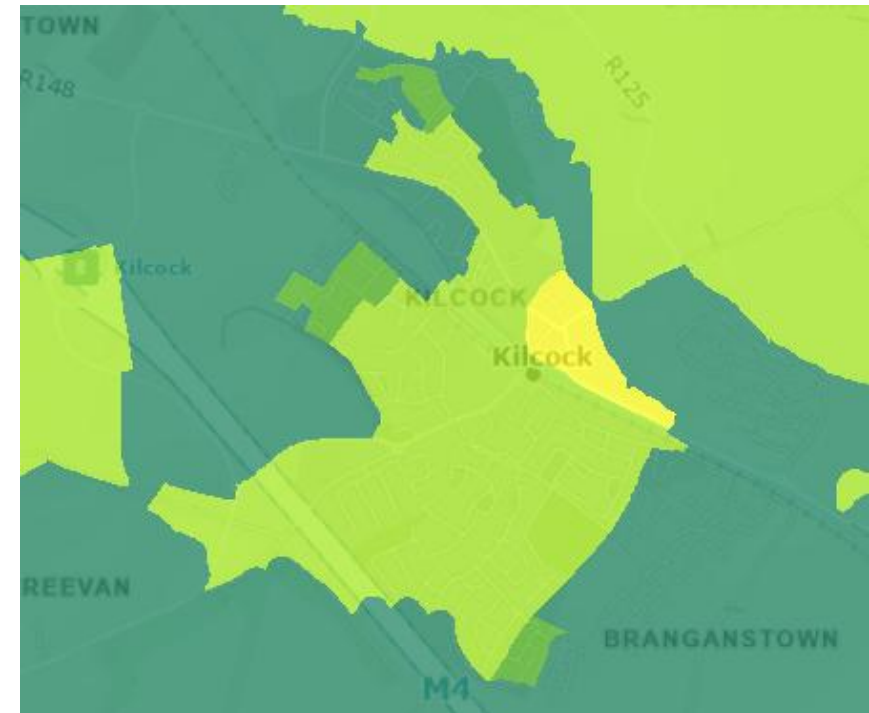


In 2023, residential sector accounted for almost 10% of greenhouse gas emissions



BER Map

Sustainable Energy Authority of Ireland



SEAI Building Energy Rating (BER) data available at Small Area Population (SAP) level



Building Energy Rating (BER) data at housing estate level



Develop approach to model Building Energy Rating (BER) data at individual house level



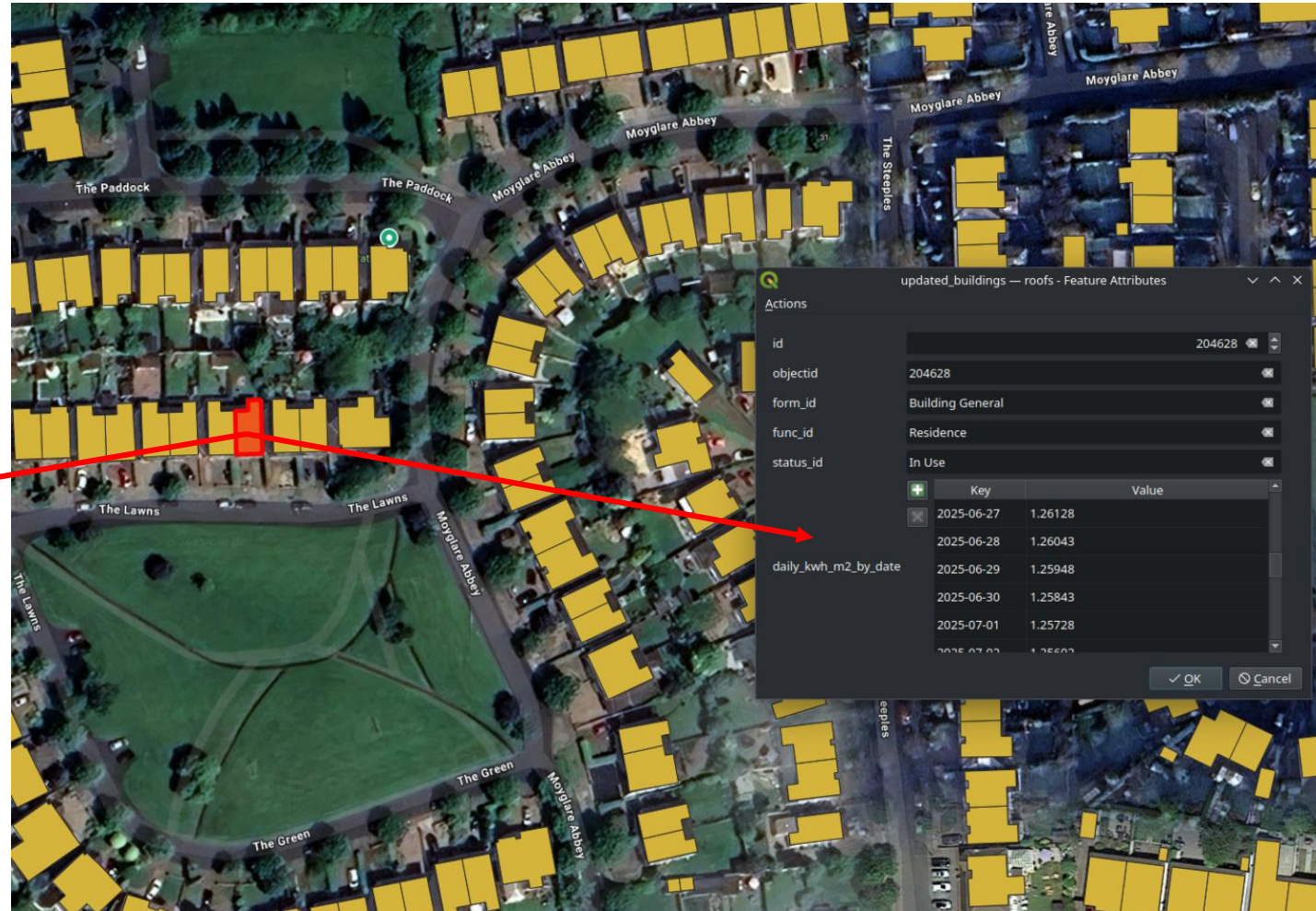
Urban : Energy Generation

KCC Urban Solar PV Roll-out

- Building Classification
- Roof Characterisation using LiDAR
 - (Area, Slope, Aspect, Connectivity)
- Daily solar energy potential (kwh/m²)



LiDAR data to determine roof area & slope



Daily solar energy potential (kwh/m²) per house

THANK YOU

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An Roinn Aeráide,
Fuinnimh agus Comhshaoil
Department of Climate,
Energy and the Environment



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreacht
Department of Housing,
Local Government and Heritage

