What's the Story with our Bogs?

Green Restoration Ireland (GRI) Cooperative Society Ltd

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1st October 2021

Irish Rural Link
Nasc Tuaithe na hÉireann

Hedge Laying Association of Ireland

ACA
Agricultural Consultants Association

RIVER MOY TRUST

FH WETLAND SYSTEMS Ltd.

NORTH PENNINES
Area of Outstanding Natural Beauty

ASSAP
Farming for Water Quality

burrenbeotrust
connecting people and place

Danú
Nurturing nature's abundance

BRIDE Project
Farming with Nature

GRI
Green Restoration IRELAND

Local Authority Waters Programme
vibrant communities | catchment assessment | healthy waters

Teagasc
Agriculture and Food Development Authority

Earthy Matters

Fraunhofer

VERRA

AGRICULTURAL CATCHMENTS PROGRAMME

DUBLIN
Ollscoil Teicneolaíochta Bhaile Átha Cliath
Technological University Dublin

Interreg
North-West Europe
Care-Peat
European Regional Development Fund

Ant
Advanced Nano Technologies

Green Restoration Ireland coop: Background

Not for profit, not for charity but for service

- Founded in 2019 & a member of ICOS
- Support rural development through actions including preparation for offsetting which generate income through *restoration* of our natural landscape
- Members include:
  - Citizens
  - Farmers
  - Scientists
  - Activists
  - Business people
- Practical, community-oriented solutions based on scientific data

What is peat?

- Peat forms when dead plant material is so waterlogged that the usual process of rapid, oxygen-fuelled decomposition is unable to take place
- Plant fragments steadily accumulate in-situ to form a waterlogged mass of organic material or ‘peat’
- Water the *key* ingredient for all peatlands
- Often >90% water

What's the state of our peatlands?

- Approx 1.5 M hectares of peatlands or 21% of our land area
- 80,000 hectares are Bord na Mona lands (*5% of total*)
- NPWS responsible for 41,000 hectares (*about 3%*)
- Coillte owns 230,000 hectares (*about 15%*)
- Assume the remaining *77%* (about 1.2 M hectares) in hands of farmers and landowners
- *16%* peatlands are in Natura 2000 network

What's the state of our peatlands?

- 270,000 hectares (*about 17%*) are natural peatlands
- Cutover bog is *about 39%* or 610,000 hectares
- *19%* or about 300,000 hectares is afforested
- 295,000 hectares of converted peatlands (pasture) or *around 19%*

What’s the state of our peatlands?

- In total > 1,200,000+ hectares of degraded peatlands
- >*80% degraded* peatlands

How much carbon is there?

- Estimated at about 1.5 billion tonnes
  - = *53%* of our soil carbon
- For comparison, this is about *4-5 times* that stored in our forests

Why so much?

- Low productivity
- Weather-dependent (climate change risk)
- Accumulating for thousands of years

How much carbon is there?

- How much in 2 metres+ of peat?

How much carbon is there?

- In fact, 10-15 cm depth equivalent to amount of carbon in e.g. a Yield Class 16 conifer plantation
- So 2 metres+ can store >1000 tonnes C
  - or
- about 20 times the carbon of a similar land area of forest

How much carbon is there?

How much carbon is there?

- 4m+ peat = 2000 tonnes+ per hectare
- Equivalent to or greater than giant redwood forests of California

>

- *If our bogs were woodlands they would tower 100m and higher above us*

Do trees and peat go together?

- 19% / 300,000 ha afforested
- All about water - ditched and drained
- Also trees planted on peat act as giant wicks
- Evapo-transpire tens of thousands of litres of water per year
- Dry out peat and hastens degradation and release of GHGs, DOC etc

Emission rates

- Farmed peatland emits CO_2 at about 8-20 $tCO_2e/ha/year$ emitting > 3 million tonnes CO_2/year
- Afforested peatland about 4.5 $tCO_2e/ha/year$ emitting > 1.3 million tonnes CO_2/year

FarmPEAT

Results based payments

Hen Harrier Project

BRIDE Project
Farming with Nature

PEARL MUSSEL PROJECT

How do RBPs work?

- Results-based payment scheme where farmers will have each habitat on their farm assessed and scored, with higher quality habitats gaining higher payments
- *Before & after* scientific measurements to quantify environmental benefits
- New technologies and analytical approaches
- Farmer-friendly technologies

Green Deal Nationale Koolstofmarkt

PEATLAND CODE

Offsetting Models for Verification

VM0036

Methodology for Rewetting Drained Temperate Peatlands

Moor Futures

Ihre Investitionen in Klimaschutz

Offsetting Principles

- *Voluntary* market not ETS
- Baseline scenario
- Additionality
- Leakage
- Permanence
- Monitoring, Reporting & Verification (MRV)
- *Transparency*

Baseline for unrestored drained peatlands?

- Peat acts like a sponge and drained peat shrinks and oxidises

- How much will it shrink by?

Baseline for unrestored drained peatlands?

- Holme Fen Post in Whittlesey Mere
- Top represents the level of the land in 1848
- 22 feet of peat oxidised to 8 feet

Baseline for unrestored drained peatlands?

- Fire and increased GHG emissions
- Accelerated degradation & no pathway to restoration

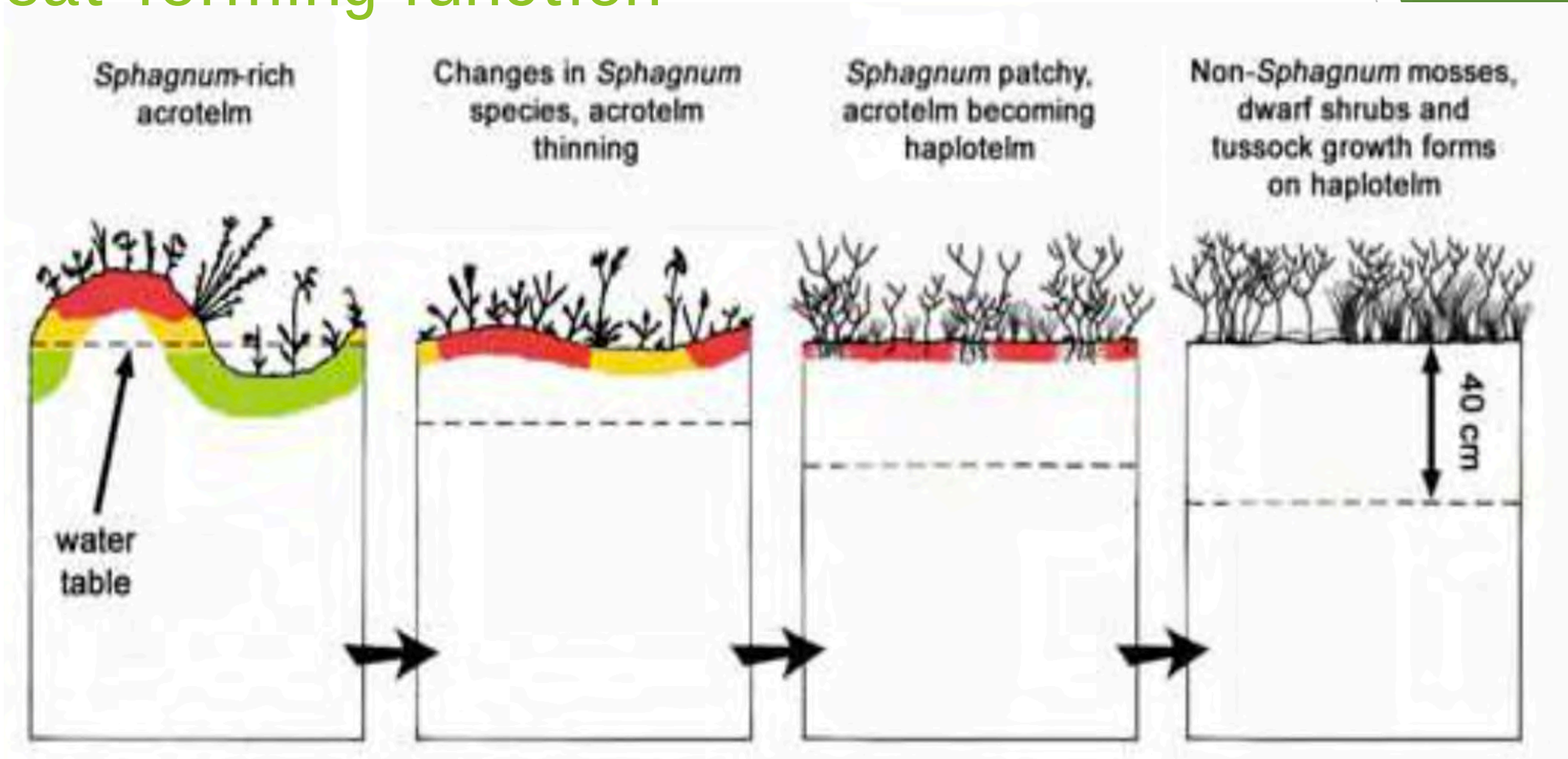
Approach

- MoorFutures basis for UK's *Peatland Code*
- Established relationships between peatland vegetation types and measured GHG fluxes
- Identify Greenhouse gas Emission Site Types (GESTs) and derive *standard* values for GHG fluxes
- Use standard values to calculate GHG *avoided emission savings* for proposed restoration projects
- Back-selling not future-selling - safer bet

Development Criteria

- Scientifically credible
- Robust (conservative includes uncertainties)
- Practical (i.e. can be performed by competent trained individuals)
- Repeatable and suitable for monitoring (clear protocol)
- Built around an understanding of ecosystem processes
- Need same process to adapt / develop an *Irish Wetland Code*

Defines Ecosystem *states* in relation to peat-forming function



1. Intact
2. Moderately degraded
3. Highly degraded
4. Severely degraded & eroding

Peatland Code Emission Factors

Peatland Ecosystem State	Plant functional types	Emission Factor (tCO2e/ha/yr)
1. Intact	Peat-forming *Sphagnum* mosses	1.08
2. Moderately degraded / modified	Non-shunt species Shunt species	2.54
3. Highly degraded / Severely degraded & eroding	Dwarf shrubs / bare peat	23.84
4. Artificially drained	Presence of artificial drainage channels 15-20 m apart	4.54

Dutch Code Emission Factors

The relationship between groundwater level and CO_2 emissions alone is shown below [Fritz, C. et al. 2017]. (Note: CH_4 and N_2O emission not included, these are shown in Table 1)

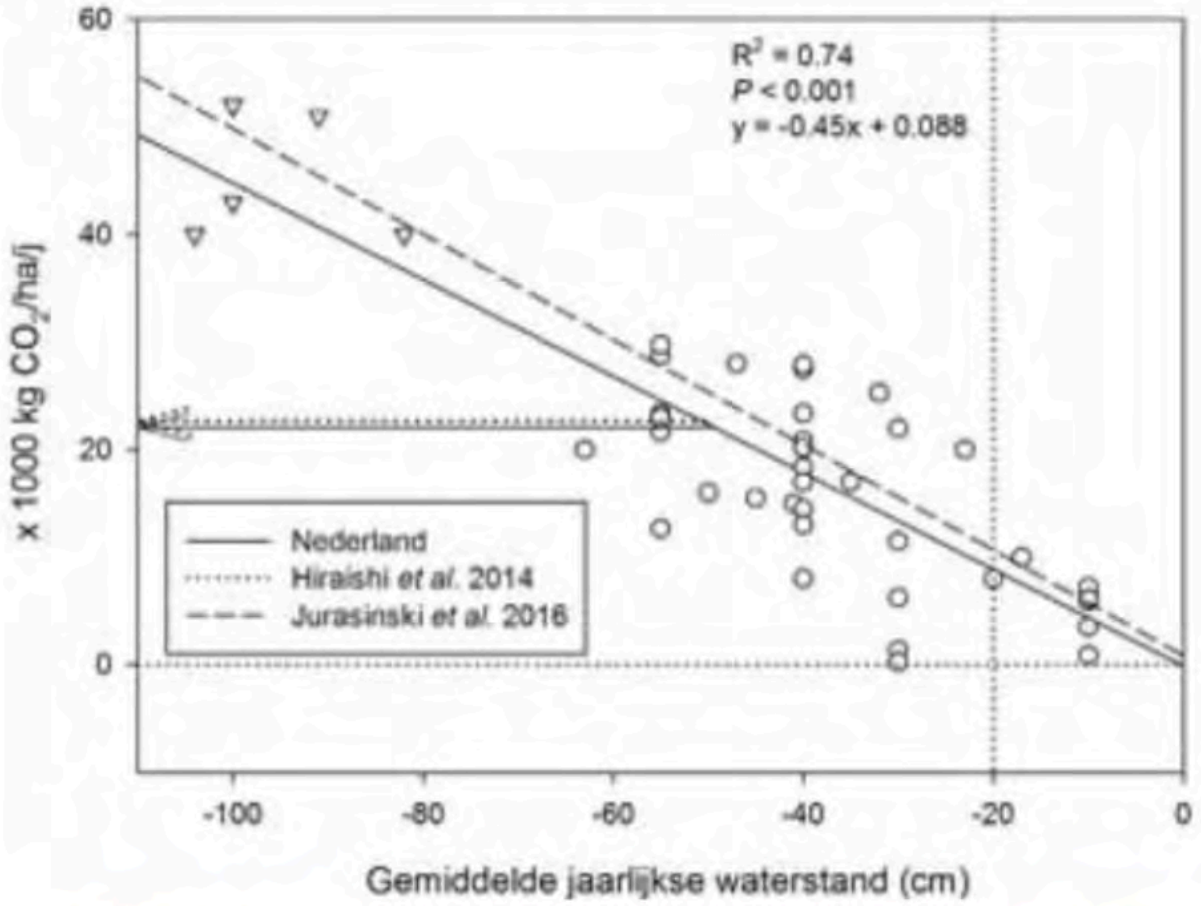
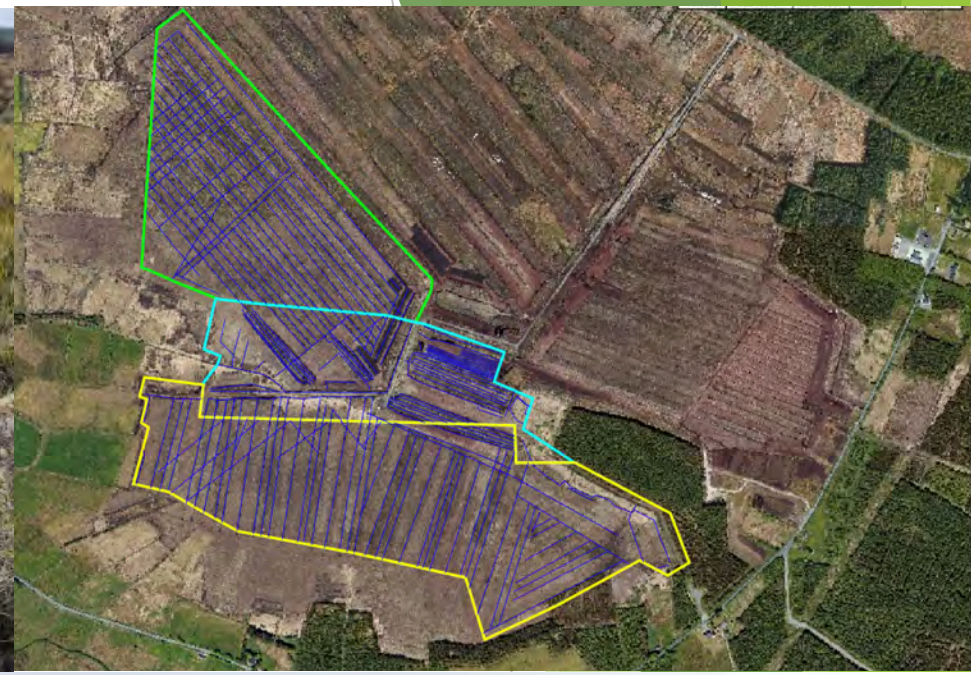


Figure 2. Relationship between groundwater level (x-axis) and CO_2-emissions (y-axis)

First Rewet at Lackaduff Bog 29/9/21

(T. McGovern owner)



Other Issues & Ecosystem Services

Into the waters

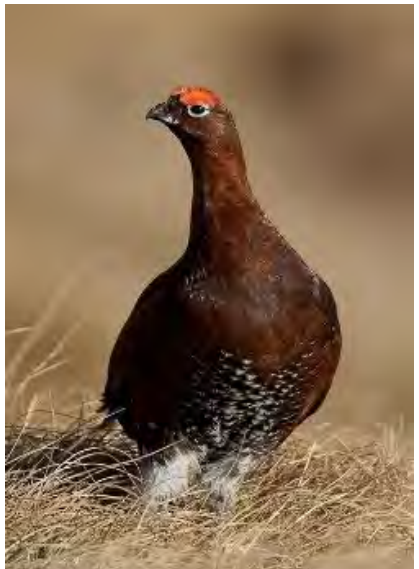
- Decomposing peat is also lost as Dissolved & Particulate Organic Carbon
- Between 0.17 and 0.26 tonnes DOC / hectare / year
- Also nutrients (ammonia, nitrates) in the peat
- Peat solids if bare peat exposed to elements

Flood control

- Intact peatlands act as sponges
- Reduced water storage capacity where drained
- Increases severity of floodwater events

Biodiversity

- Ireland has 50% of remaining raised bog in western Europe
- Fens most threatened habitat in Ireland only about 20,000 hectares
- Some of our most threatened /rapidly declining wildlife makes a home on bog, fen and callow / wet grassland e.g. corncrake, curlew, lapwing, marsh fritillary etc.



Possible solutions to control GHG emissions

- Some form of rehydration involved:
  - Full rewetting and restoration to bog, fen or wet grassland
  - Partial rewetting

Possible solutions to control GHG emissions

- Some form of rehydration involved:
  - Paludiculture = ‘wet agriculture’ - productive land use of wet peatlands that stops subsidence and minimises emissions by cultivating crops that are adapted to high water levels, e.g. reed, cattail, common alder, peat mosses and fodder grasses (see DPPP)

Adjacent lands issue

- Rye-grass monoculture has poor water infiltration capacity
- Multi-species swards
- Mob grazing

THANKYOU FOR YOUR ATTENTION!

Green Restoration IRELAND

For more information email us at doug@greenrestorationireland.coop or eip@farmcarbon.ie
(Information will soon be available at www.farmcarbon.ie and www.greenrestorationireland.coop)