An adaptive mapping framework for the management of peat soils: a new Irish Peat Soils Map

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1. INTRODUCTION

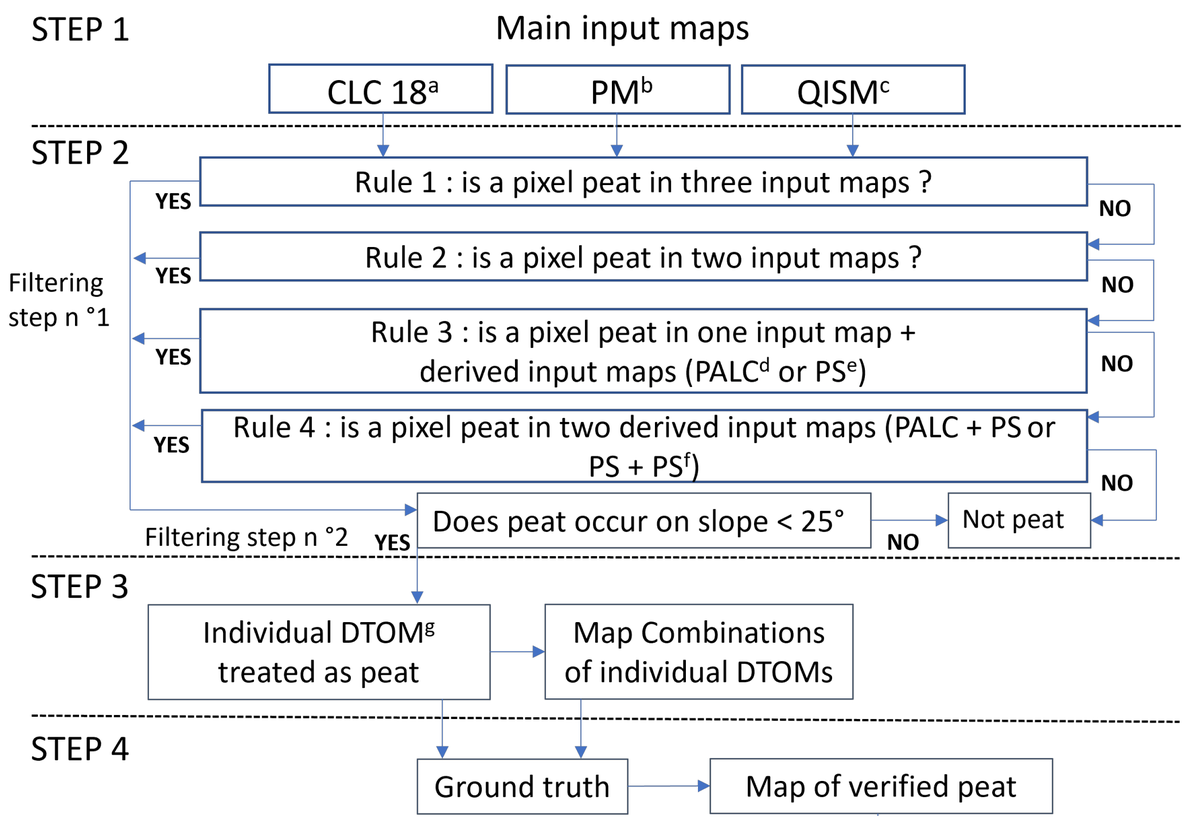
This poster focuses on research carried out to update the Derived Irish Peat Map version 2 (DIPM V2, 2009)[1]. It describes the generation of a new and refined dataset, incorporating shallow peat soils (≥ to 10 cm and ≥ 8.6 % Organic Matter (OM) content) to develop an Irish Peat Soils Map (IPSM). Generated with an Adaptive Mapping Framework (AMF), the IPSM aims to confidently identify the location of peat soils in Ireland to help meet environmental and sustainability challenges such as greenhouse gas emission management, soil carbon stock inventory, transitional habitat identification and impacts to water quality. So far progress on these vital issues has been limited by the incomplete mapping of Irish peat soils, based on a traditional peat thickness threshold (30-45 cm) that is more relevant for commercial or agricultural considerations.

2.RESEARCH AIMS

- Define peat soils to better facilitate the evaluation of their role in environmental processes and including soils with a peat layer ≥ 10 cm and OM content ≥ 8.6 %
- Locate unknown converted peatlands covered by forests and grasslands
- Integrate new data into an adapted methodology
- Refine the mapping of peat soils in Ireland for nationally important management applications

3. METHODS AND MATERIALS

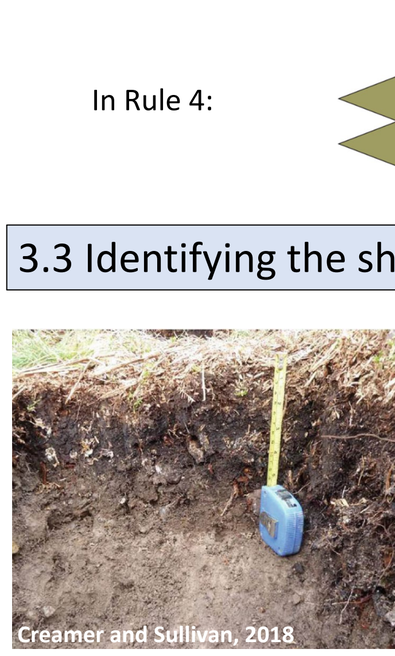
3.1 An Adaptive Mapping Framework (AMF) based on a decision-tree methodology



[a]**CLC 18**: 2018 CORINE Land Cover map; [b]**PM**: Peatland Map of Ireland; [c]**QISM**: Quaternary Sediments + Indicative Soil Map; [d]**PALC**: Peat Associated Landcover Class; [e]**PS**: Peaty Soils (**HL**: Histic Lithosol or **PP**: Peaty Podzol or **PG**: Peaty Gley); [f]**PS+PS**: HL+PG or PP+PG (HL and PP cannot overlap as they come from the same dataset); [g]**DTOM**: Decision Tree Output Map

3.2 Locating converted peatlands with Peat Associated Landcover Classes (PALCs)

1.Identification of the PALCs



Input maps (PM, QISM) where pixels are classified as peat

Input CLC 18 map where pixels are not classified as peat

Peat Associated Landcover Classes (non-peat pixels of CLC 18 classified as peat on PM and QISM)

Coniferous forest | **Pastures** | **Mixed forest**

Moors and Heathland | **Transitional woodland -shrub**

Land principally occupied by agriculture with significant areas of natural vegetation

2.Selection of the PALC areas to include in the updated map

In Rule 3: **Peat in QISM or in PM** ∩ **PALC** → Pixel classified as peat in QISM or PM and identified as a PALC

In Rule 4: **Peaty Soil** ∩ **PALC** → Pixel classified as Peaty Soil (PG, PP or HL) and identified as a PALC

3.3 Identifying the shallow peat soils

Creamer and Sullivan, 2018

Histic lithosols
Peaty surface horizon (≥ 20 % organic carbon), between 7.5 and 40 cm thick.[2]
Area : 152,000 ha

Geodata source: Soil Information System (2014)


Radford and Short, nd

Peaty gleys
Poorly drained mineral soils with peaty topsoil.[3]
Peaty topsoil supposedly < 30-40 cm thick.
Area: 244,893 ha

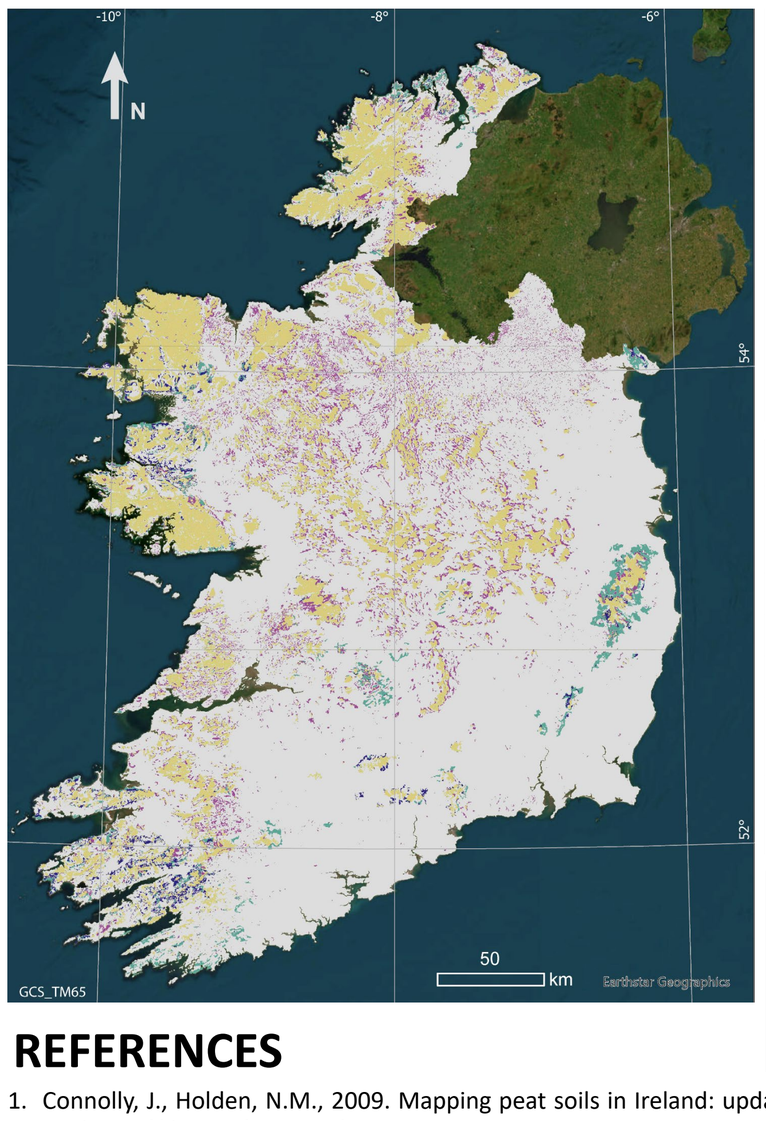
Geodata source: Indicative Soil Map (2006)

Stagnic iron-pan podzols (Peaty podzols)
A peaty topsoil above a gleyed albic horizon that rests directly on a cemented continuous thin iron-pan.[3]
Peaty topsoil < 40 cm thick.
Area: 103,184 ha

Geodata source: Soil Information System (2014)


Reidy, 2017

4. RESULTS



Peat area based on conventional peat mapping (≥ 30-40 cm) ≈ 1,102,000 ha (66 %)

Peat area based on PALC and conventional peat (≥ 10 cm) ≈ 370,550 ha (22 %)

Peat area based on peaty soils and conventional peat (≥ 10 cm) – ≈ 67,800 ha (4 %)

Peat area based on PALC and peaty soils (≥ 10 cm) ≈ 124,250 ha (7 %)

Non peat area

	DIPM V2	IPSM
Peat - Producer Accuracy	0.62	0.74
Peat - User Accuracy	0.92	0.94
Peat - F1 score	0.74	0.83
Overall accuracy	0.78	0.83
Peat area (ha)	1,466,469	1,660,289
Difference area with DIPM V2 (ha)	-	+ 193,820
Proportional difference with DIPM V2 (%)	-	13.2

Distribution of peat soil types in the IPSM:

Raised bogs: 309,650 ha (19%)
Blanket bogs: 763,700 ha (46%)
Fens: 4,450 ha (0.4%)
Other[a]: 582,500 ha (35%)

a: "Other" includes areas likely to be shallow peat soils or peat soils covered by moors-heathland or natural grasslands (CLC18)

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An Roinn Talmhaíochta, Bia agus Mara
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