

Irish soils

The National Picture

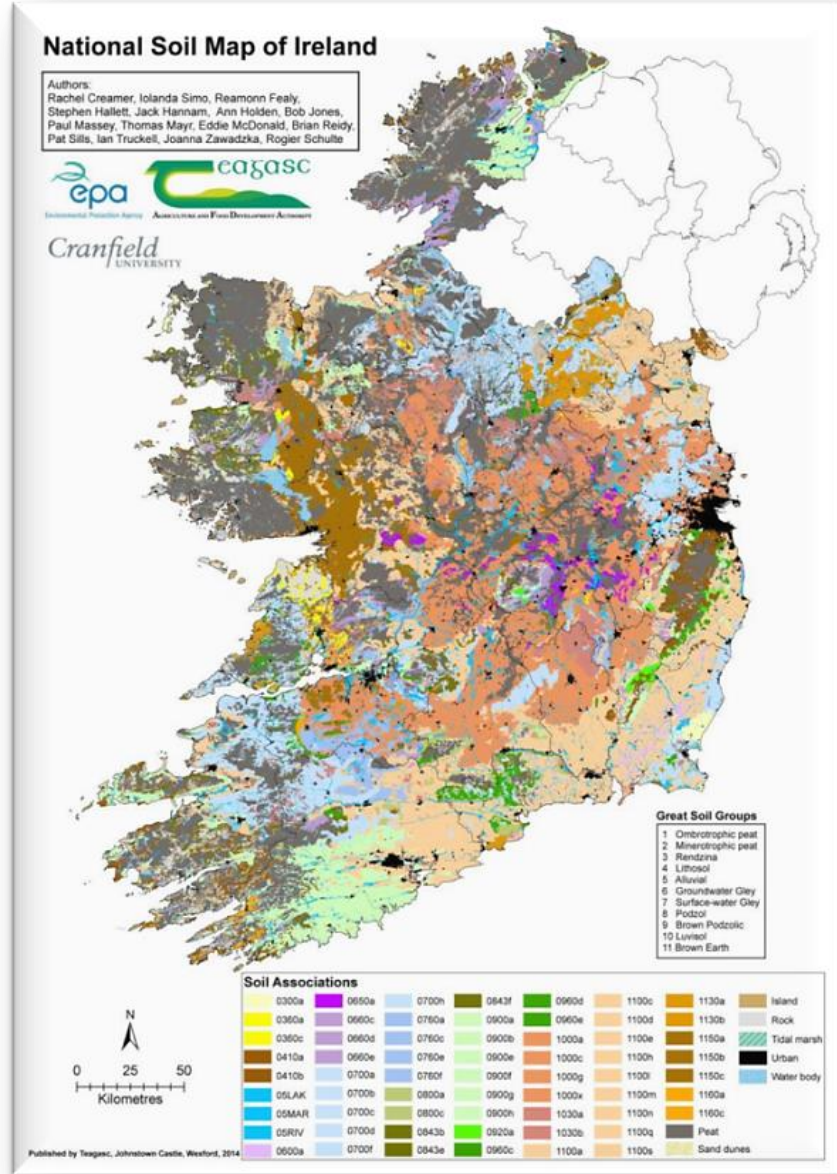
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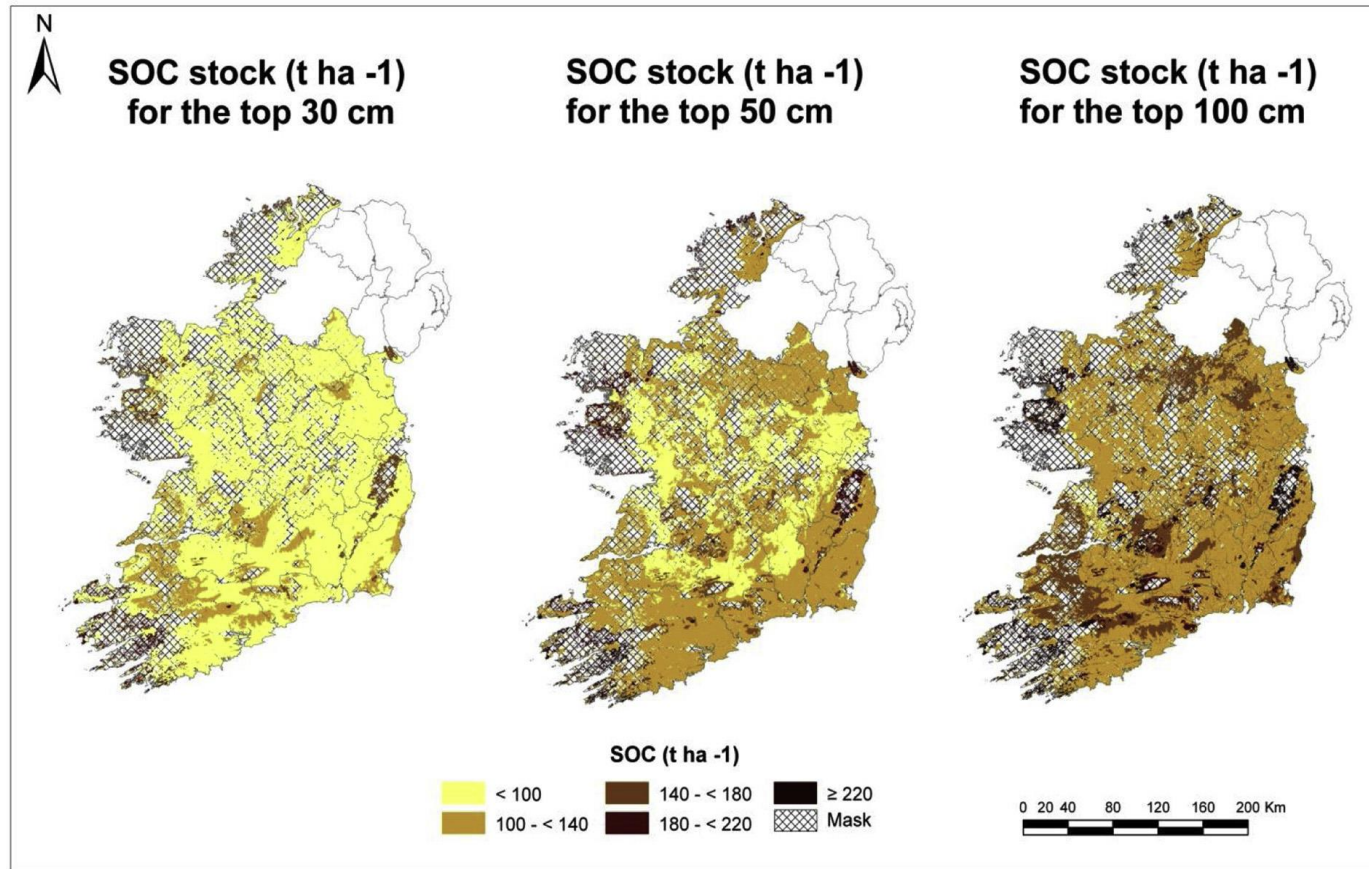
What soils do we have in Ireland?



<http://gis.teagasc.ie/soils/index.php>

How have we used this knowledge?

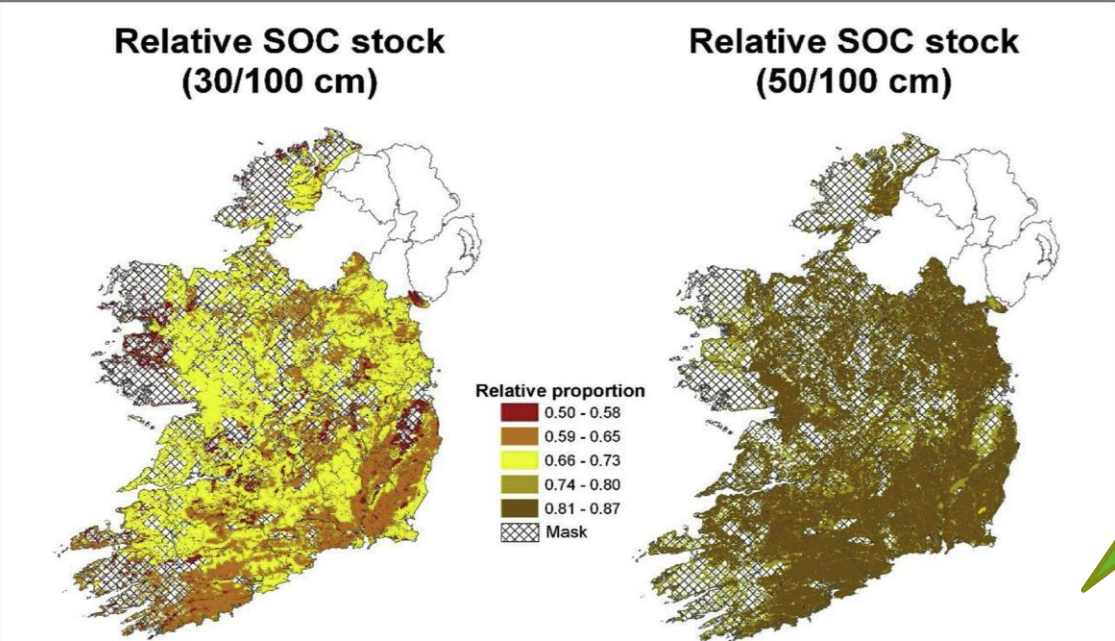
Carbon stocks – Irish mineral soils baseline – 1m SOC and subsoil SOC



SOC stock maps showing the spatial distribution and geographic variation of stocks at different depths in mineral soils

~1800 Mt CO₂e; ~69 Mt C (253 Mt CO₂e); Total annual emissions - ~60 Mt CO₂e

Carbon stocks – what measurement depth?



The issue of sampling depth: IPCC focus on top 30cm of soil – magnitude but does not capture quality (residence times).

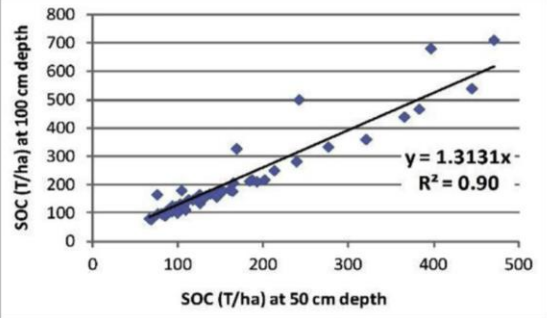
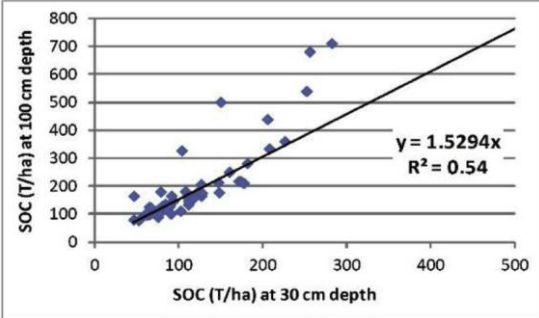
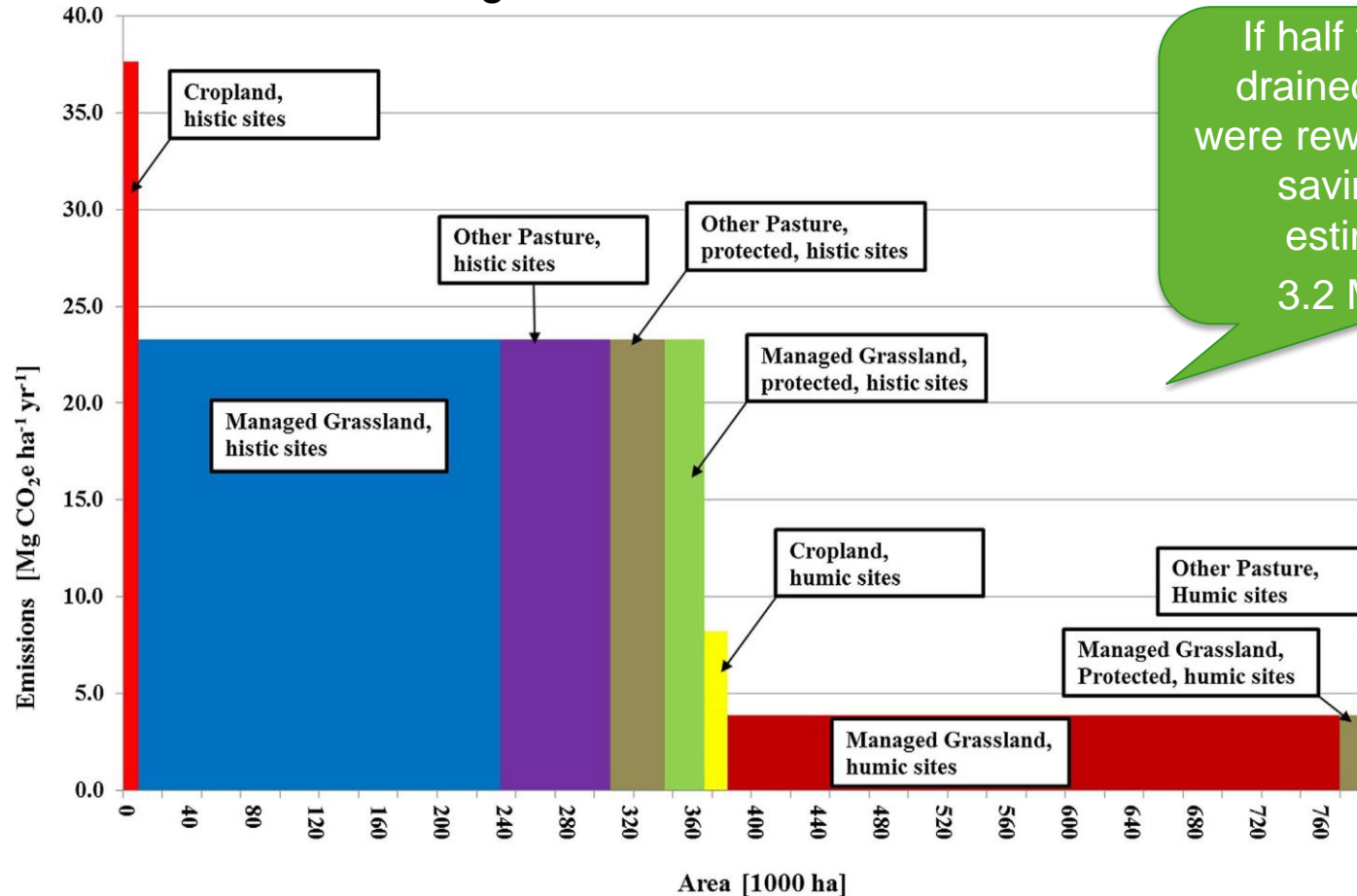


Fig. Distribution of C relative proportion for 0-30cm and 0-50 cm. The prop SOC stock in the first 50 cm depth is more consistent across subgroups and accounts for 90% of the variation in total SOC stock to 1 m

The role of carbon rich soils

The role of artificially drained agricultural land for climate change mitigation in Ireland was assessed focusing on carbon rich soils:



If half the area of drained peat soils were rewetted, annual savings were estimated at 3.2 Mt CO₂e.

Drained extent: Peat (histic): 370,000 ha | Peaty-mineral (humic): 426,000 ha
 Drainage emission: 8.7 Mt CO₂e | 1.8 Mt CO₂e
 (yr)

Spatially tailored 'smart' SOC

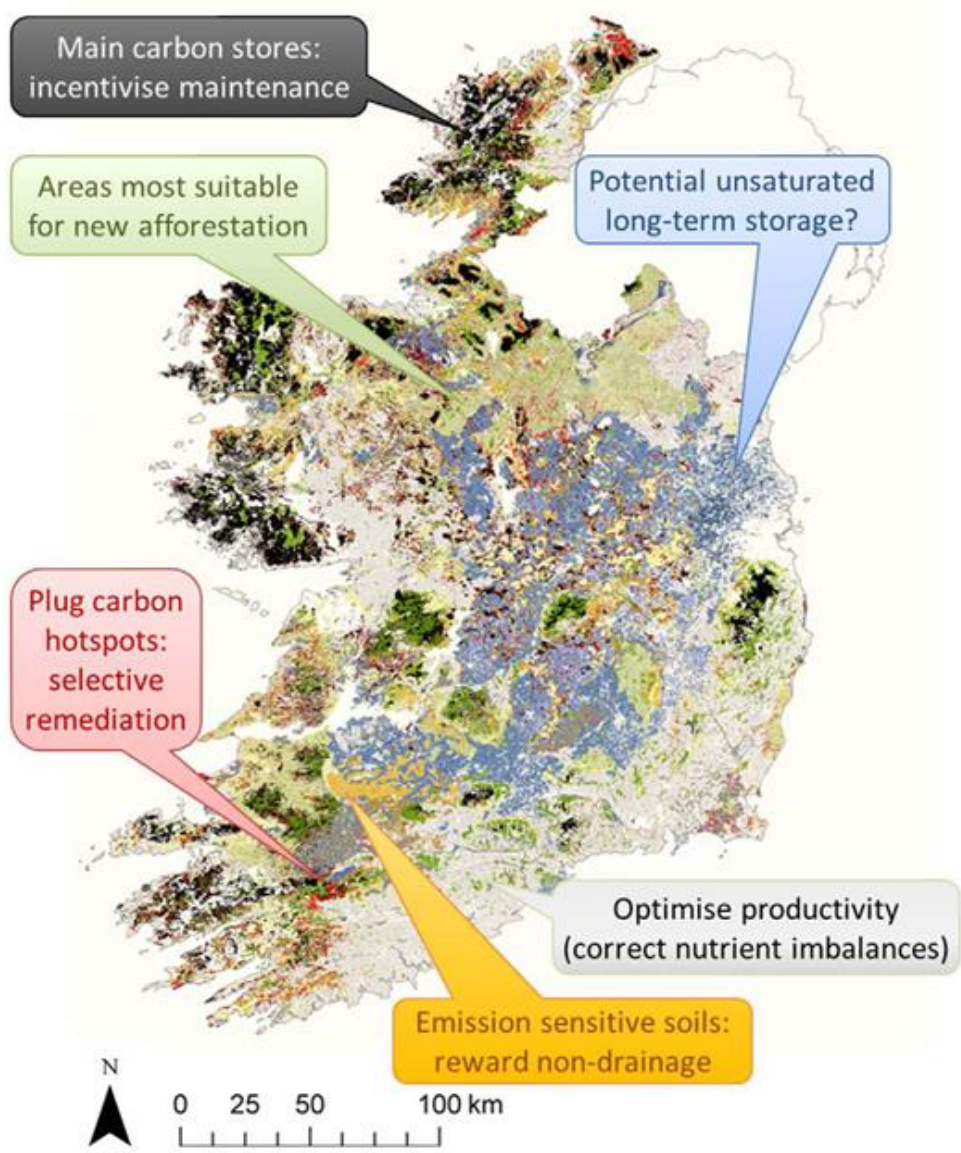


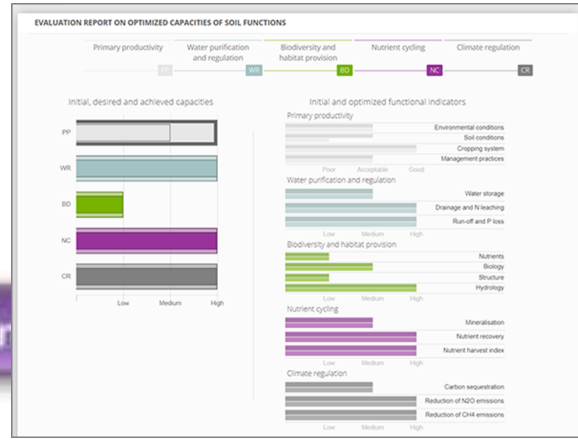
Fig. Geographic distribution of SOC stocks and fluxes of relevance to climate-smart land management in Ireland

Other C sinks and soil C impact



WHAT DO WE DEMAND FROM OUR SOILS?

All soils have the capacity to perform all functions simultaneously!



<http://cloudstorage.ijs.si/navigator/#/app/navigator>



Funding from the European Union's Horizon 2020 research & innovation programme under grant agreement No 635201.



Other C sinks and soil C impact



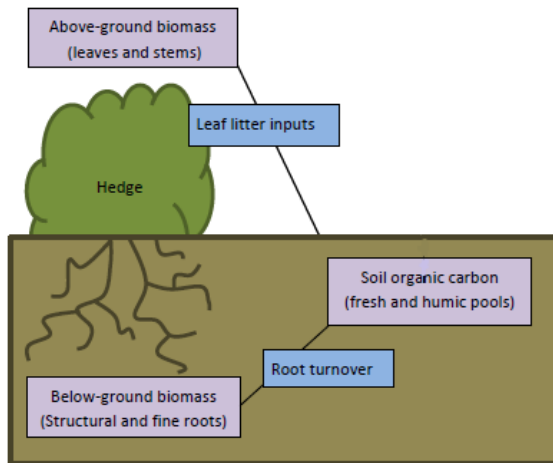
OBJECTIVES

Calculate carbon stock of measured biomass from selected hedgerows & relate to volume measurements captured using remote technologies: Δ biomass volume = Δ C stock

Develop an integrated scorecard BMP for carbon and other ecosystem services.

METHODS - Measure, Model, Manage

MEASURE: ABG, BGB, SOC



Carbon stores (purple) and flows within the system (adapted from Crossland, 2015)

EXPECTED OUTPUTS

Better understanding of carbon dynamics of hedgerows and assessment scorecard.



REMOTE MEASUREMENTS



BGB ROOT BIOMASS
(Image from Axe, 2017)



SOIL SAMPLING



AGB LITTER TRAP

Acknowledgement



Summary

- Irish SIS is one survey resource for collaboration
- Agricultural mineral soils have an important SOC stock in subsoil
- Spatially targeted approach accounting for SOC in soils
- Integrated management tools that can account for carbon and other soil services will be increasingly required

Thank you

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References

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- Torres-Sallan, G., Schulte, R.P.O., Lanigan, G.J., Byrne, K.A., Reidy, B., Simo, I., Six, J., Creamer, R.E., 2017. Clay Illuviation Provides a Long-term Sink for C Sequestration in Subsoils. *Scientific Reports* 7. 45635. <https://doi.org/10.1038/srep45635>.