PEATLANDS for Prosperity

Carbon Farming & Paludiculture in Ireland

Farm Carbon TRANSITIONS

Green Restoration Ireland (GRI) Cooperative Society Ltd

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Rialtas na hÉireann Government of Ireland

Arna chomhchistiú ag an Aontas Eorpach

Co-funded by the European Union

Tionól Réigiúnach an Oirthir agus Lár Tíre Eastern and Midland Regional Assembly

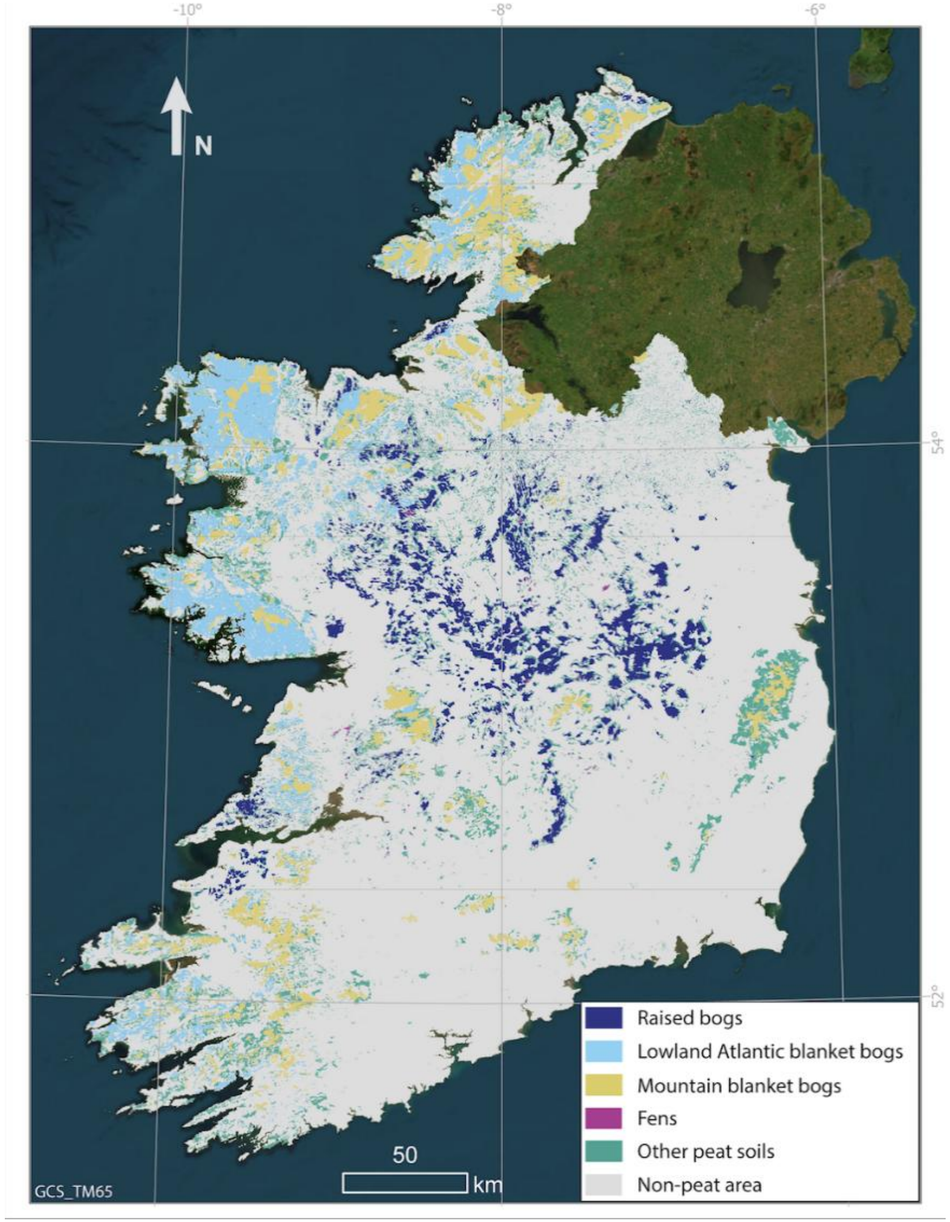
pobal government supporting communities

community finance IRELAND

Green Restoration IRELAND

Context

The Peatland Challenge



- 1.66 M ha (23% of Ireland)
- 85% damaged / degraded
- *Up to 10M t CO2e emissions*

- 270,000 ha natural peatlands
- 300,000 ha afforested
- 10,000 ha arable
- ***340,000 ha peat grasslands***
- ***610,000 ha cutover***
- 5% Bord na Mona, 3% NPWS, 15% Coillte, *77% remainder*

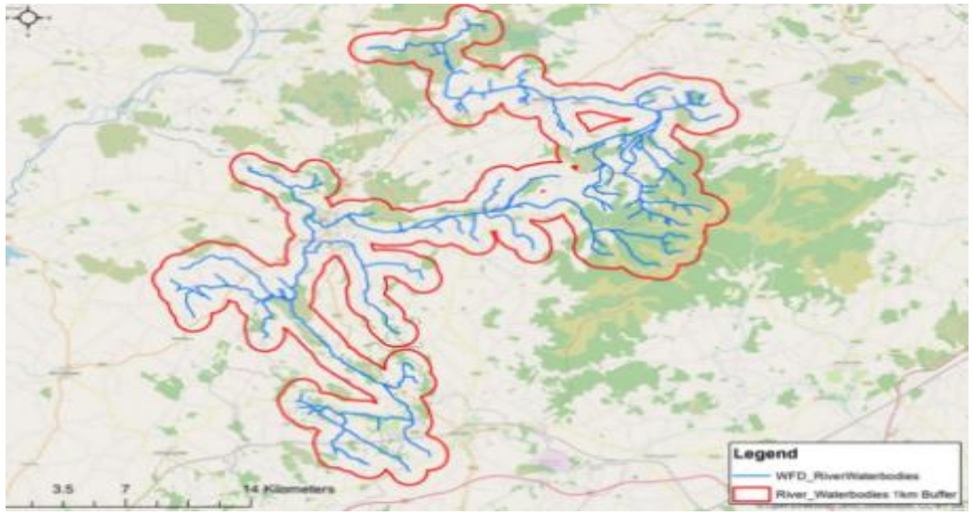
The Peatland Challenge

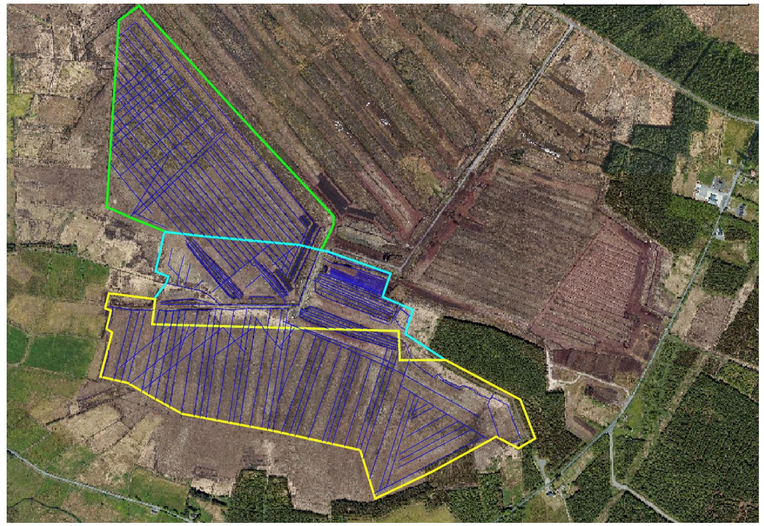
- Estimated at about 2.2 billion tonnes
  - = ***75%*** of our soil carbon
- For comparison, this is about ***6-7 times*** that stored in Irish forests

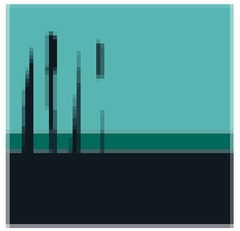
GRI Overview

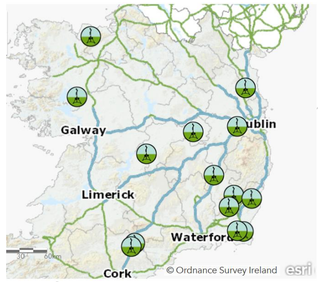
Farm Carbon EIP & Mayo Bogs

Green Restoration
IRELAND



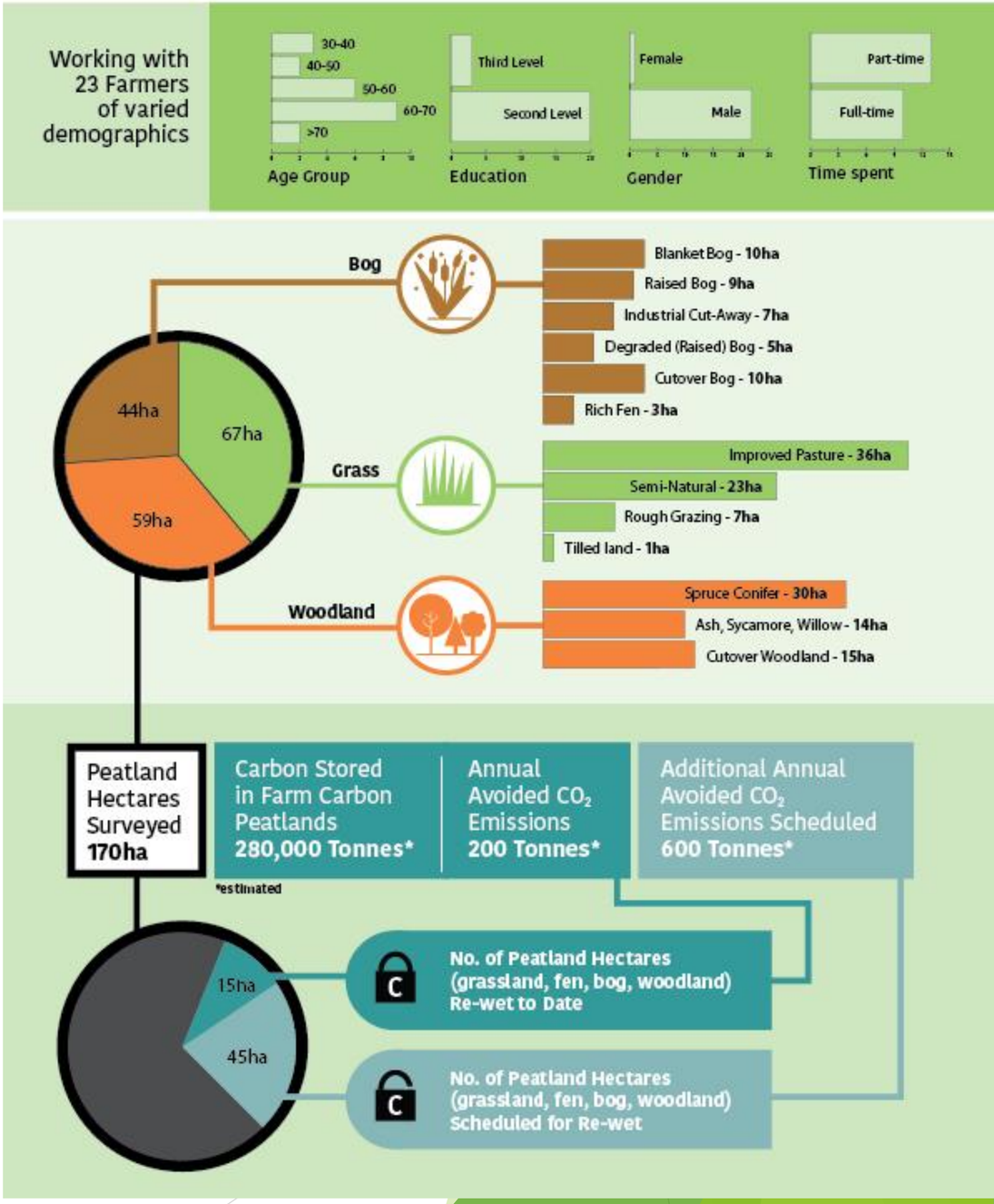






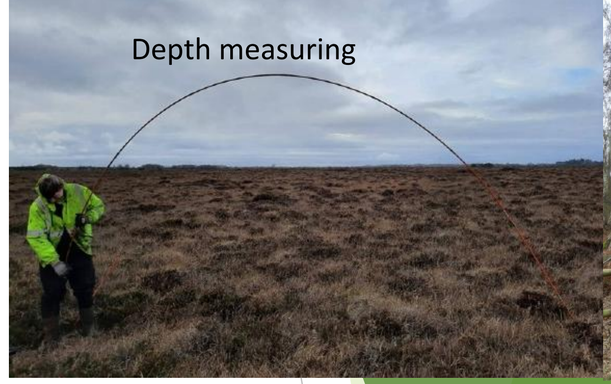
Aims & Achievements

- *Farm Carbon* EIP undertaking integrated *before* and *after* studies of a range of peatland habitats from e.g. intact bog to intensive peat pasture:
  - Intact raised bogs and fens
  - Degraded raised bog & *Industrial cutaway bog*
  - Cutover bog
  - Cutover woodland
  - Plantation forestry on peat
  - Semi-natural - semi-improved pasture / rough grazing
  - Improved grassland,
  - Tilled land.
- 180 hectares surveyed storing 270,000 tonnes carbon
- 680-990 tCO2e annual emissions
- 20+ farms in the catchments of:
  - Little Brosna, Camcor (south central Offaly), and Silver Rivers
- ***Majority*** carried out some form of water table management (WTM)



Baselines - Peat stocks & GHG emissions

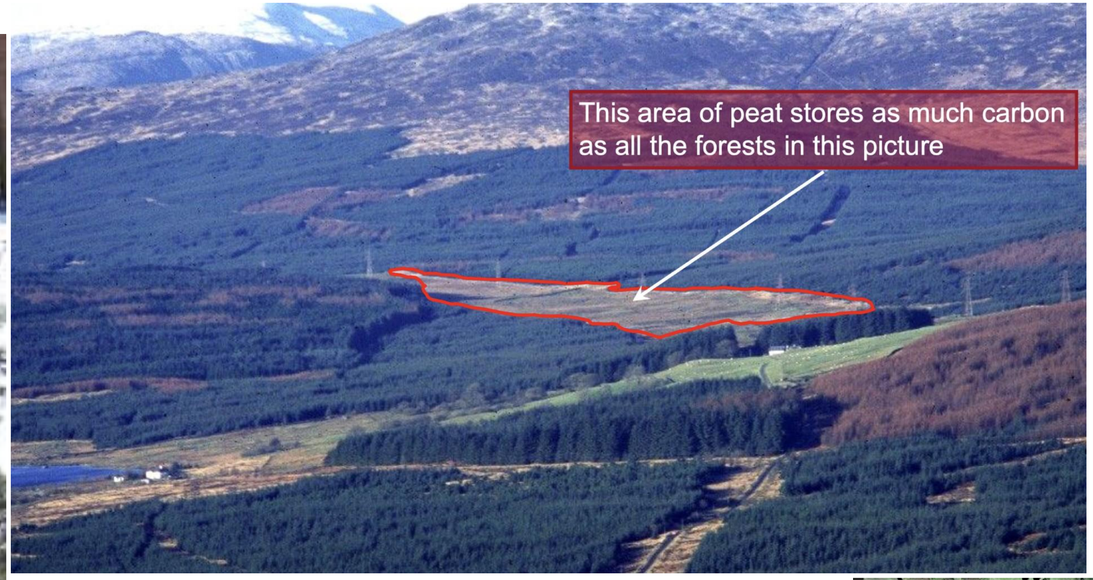
LAND USE	Average tonnes C / hectare	Standard deviation	Median	AVERAGE DEPTH (mm)	Standard deviation	Median
Improved / semi-improved pasture	1100		529	1402	1632	529
Semi-natural pasture	820		623	1039	877	790
Rough grazing	1024	611	895	1682	1168	1500
Tilled land (1 site)	576	N/a		730	N/a	
Spruce plantation	932	687	682	1131	868	779
Lodgepole plantation (1 site)	201	N/a		255	N/a	
Ash plantation	1023	400	1130	1297	507	1433
Willow plantation (1 site)	1207	N/a		1530	N/a	
Sycamore plantation	709	55	709	899	69	899
Native woodland / scrub	1873	900	1257	2419	1092	1675
Blanket bog	266	N/a		338	N/a	
Raised bog (active)	5645		6295	7157	1456	7981
Semi-degraded raised bog	5572		5579	7065	2133	7074
Degraded raised bog (1 site)	3364	N/a		4265	N/a	
Cutover bog	2619	782	2619	2642	975	2350
Industrial cutaway	3311	2679	3311	4199	3396	4199
Fen (1 site)	1760	N/a		2231	N/a	

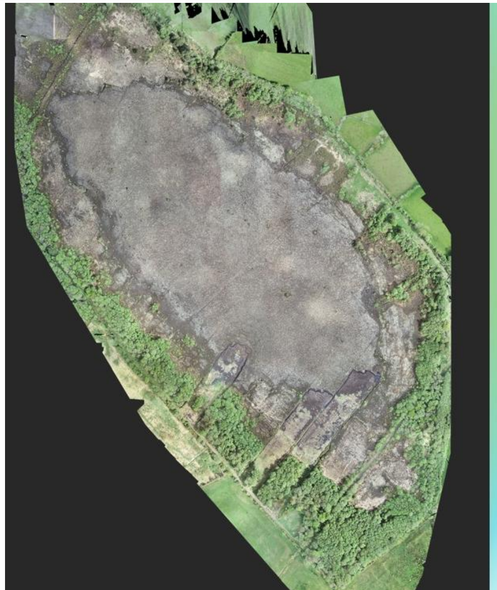


- **Resource depletion = 0.5-1 cm soil loss annually**

Impermeable sub-soil with little to no agricultural value

How Much Carbon?





Carbon storage in:

- Intact bog - 94,000 tonnes
- Cutover bog - 19,000 tonnes
- Cutover woodland - 7800 tonnes

Potential CO2 emissions in:

- Intact bog - 60 tCO2e
- Cutover bog - 69 tCO2e
- Cutover woodland - 86 tCO2

Farm Carbon Transitions EIP

- 10-year Farm Transition Strategies based on:

- High quality carbon baseline (operational and ecological data):
  - Biodiversity baseline (birds, bats, pollinators, flora, nematodes, ciliate amoeba)
  - Water storage (and quality) baseline.

- Carbon farming, Paludiculture (2 lighthouse farms), nature-based solutions & farm habitat measures
- Environmental Production Outcomes
- Habitat Management Plans (protect, enhance, create and bigger, better, more linked up)
- Crop Production Pans (for Paludiculture)
- Environmental Income Forecasts (carbon, PES, biodiversity)
- Landscape Level Plans for farm clusters

- Minimum 3 measures to achieve 15% reduction in carbon footprint
- Beef, dairy, tillage and coastal farms.

Calculating Emissions & Next Steps

- Created an emissions model for payment (average water table)

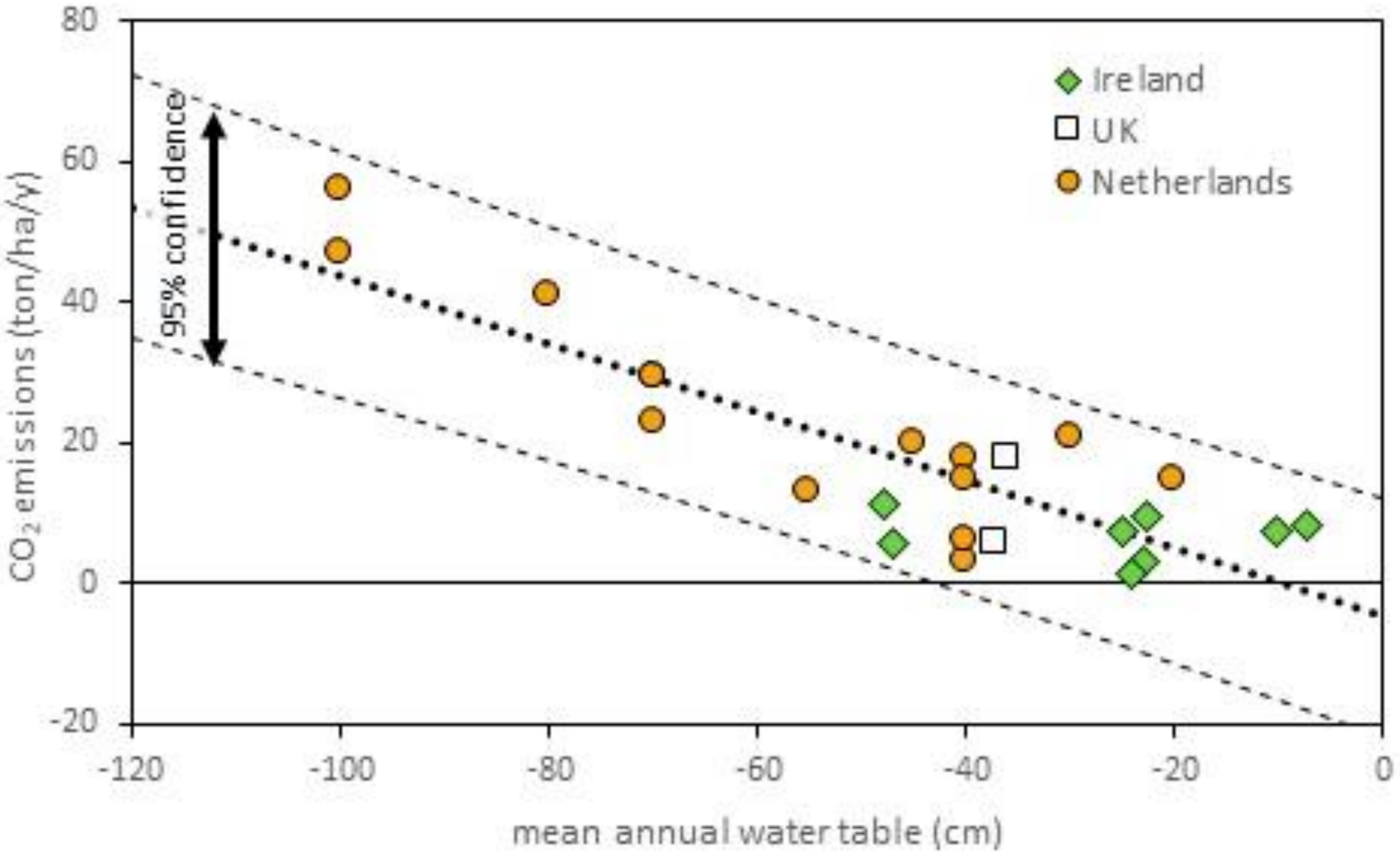
  10 cm = 5t CO2e/ha/yr

- ***-40 cm = business-as-usual***

- What happens above

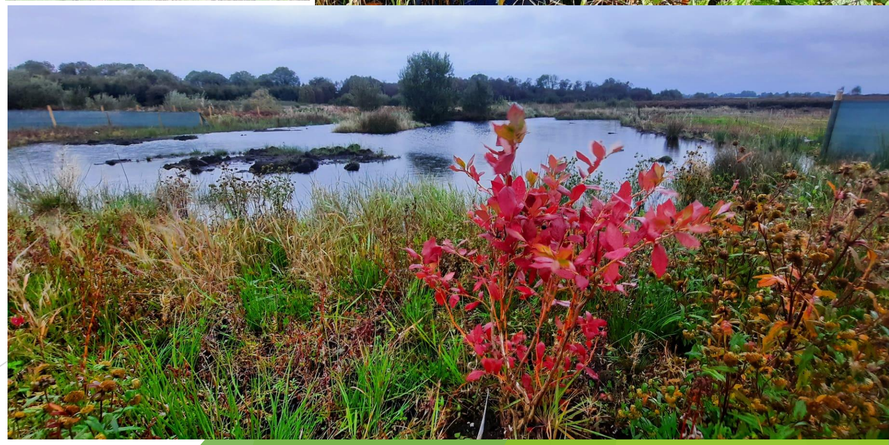
  -40 cm?

➡ ***paludiculture trials***



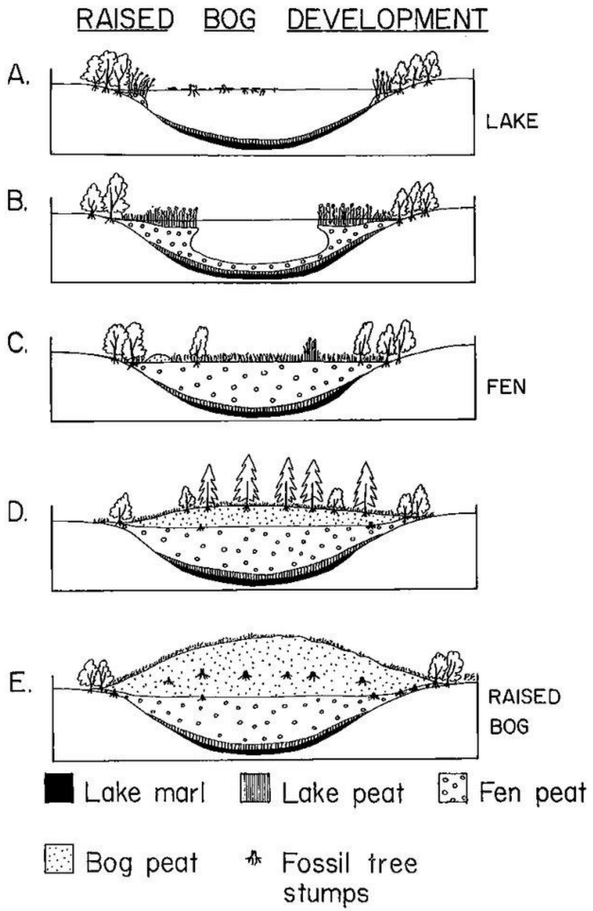
Rewetting options

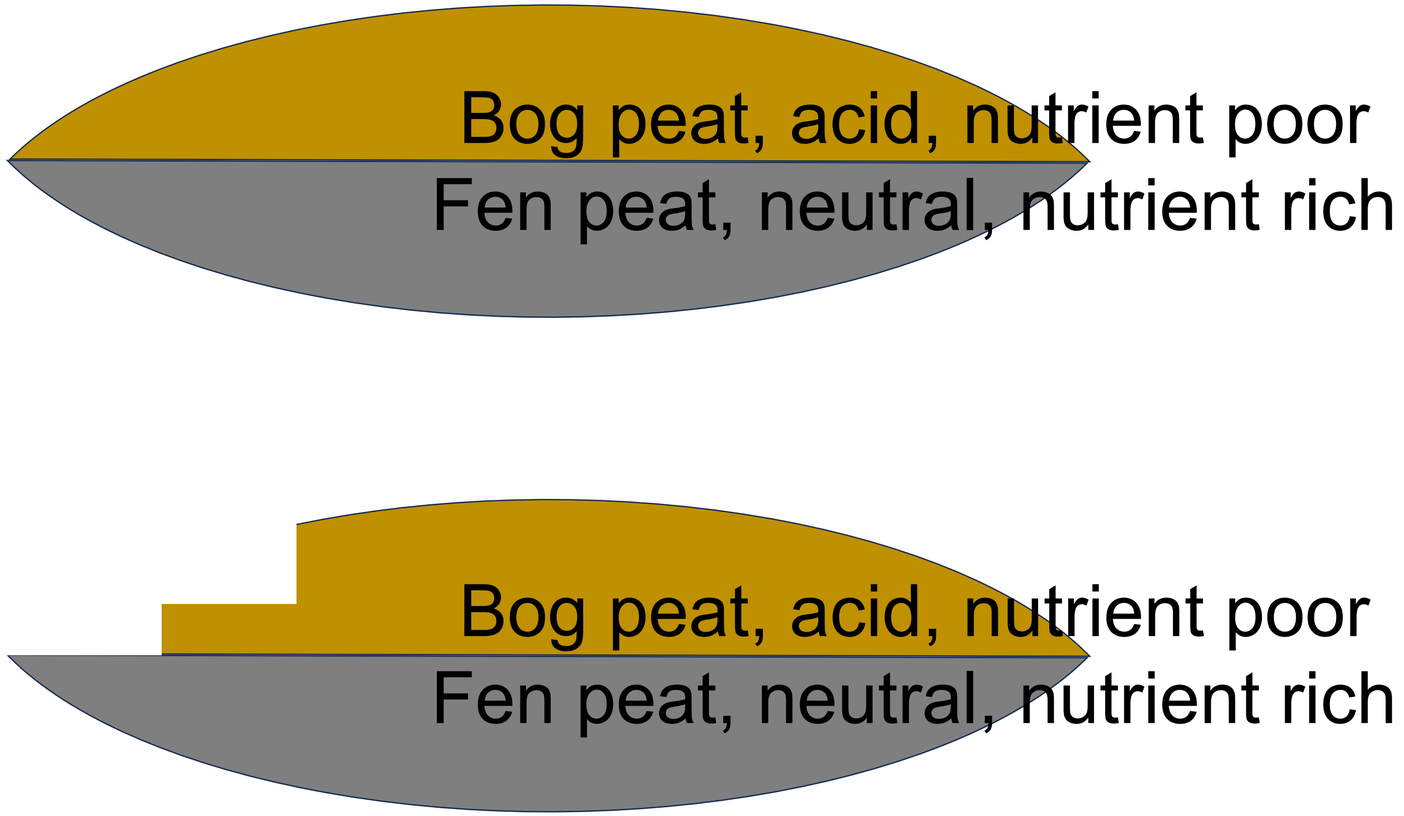
- Farmer-led paludiculture trials of various crops & water table management / rewetting' approaches:
  - Rewetting & rewilding of pasture (recreate fen & wet grassland)
  - Scrub clearance / reclaiming rough grazing for creation of wet grassland
  - Partial rewetting of pasture
    - Commercial wet grass mix trials
    - Randomised block design experiment - wet-tolerant grasses, legumes & herbs
  - Paludiculture trials in horticulture - fruit, herbs, vegetables, peat mosses
  - Rewetting of cutover and regenerated woodland
  - Commercial timber from paludiculture forestry - liquidambar, dawn redwood etc.
  - Fuel & building material - reed, cattail.



Peatscape

Development of Raised Bogs

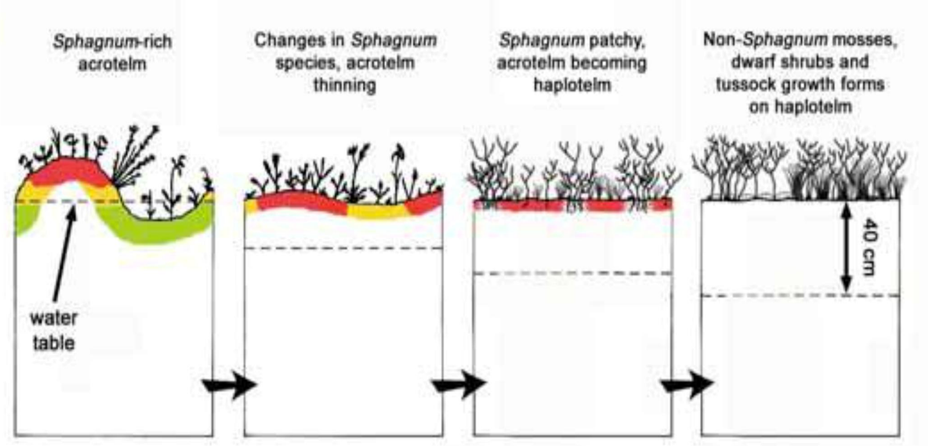




Shallow Lakes

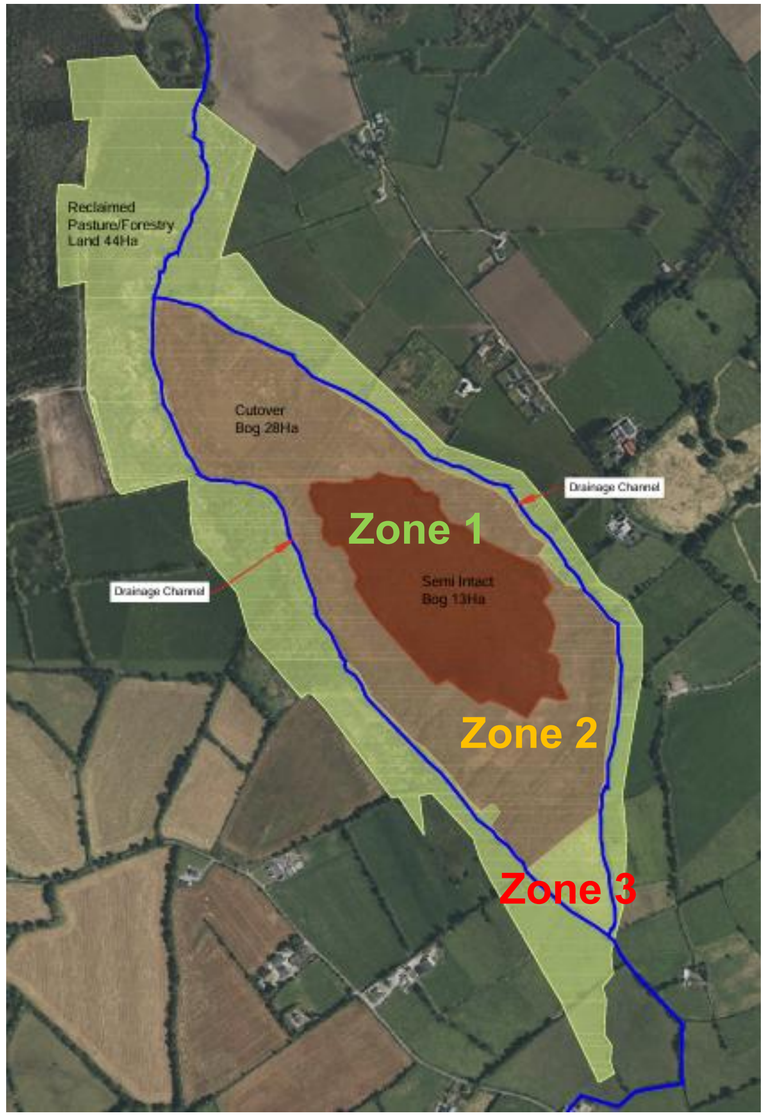
Fens

Raised Bog


Sphagnum-rich acrotelm
Changes in Sphagnum species, acrotelm thinning
Sphagnum patchy, acrotelm becoming haplotelm
Non-Sphagnum mosses, dwarf shrubs and tussock growth forms on haplotelm
water table
40 cm

Gortavally Example

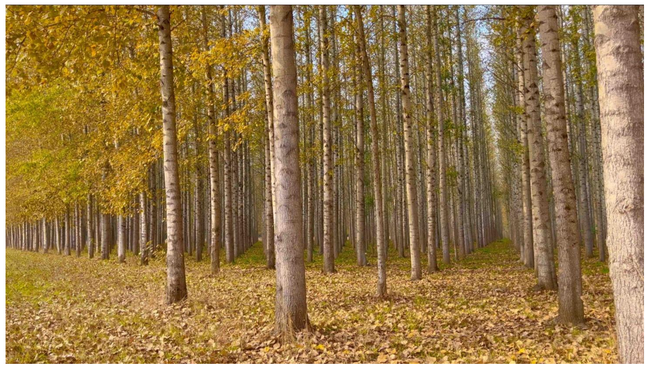
3-Zone Solution: Landscape-Level Mosaic



- Irish (raised bog) peatlands typically in 3 concentric zones:
  - ***Zone 1***: *Semi-intact core* (50,000 ha);
  - ***Zone 2****: Cutover middle ring* (120,000 ha) - Post-extraction abandoned areas/forestry;
  - ***Zone 3****: Agricultural outer ring* (80,000 ha) - Converted to grassland/forestry - Gradual transition potential with partial water level increase in pastures
- Restore Zone 2 '**wastelands**' with ***tailored, habitat-appropriate*** paludiculture solutions simultaneously restores productivity AND hydrological conditions needed to protect Zone 1
- *Restore & protect nature* by *producing (through paludiculture)* – creates hotspots of wetland biodiversity
- De-risked, 'stacked income' opportunities

OR

Cutover – Fen or Bog Peat?



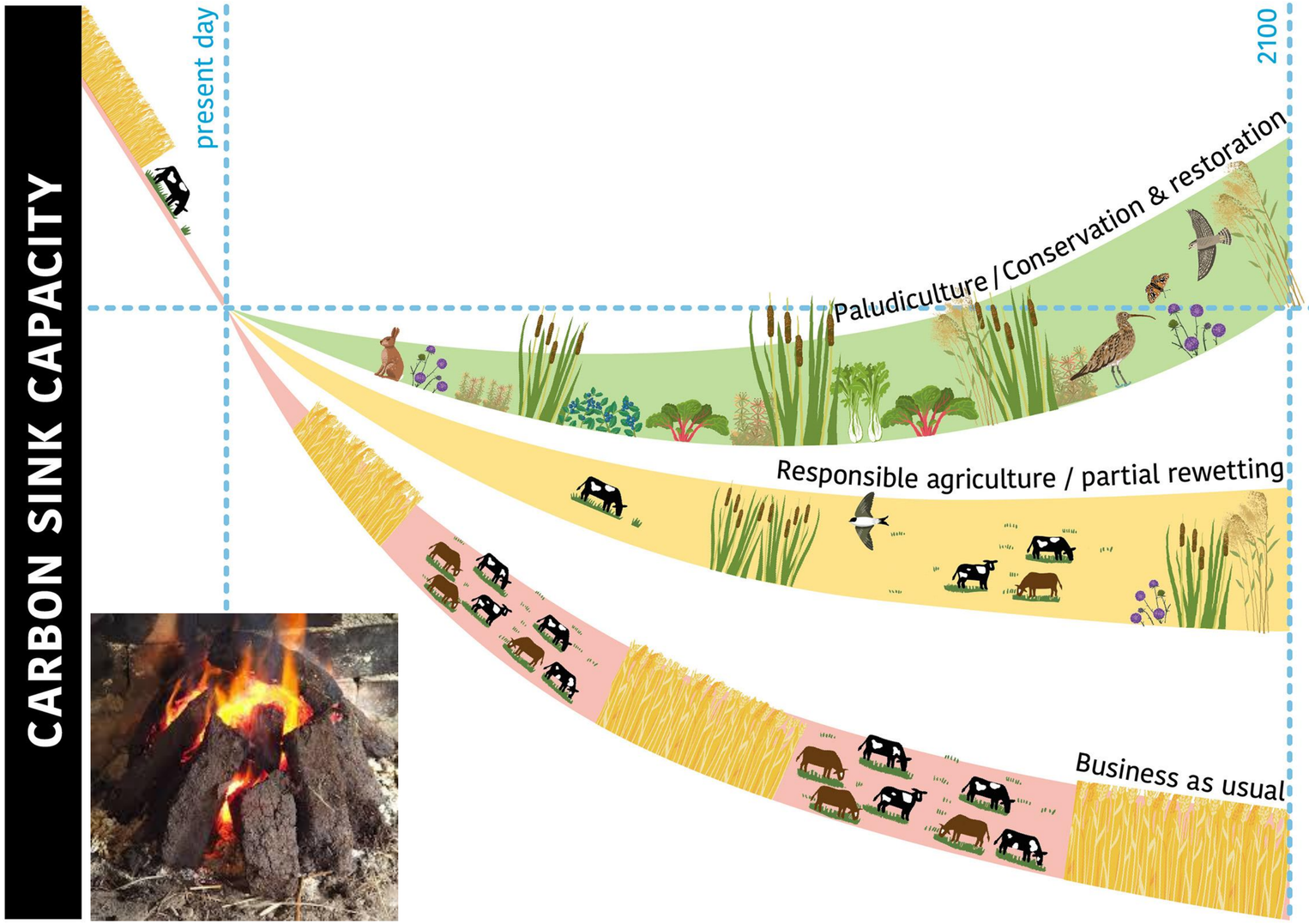
Etc

OR

Cultural Alignment in No-risk Cutover

- Need sustainable solutions for all habitats
- No-risk use of ‘Stranded Assets’
- More land, more income, production, more nature
- Need restoration & active management

Peat Grassland Options for Water Level Increase?



No burn

Slower burn

Slow burn and …

Paludiculture addresses False Dichotomy

VS

Mission Impossible?!?

Paludiculture = Silver Bullet

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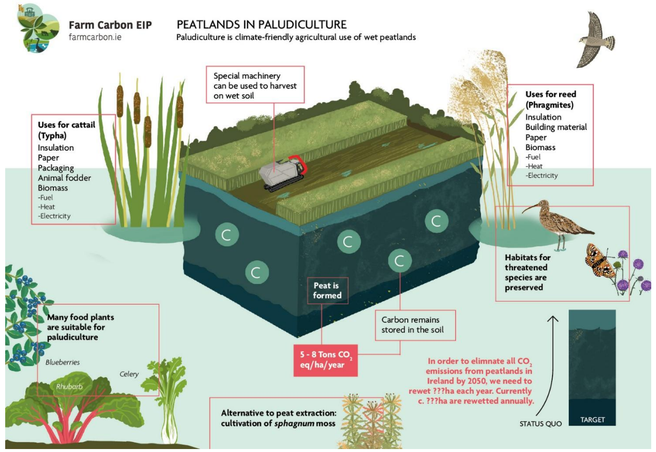
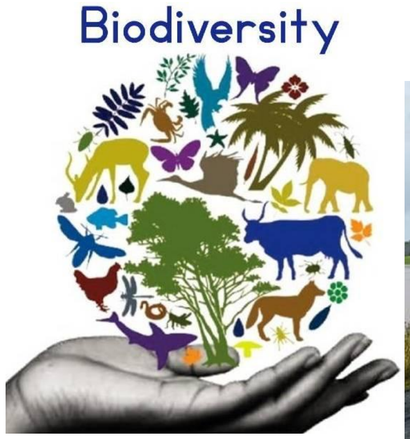
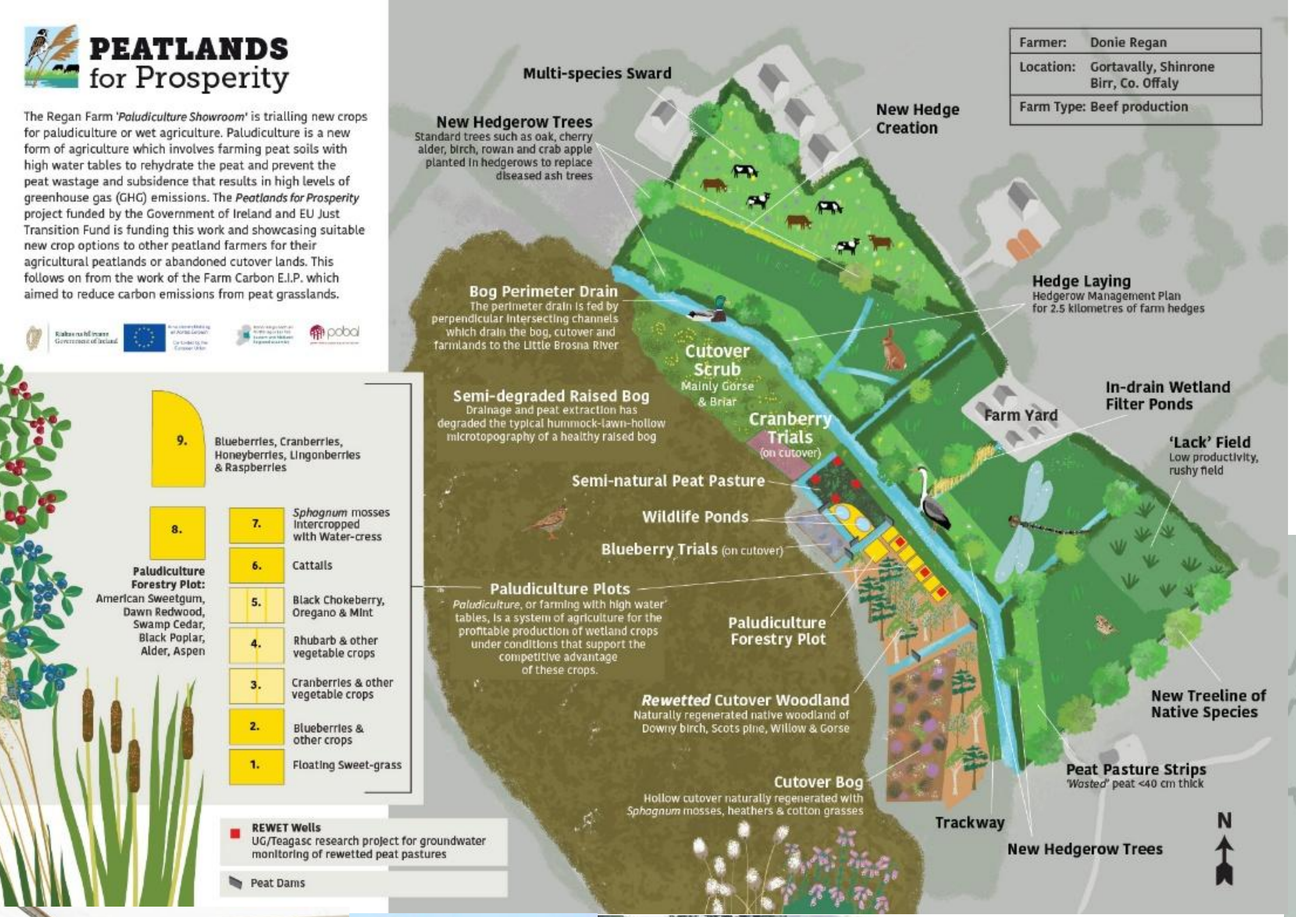


PEATLAND FRIENDLY Farming



PEATLANDS for Prosperity

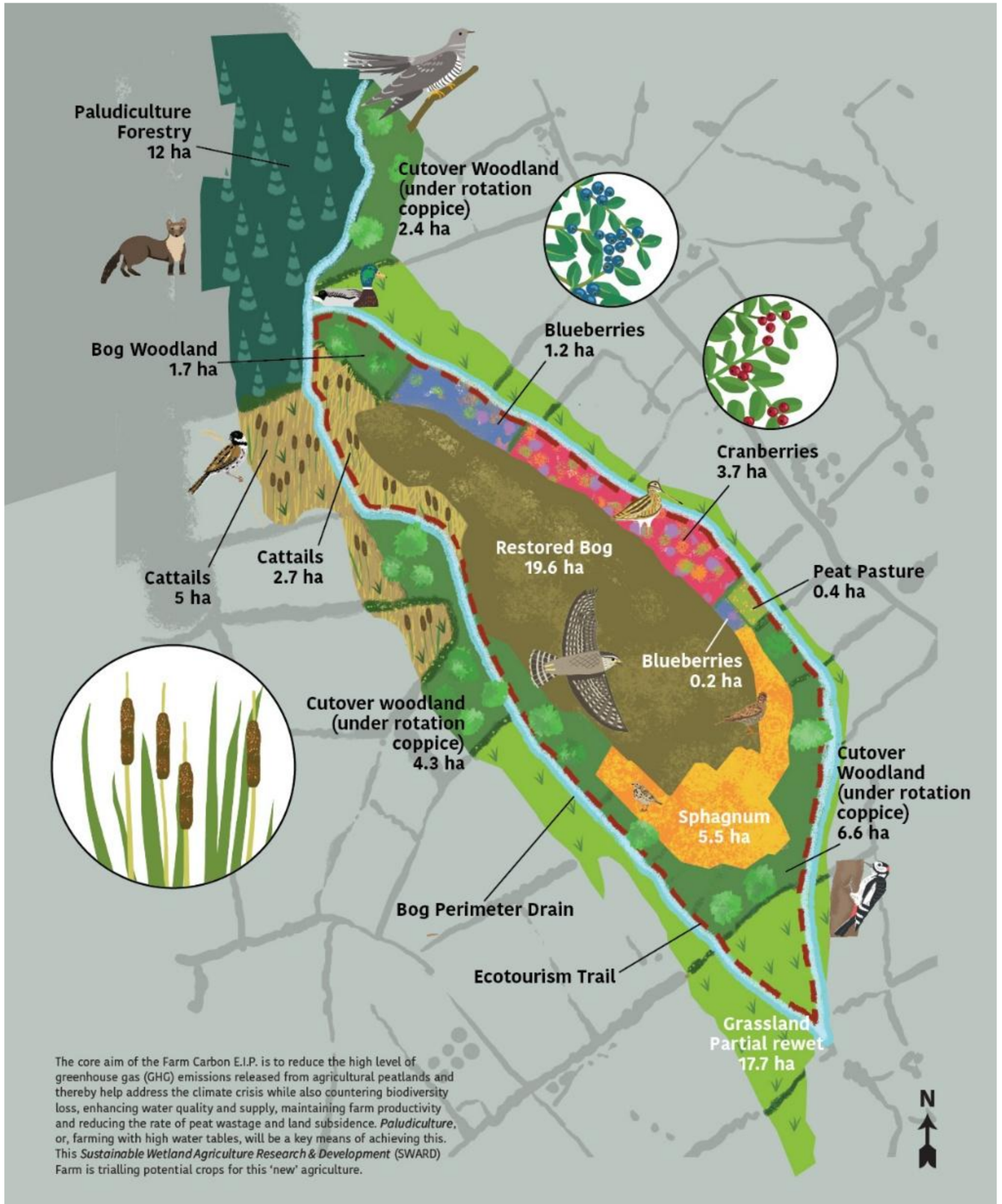
The Regan Farm '*Paludiculture Showroom*' is trialling new crops for paludiculture or wet agriculture. Paludiculture is a new form of agriculture which involves farming peat soils with high water tables to rehydrate the peat and prevent the peat wastage and subsidence that results in high levels of greenhouse gas (GHG) emissions. The *Peatlands for Prosperity* project funded by the Government of Ireland and EU Just Transition Fund is funding this work and showcasing suitable new crop options to other peatland farmers for their agricultural peatlands or abandoned cutover lands. This follows on from the work of the Farm Carbon E.I.P. which aimed to reduce carbon emissions from peat grasslands.



Developing a network of such farms

PEATLANDS for Prosperity

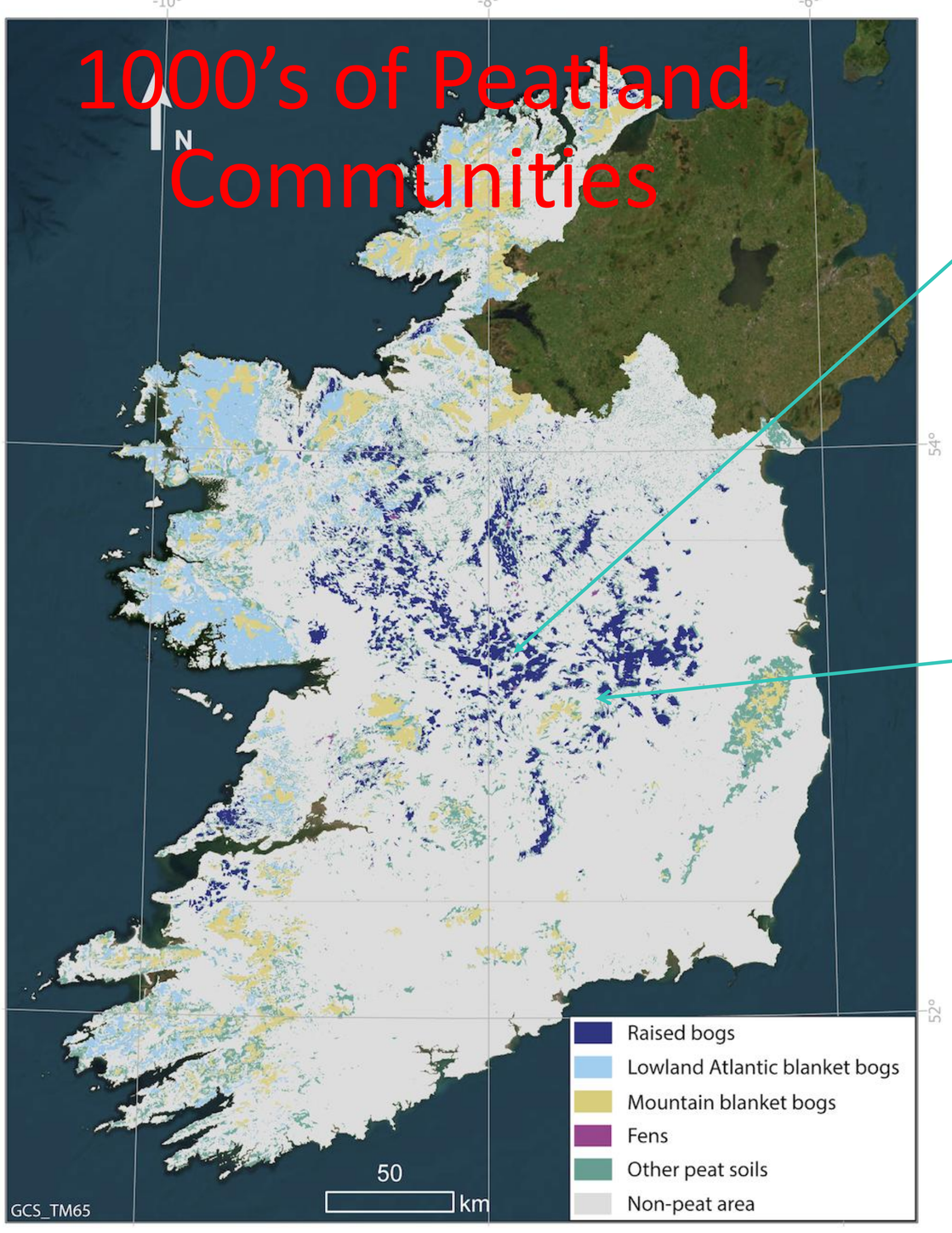
Options on display: Paludiculture 'Showroom' & 'Landscale' Farms



PEATLANDS for Prosperity

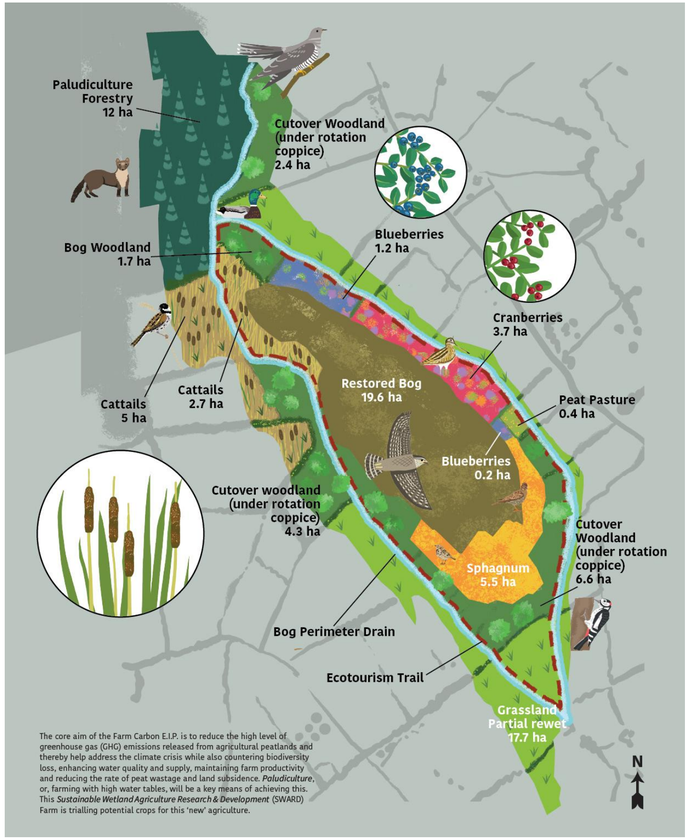
Future Vision: *Paludiculture-Restoration Peatscape 'Mosaic'*

1000's of Peatland Communities



- Each peatland has its own history, unique community & mix of:
  - 1. farmers, turbary rights owners etc,
  - 2. agricultural practices and
  - 3. habitats

Future Vision of Paludiculture-Restoration Peatscape Mosaics x 1000s



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Each peatland community needs its own unique solution!!

Stacked income streams – Paludiculture

- Crops suitable for large scale cultivation
  - Wet grassland – 10-20 bales/ha; €30-50/bale
  - Bulrush – 5-20 tonnes/ha; ±€600/tonne
  - Reeds – 300-1000 bundles/ha; ±€4/bundle
- Cash crops in undersaturated markets
  - Sphagnum – 1-2 t /ha - ±€10/kg - €1/m2
  - Cranberries – 1-8 t /ha - ±€10/kg - €1/m2
  - Blueberries – 1-8 t /ha - ±€10/kg - €1/m2

Thank You For Joining Us

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