Signpost Webinar

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Why map hedgerow

- If you don’t know what you have, its hard to value
- Hedgerows are a foundation of farm biodiversity
- Play a huge role in surface hydrology
- Large carbon store- potentially important for carbon sequestration

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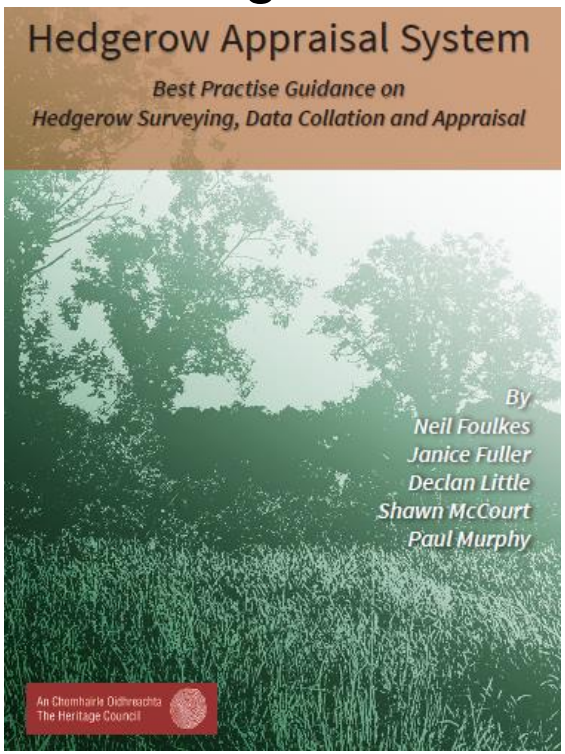
Field Mapping

- County Hedgerow Surveys
- Common approach
- Gold standard for understanding our hedges



HEDGEGROW SURVEYS
County Roscommon Hedgerow Survey Report
Author - Foulkes, N. and Murray, A. (2005b)
Publisher - Roscommon County Council
County Westmeath Hedgerow Survey Report
Author - Foulkes, N. and Murray, A. (2005c)
Publisher - Westmeath County Council
County Offaly Hedgerow Survey Report
Author - Foulkes, N. and Murray, A. (2005d)
Publisher - Offaly County Council, unpublished report
County Laois Hedgerow Survey Report
Author - Foulkes, N. and Murray, A. (2005e)
Publisher - Laois County Council, unpublished report
County Kildare Hedgerow Survey Report
Author - Foulkes, N. (2006a)
Publisher - Kildare County Council, unpublished report
County Longford Hedgerow Survey Report
Author - Foulkes, N. (2006b)
Publisher - Longford County Council, unpublished report
County Leitrim Hedgerow Survey Report
Author - Foulkes, N. (2006c)
Publisher - The Heritage Council, unpublished report
County Mayo Hedgerow Survey Report
Author - Foulkes, N. (2007)
Publisher - Mayo County Council, unpublished report
East Galway Hedgerow Survey 2006
Author - Fuller, J. (2006)
Publisher - Galway County Council unpublished report
County Cavan Hedgerow Survey
Author - Giorria Environmental Services (2006)
Publisher - Cavan County Council unpublished report
A Survey of Ancient and Species Rich Hedgerows in Dublin City
Author - Lyons, M. and Tubridy, M. (2006)
Publisher - The Heritage Council

Hedge Laying Association of Ireland - A good hedge for the farm is a good hedge for wildlife

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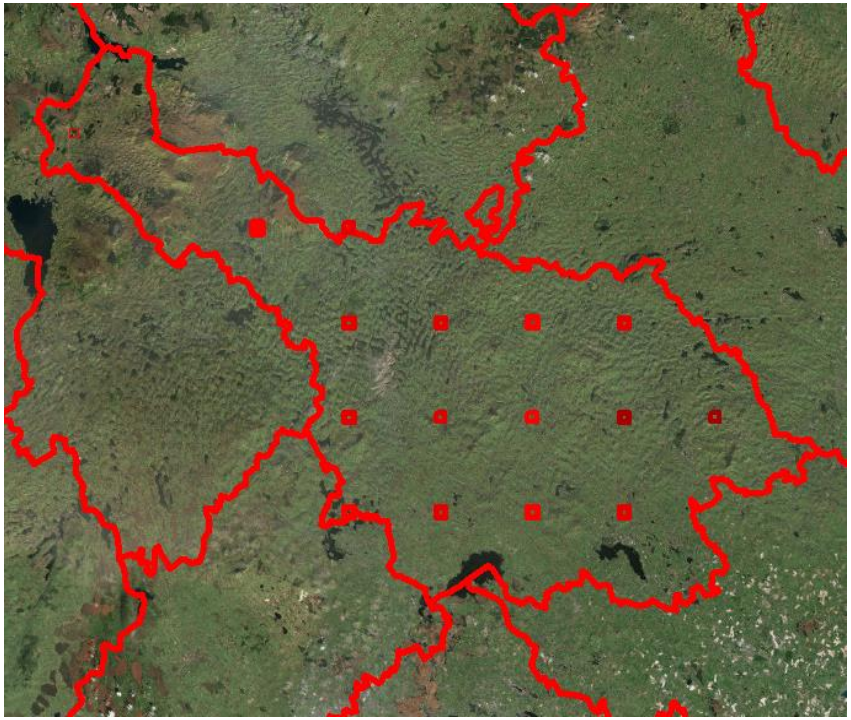
Example



- Hedgerow Cover
- Structure of hedgerow
- Habitats
- Plants

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Mapping hedgerows by digitally by hand

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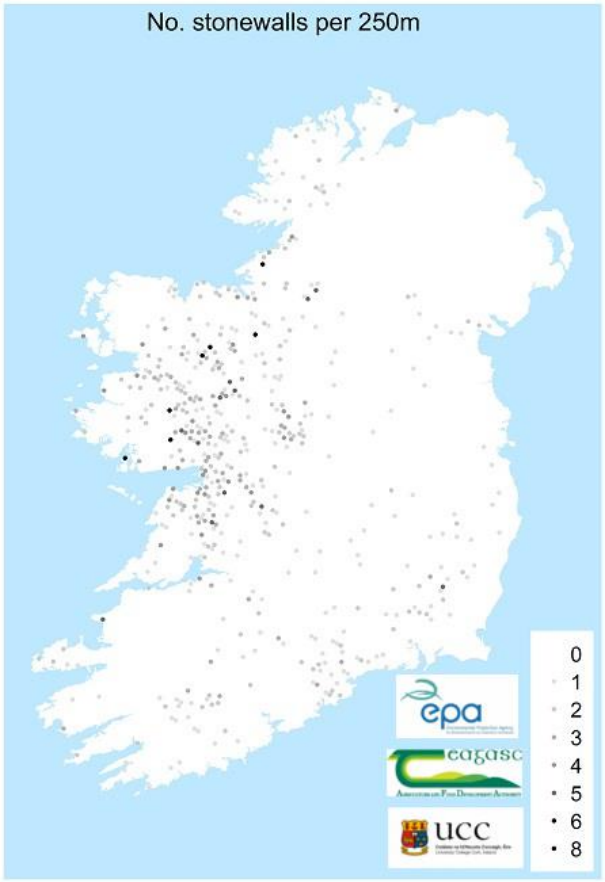
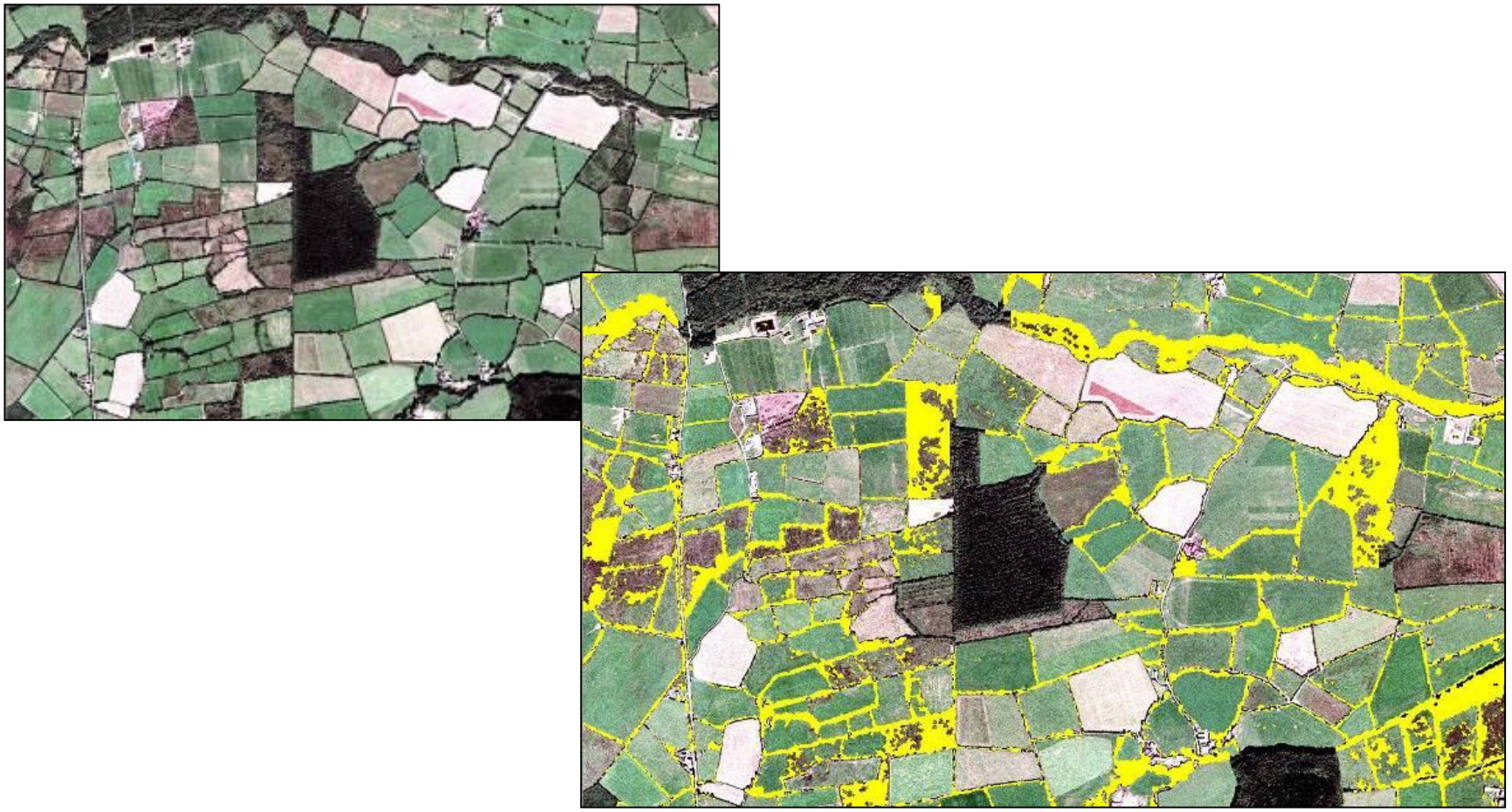
LUCAS

- 4000+ points are visited every 3 years and land cover is recorded, including occurrence of field boundaries on a 0.5km transect



Original Teagasc Hedgerow Map- 2005



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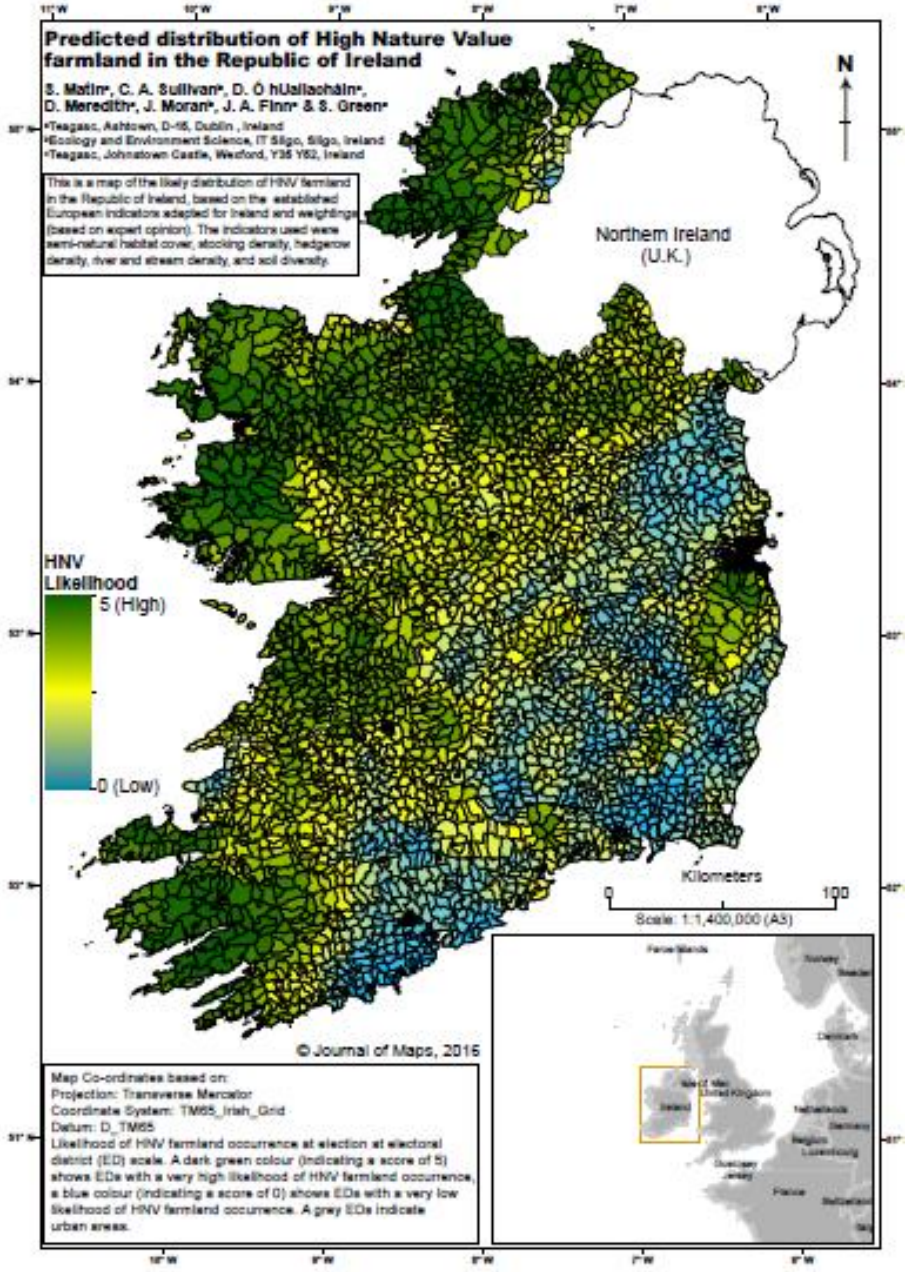
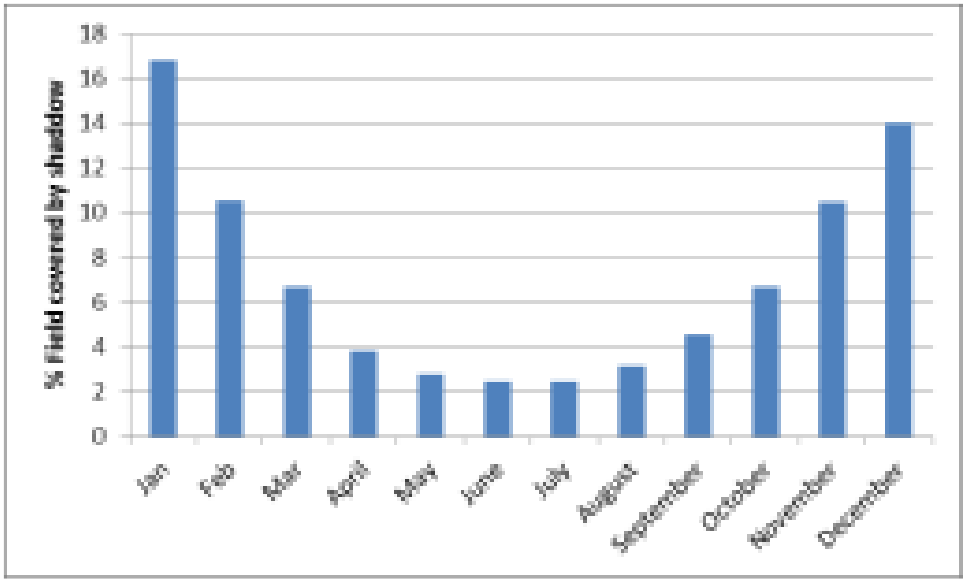
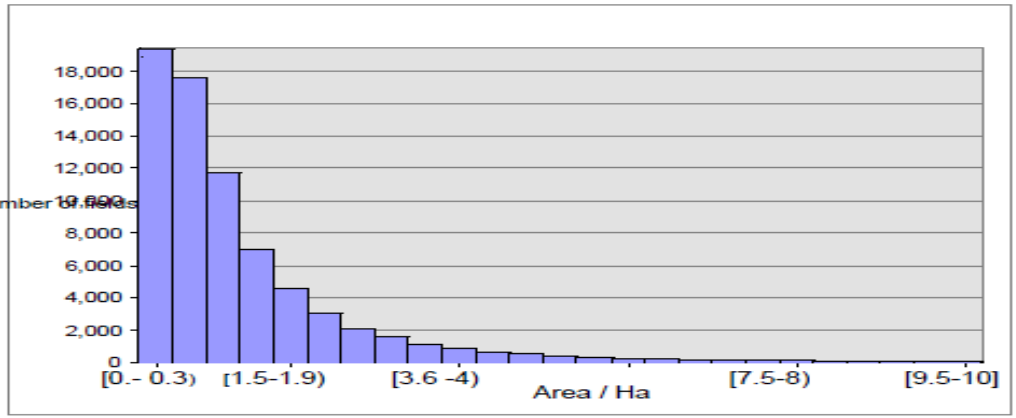
Original Teagasc Hedgerow Map- 2005

Results were provisional, and estimated that
Approximately 6% of the country was covered by:
Hedgerows, scrub, treelines etc



Hedgerow Shadow





ILM
Irish Land Mapping Observatory

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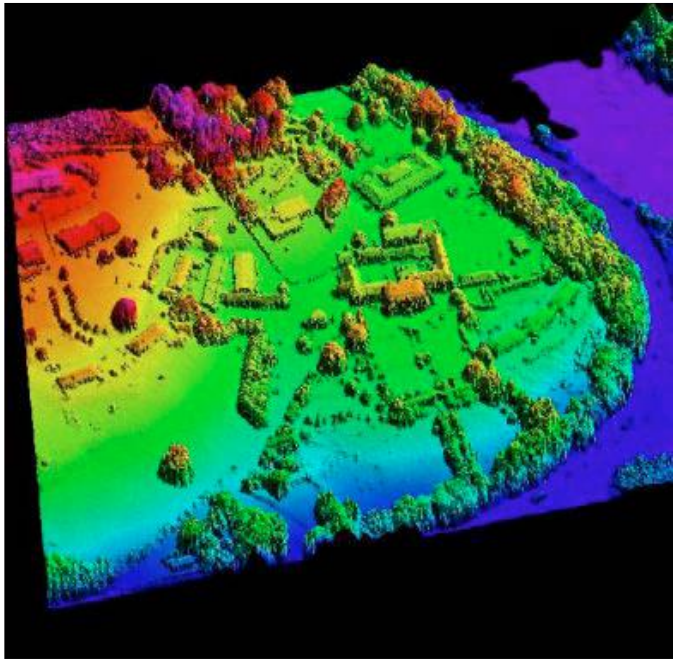
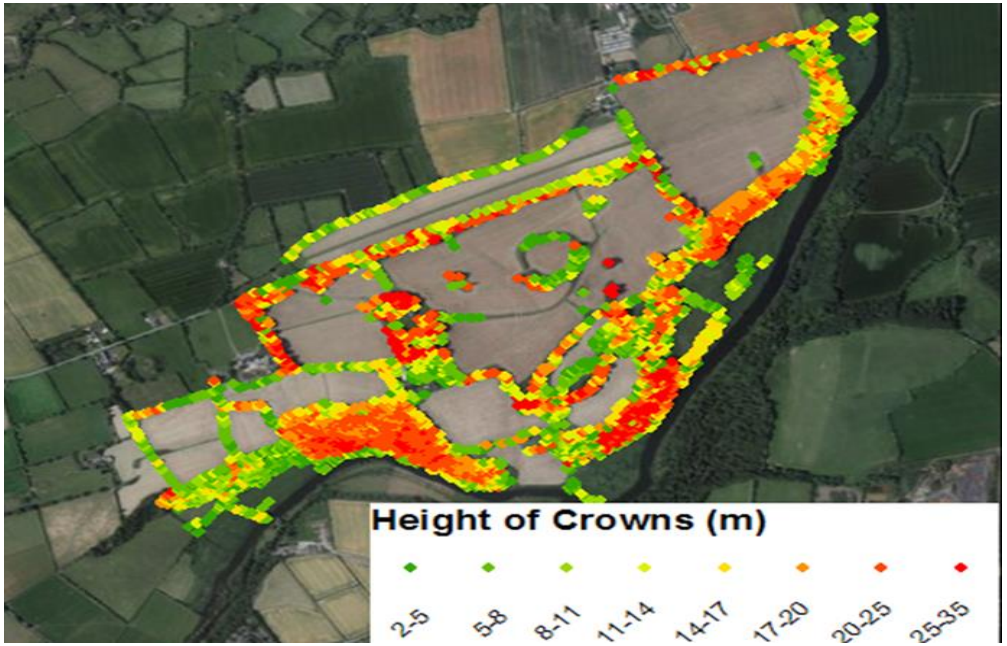
Laser Scanning





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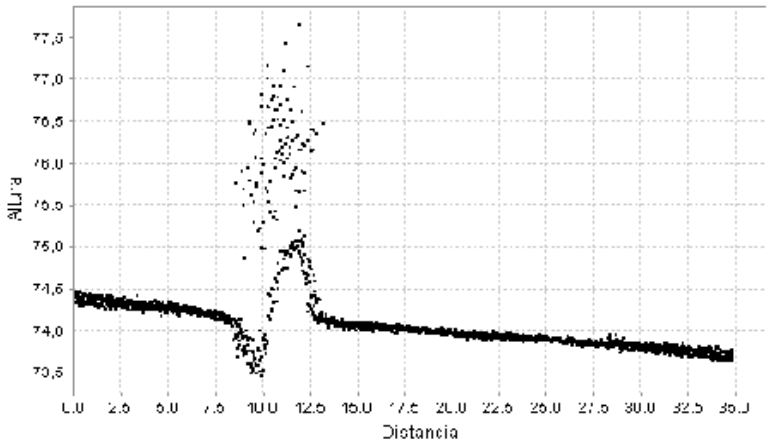

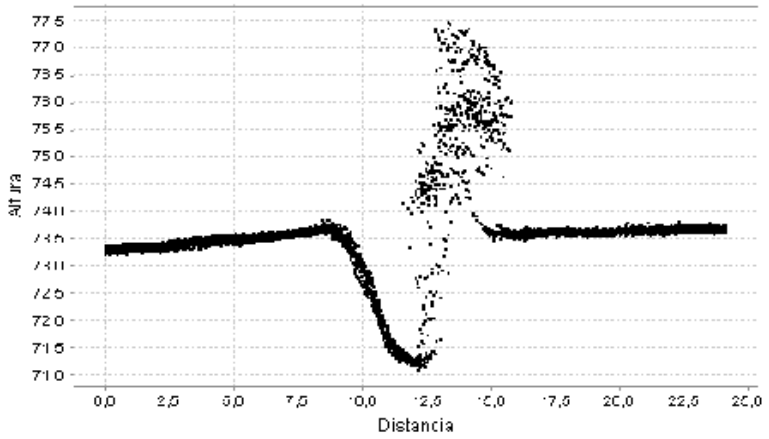

	Estimate	Lower/Upper limit to estimate
Above Ground Hedgerow Sequestration Rate ($tCO^2/ha/yr$)	1.6	0.5-2.7
Total Hedgerow Sequestration Rate ($tCO^2/ha/yr$)	1.9	0.6-3.2
Above Ground Scrub Sequestration Rate ($tCO^2/ha/yr$)	2.6	2.2-2.8
Total Scrub Sequestration Rate ($tCO^2/ha/yr$)	3.1	2.7-3.4
National Hedge & Scrub Annual Sequestration ($t\ CO^2$)	0.7 Million	0.3-1.1
Annual net-net removal ($t\ CO^2$)	9200	3000-17000

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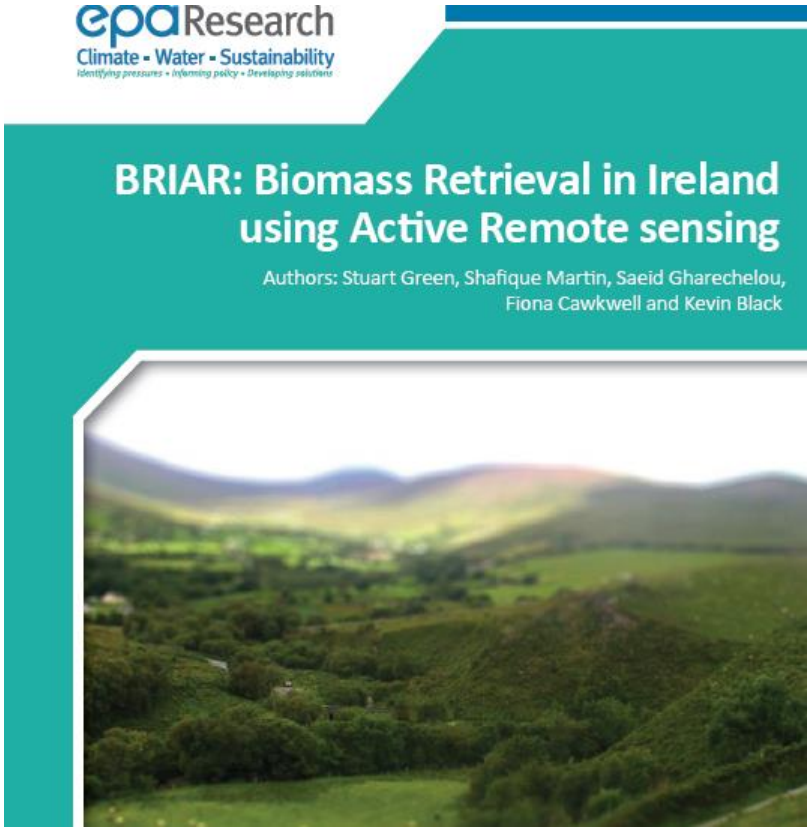
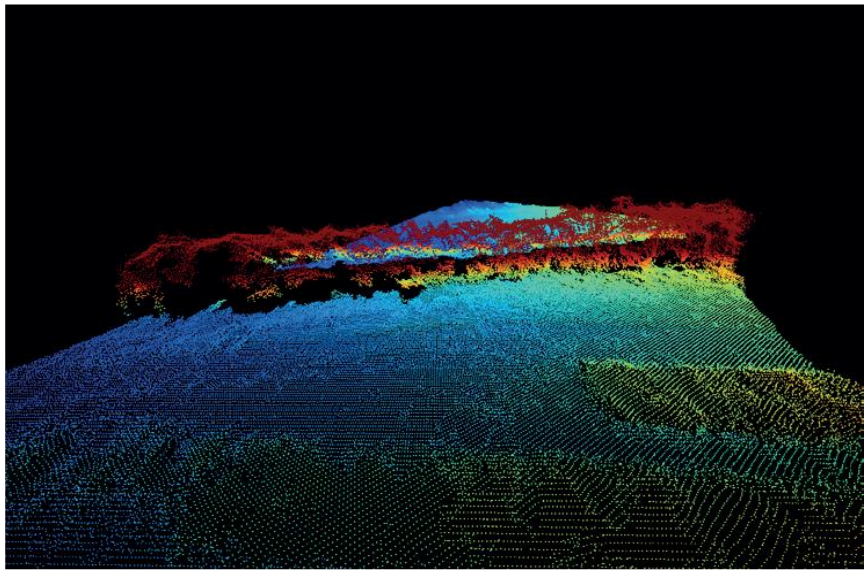
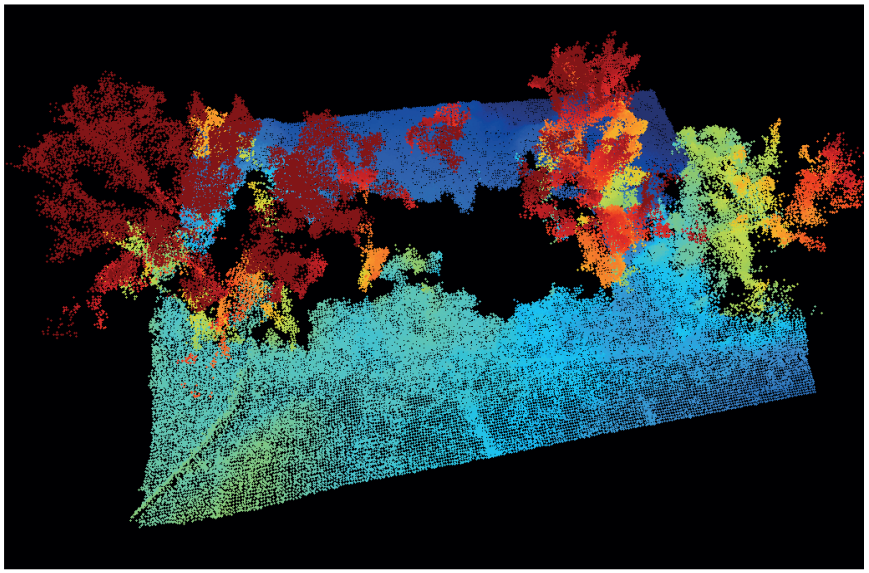
BRIAR



- Try to estimate hedgerow biomass using TerraSAR-X Radar satellite

- Both Traditional Survey methods (plot based) and new UAV approaches were tested to get ground reference data





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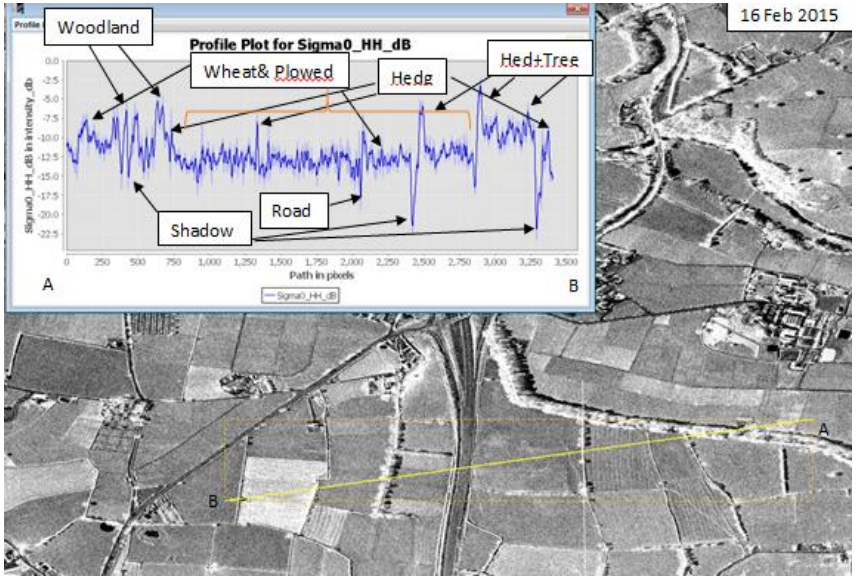
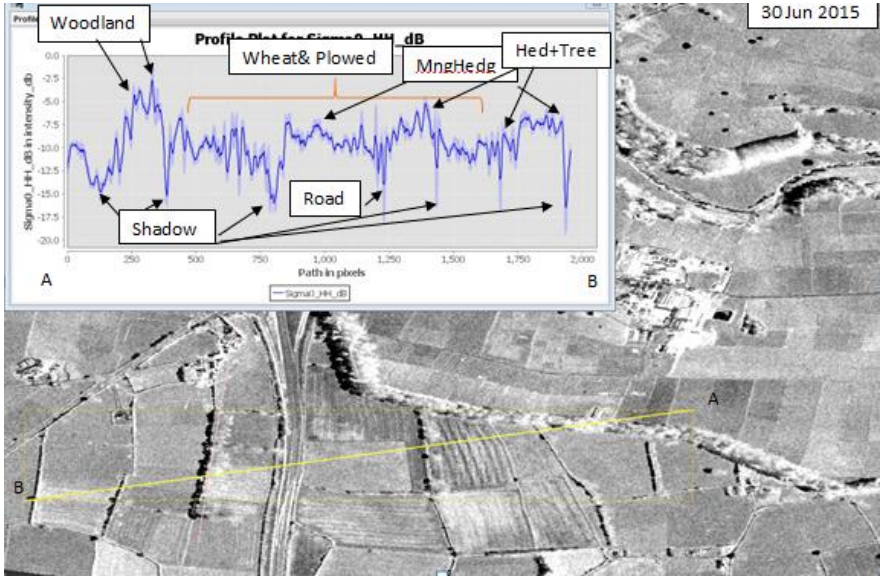
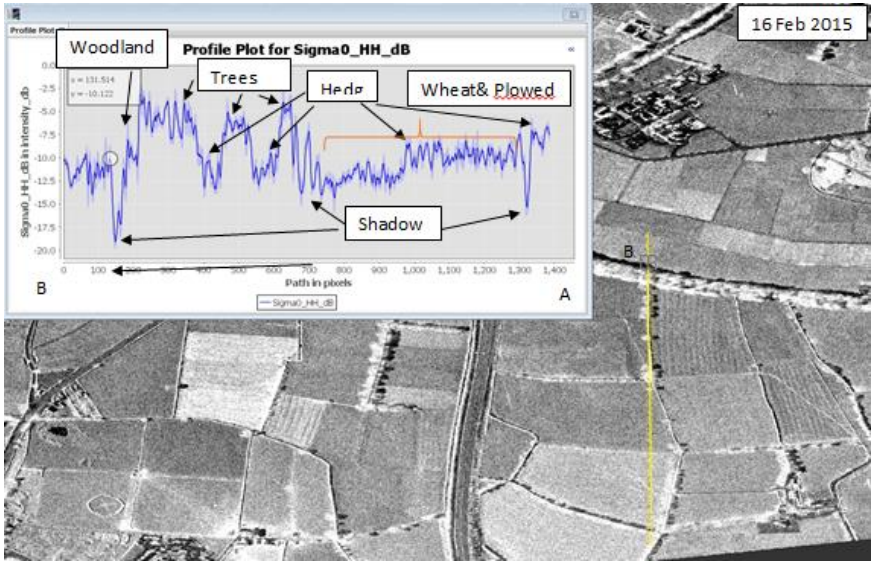
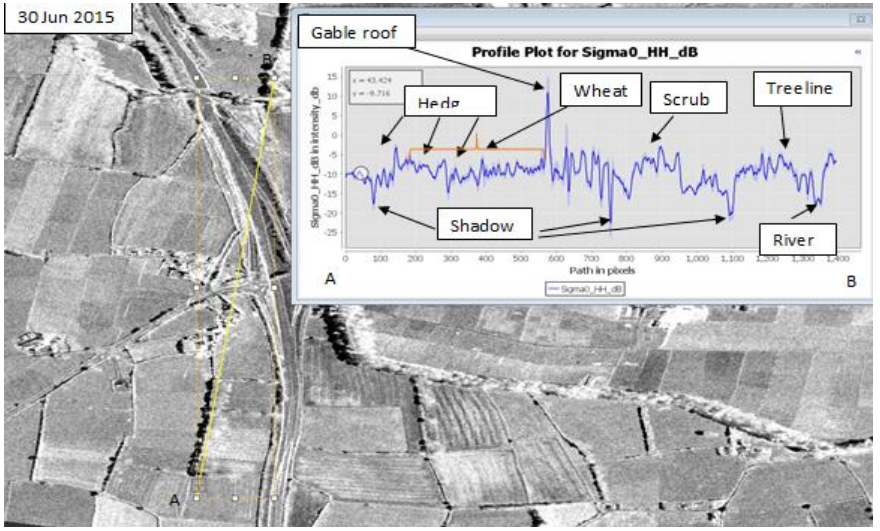
RADAR & Hedges









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Change over time

- Estimate a net removal between 1995 and 2015 of approx. 3%
- This doesn't take into account new hedgerow planting under GLAS

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	Boundary biomass Length ('000s km)-(% of Total)			
County	TOTAL	Un-shared Boundary	Shared Boundary	Internal Farm Boundary
Clare	33	19 (58%)	5 (15%)	9 (27%)
Cork	88	50 (57%)	13(15%)	25(28%)
Cavan	30	17(57%)	4(13%)	9(30%)
Carlow	10	5(50%)	2(20%)	3(30%)
Dublin	5	3(60%)	1(20%)	1(20%)
Donegal	32	19(59%)	5(16%)	8(25%)
Galway	39	23(59%)	7(18%)	9(23%)
Kildare	16	10(63%)	2(13%)	4(25%)
Kilkenny	26	13(50%)	5(19%)	8(31%)
Kerry	38	23(61%)	6(16%)	10(26%)
Longford	14	8(57%)	2(14%)	4(29%)
Louth	9	6(67%)	2(22%)	2(22%)
Limerick	35	21(60%)	5(14%)	9(26%)
Leitrim	21	11(52%)	3(14%)	7(33%)
Laois	18	11(61%)	3(17%)	4(22%)
Meath	26	16(62%)	4(15%)	6(23%)
Monaghan	22	12(55%)	4(18%)	6(27%)
Mayo	35	22(63%)	5(14%)	7(20%)
Offaly	19	13(68%)	3(16%)	4(21%)
Roscommon	26	15(58%)	4(15%)	6(23%)
Sligo	19	11(58%)	3(16%)	5(26%)
Tipperary	48	27(56%)	8(17%)	13(27%)
Waterford	17	10(59%)	2(12%)	5(29%)
Westmeath	20	13(65%)	3(15%)	4(20%)
Wicklow	14	8(57%)	2(14%)	4(29%)
Wexford	29	16(55%)	5(17%)	7(24%)
ROI	689	406(59%)	106(15%)	177(26%)

Total estimated length of "boundary biomass" is :

689,000km

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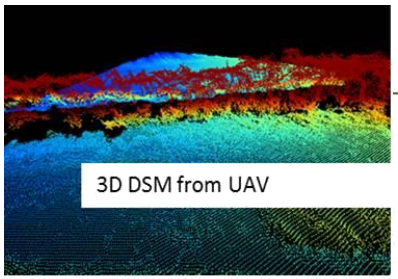
Current work

Objectives

- Quantify the carbon stock of biomass from selected hedgerows. Also, the soil, deadwood and litter carbon stocks will be measured to develop carbon flow models.
- Develop biomass functions based on volume measurements captured using 3D digital surface models.
- Explore potential to develop a model to incorporate the land use mitigation potential associated with hedgerows into existing C-model for off-setting at farm scale.
- An integrated scorecard for assessment along with BMP for carbon and other ecosystem services will be developed.

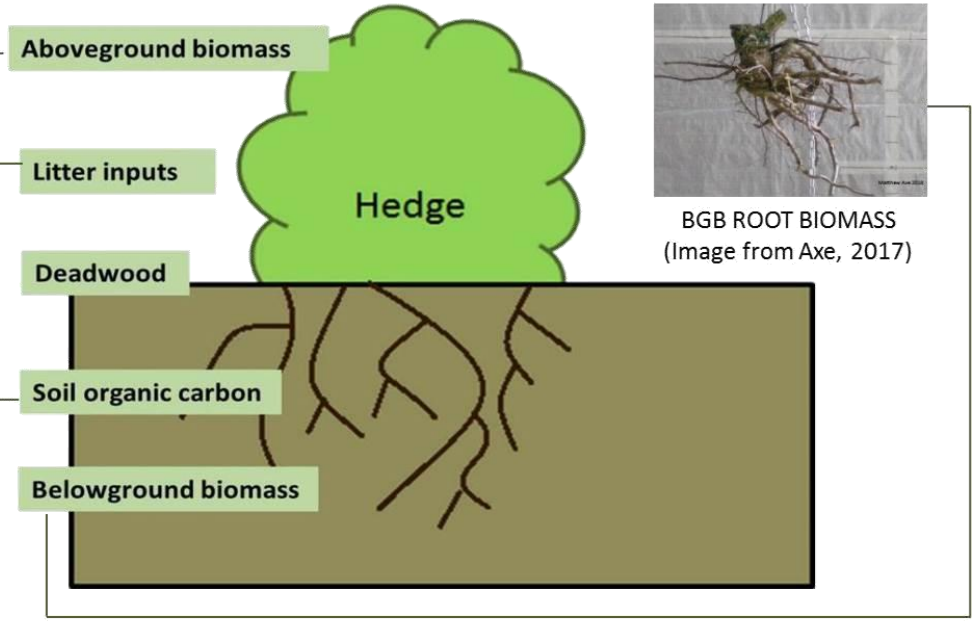
Study design

Selected sites represent a range of management and age classes. Derive 3D digital surface models (DSM) using an unmanned aircraft vehicle (UAV) to assess volume. Litter traps have been placed at sites to collect litter fall. Direct measurements (winter 2020) to capture carbon pools shown below.



AGB LITTER TRAP

SOIL SAMPLING



BGB ROOT BIOMASS
(Image from Axe, 2017)

Figure: Carbon pools to be measured

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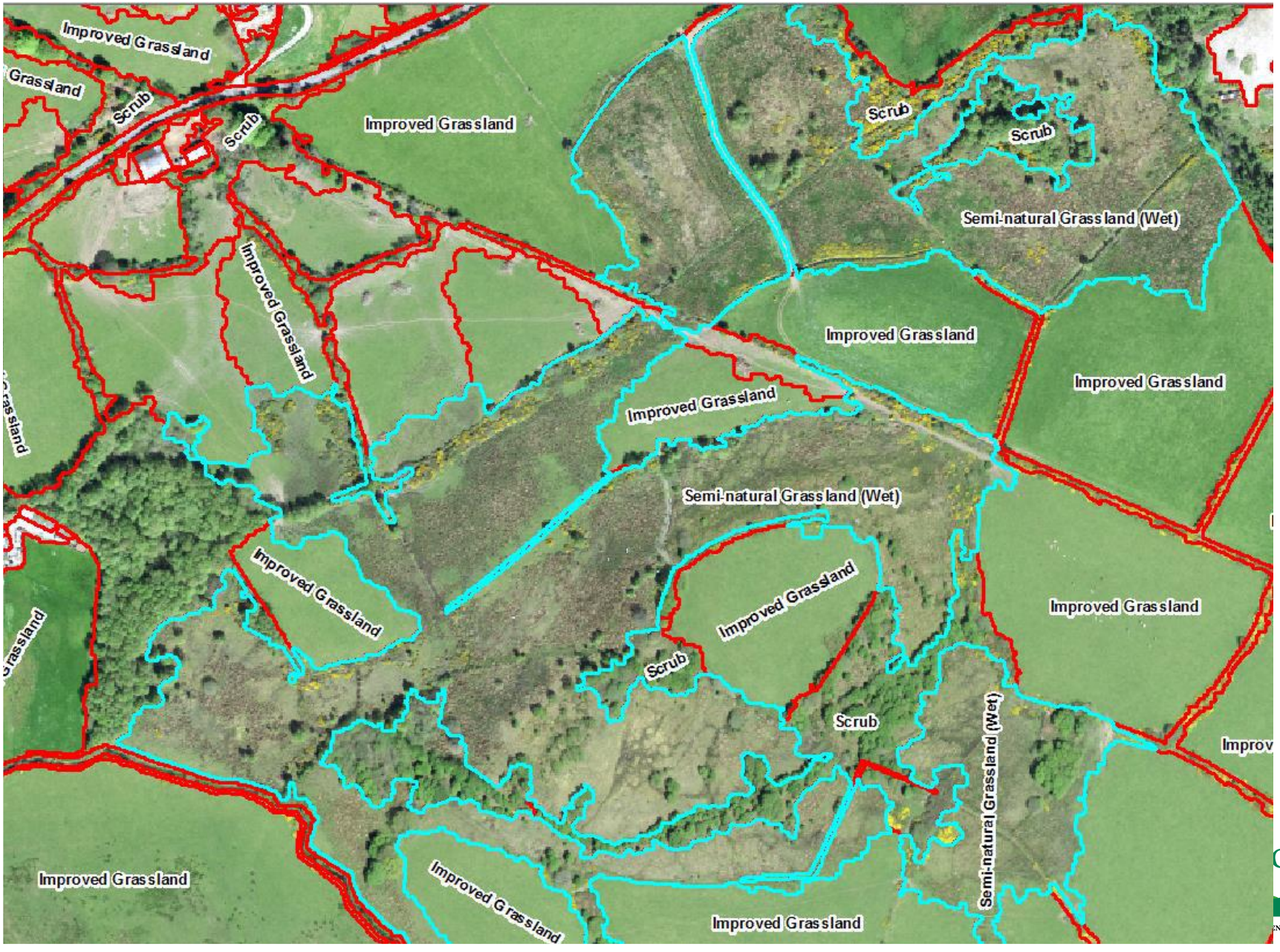
New National Land cover Map from OSI & EPA



Our Hedgerows are valued more than ever

.

- From 2021 we are going to have in place accurate maps to measure and monitor hedgerows
- From 2022 we can have better estimates of carbon in hedgerows
- We now map changes, management, new hedgerows planted and hedgerows removed using satellites.

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