

Peatland restoration: challenges to valuation

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Background



- Historic and ongoing degradation of peatlands due to
 - Land use change (drainage, afforestation, burning, grazing)
 - Atmospheric deposition
 - Climate change
- Land use change most important driver
- Peatland degradation affects
 - Greenhouse gas emissions
 - Water quality
 - Biodiversity
- Recognition that peatland restoration can provide substantial benefits to society

Peatland restoration: policy interest



- Global commitments and agreements
 - Climate change mitigation (Kyoto protocol; accounting)
 - Biodiversity conservation (Ramsar convention; Nagoya protocol)
- EU regulation
 - EU Water Framework Directive MARTIN-ORTEGA et al forthcoming
- UK/Scotland
 - Climate change adaptation MORAN et al 2013, MOXEY & MORAN 2014
 - Reporting and accounting under UNFCCC/Kyoto Protocol
 - Flood risk mitigation – Flood Risk Management (Scotland) Act
 - Interest in applying market based mechanisms (PES)


Green stimulus funding in Scotland



2013 Green
Stimulus Peatland
Restoration
Project: £1.7m
over 2 ½ years

Additional £15m of
funding over 2
years recently
implemented

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Peatland Action

Restoring Scotland's peatlands

As lead advisor to the Scottish Government on peatland restoration Scottish Natural Heritage (SNH) was allocated a further £5 million from the [Green Stimulus Package](#) for spend in 2014/15. This is in addition to the £1.7 million received in 2012. SNH has made excellent progress in delivery of the project - recently re-named '*Peatland Action*' - which aims to:

- restore and manage peatlands to maintain carbon stores and encourage carbon sequestration (with 2500 ha peatland restoration by March 2015);
- restore peatland ecosystem functions;
- enhance ecosystem resilience to climate change; and
- build peatland restoration capacity and understanding amongst land managers, contractors, advisors and the public.

Valuation of benefits - objectives



Support decision making via cost-benefit analysis of peatland restoration by deriving

1. values that justifiably represent a **wide range of (non-)market benefits** beyond carbon, ideally related to an **ecosystem services approach**
2. values for peatlands that take into account **spatial preferences**
3. values that are **transferrable** across peatland sites

Method: **Discrete Choice Experiment** (stated preference)

Valuation of benefits - objectives



4. Assess cultural ecosystem services associated with peatlands and their conservation or restoration

Method: **Qualitative research** (focus groups)

Benefits for wide range of services



- Ecosystem service provision from peatlands is functionally correlated with peatland status
- Derive benefit estimates based on preferences for **change in peatland status following restoration**

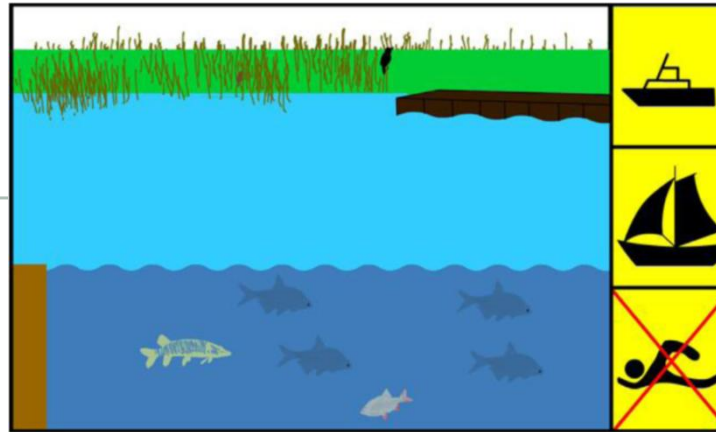
Benefits for wide range of services



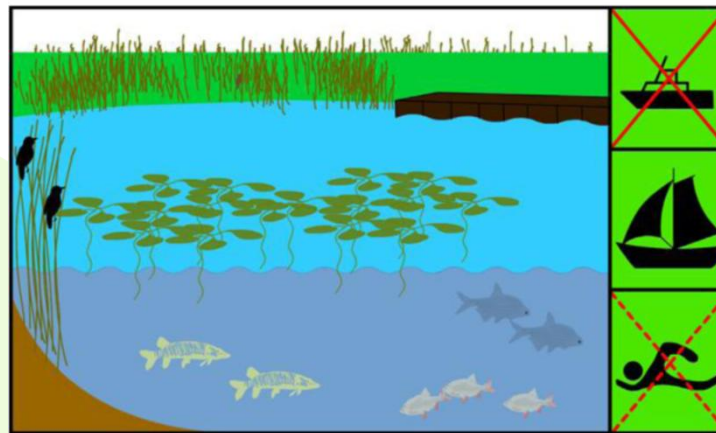
- Develop **status classification** of peatlands for use in choice experiment survey
 - draw on Peatland Action photo database and Common Standards Monitoring classification?
 - link to ecosystem service provision using e.g. Common International Classification of Ecosystem Services (CICES)
- Explain to survey respondents e.g. using icons or pictograms how (change in) status is related to (change in) service provision

Source: Schaafsma and Brouwer (2012)

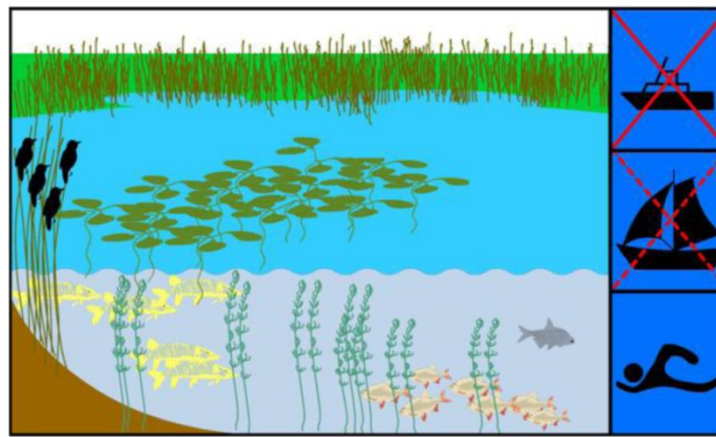
Valuation of water quality improvements of lakes in Flanders, Belgium



At the **YELLOW** level, the water is turbid, and you can see less than a meter deep. There are few birds, especially few endangered bird species. There are many brems, but few other fish species, such as pike. Reed grows along some of the banks. Bathing is often prohibited due to toxic algae blooms. Sailing and motorised boating is allowed and there are many piers.



At the **GREEN** level, the water is rather clear and visibility is about one meter. There are some brems and pikes. A small number of endangered bird species are present. There are some water plants and reed is found along the banks. Due to toxic algae, bathing is prohibited a couple of times each summer. Motorised boating is prohibited, but sailing is possible and piers are available.



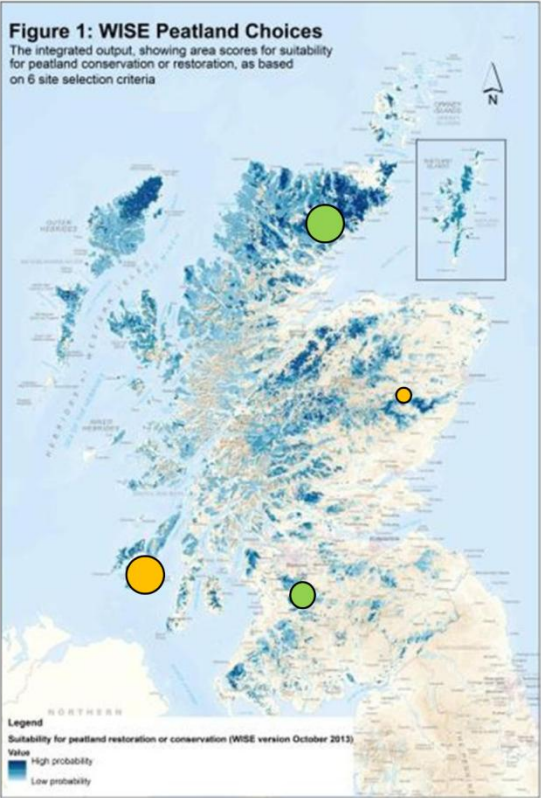
At the **BLUE** level the water is very clear. There are many fish species, primarily pike. There are also various protected bird species present, such as the reed warbler. There are many water plants and thick reed areas along most of the banks. Swimming is possible during the entire summer. There are more shallow areas, in which sailing is not possible. Motorised boating is prohibited.

Spatial preferences



- We don't know how respondents react to representations ('scenarios') of peatland restoration that are spatially explicit
 1. they don't care at all
 2. they only care about total **area** restored
 3. they care about **location** of the peatland or how they are located in relation to the peatland
 4. they care about both 2. and 3.
 5. they have preference patterns that are not captured by all of the above and remain unobserved

With restoration programme (in 2044)



Status:

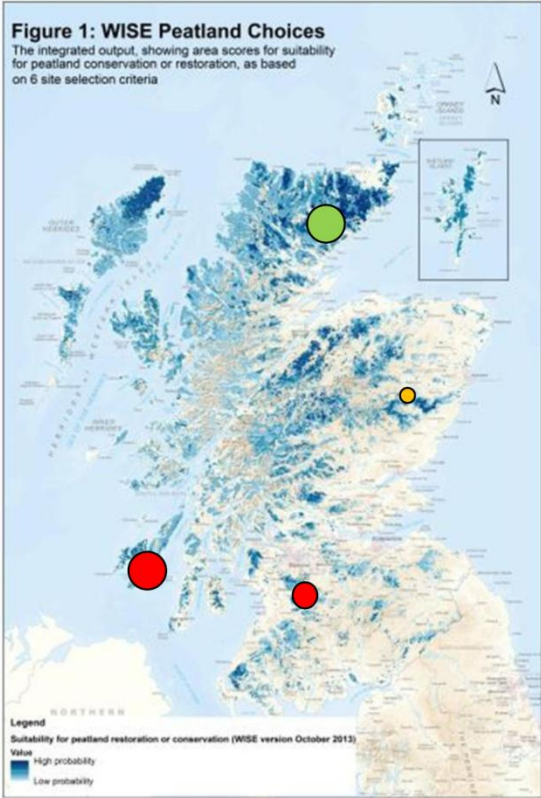
Good condition	30,000 ha
Moderate condition	25,000 ha
Poor condition	0 ha

Cost to you per year:

£30



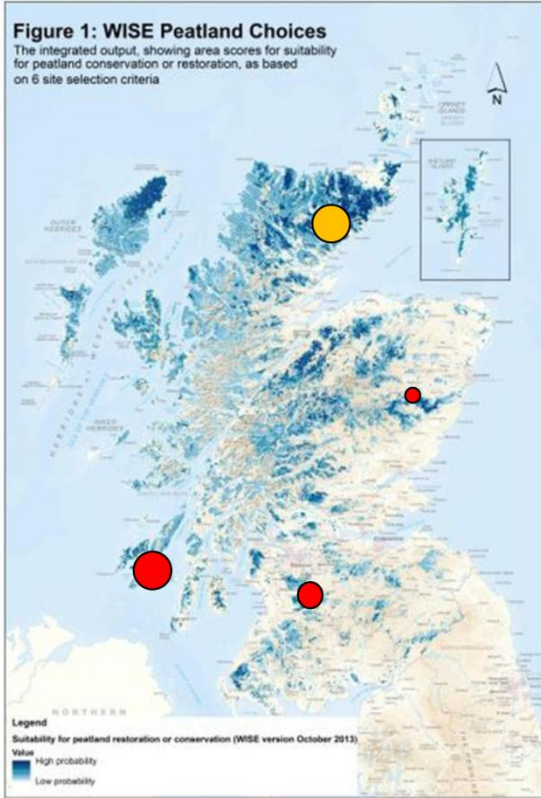
Current situation (2014)



Status:

Good condition	20,000 ha
Moderate condition	5,000 ha
Poor condition	30,000 ha

No additional restoration (in 2044)



Status:

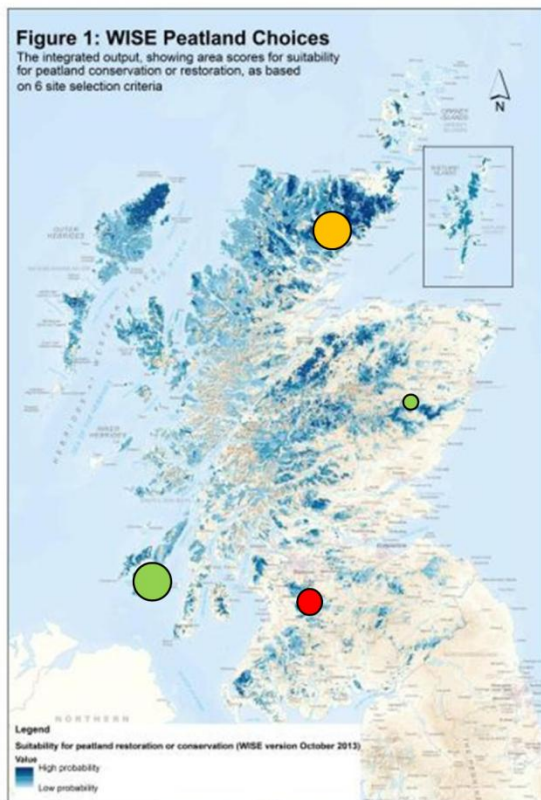
Good condition	0 ha
Moderate condition	20,000 ha
Poor condition	35,000 ha

Cost to you per year:

£0



With restoration programme (in 2044)



Status:

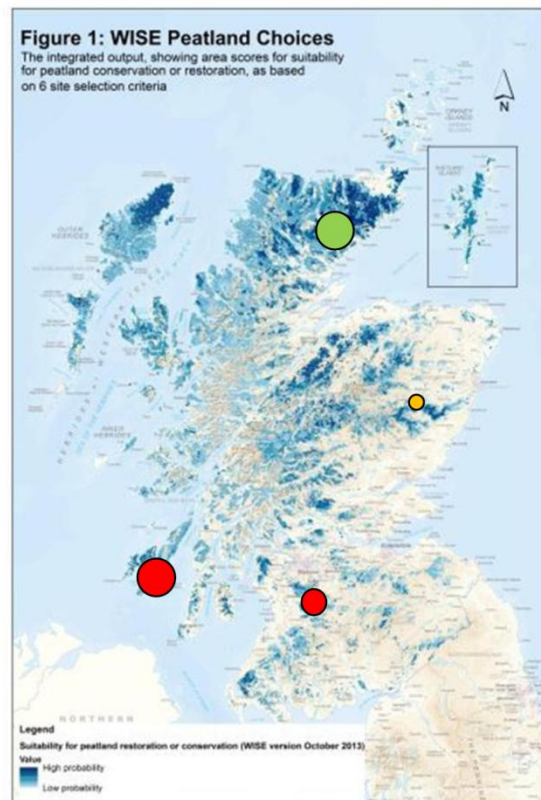
Good condition	25,000 ha
Moderate condition	20,000 ha
Poor condition	10,000 ha

Cost to you per year:

£80



Current situation (2014)



Status:

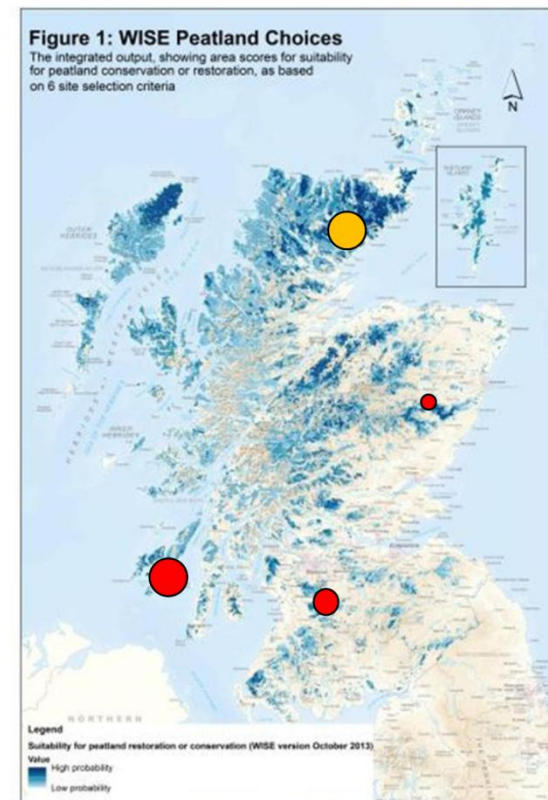
Good condition	20,000 ha
Moderate condition	5,000 ha
Poor condition	30,000 ha

Cost to you per year:

£0



No additional restoration (in 2044)



Status:

Good condition	0 ha
Moderate condition	20,000 ha
Poor condition	35,000 ha

Transferrable benefit estimates



- We cannot derive values for *all* peatland sites
- Ideally therefore we would like to be able to transfer benefit estimates across sites
- Develop benefit transfer based on value function
- The value function describes how benefits change depending on characteristics of the peatland including spatial context

Transferrable benefit estimates



- Possible value function components:

Component	Indicative relationship with benefits per ha (willingness to pay)
Area of restored peatland site (ha)	+/-
Level of improvement in peatland status	+
Distance of place of residence of beneficiary to restored peatland site	-
Location indicator (relates to substitute availability)	North: - Central +/- South: +
Distance of place of residence of to closest (restored or non-restored) peatland site (relates to substitute availability)	-
Income of beneficiary	+

Cultural ecosystem services



- Not much is currently known about the cultural benefits and services (CES) from peatlands
- Findings from other ecosystems:
 - CES do not exist 'out there' – they only come into being through human interaction with the environment
 - Provisioning services have cultural aspects as well
 - CES are found at different spatial levels, some are a-spatial and not all can be measured
 - Dis-services and dis-benefits need to be taken into account

Cultural ecosystem services



- Open questions:
 - Which CES are linked to particular ecosystems such as peatlands and to the state of that ecosystem?
 - What other factors influence CES?
 - Which CES are important to whom and how is this related to the kinds of CES which are recognised in policy and decision making?
 - How can 'unmeasurable' CES be included in decision making?

Limitations and challenges



- Ambition of deriving benefit estimates that can be used for peatlands across Scotland requires assumptions and simplification
 - Peatland status classification cannot fully capture variability across all peatland sites
 - How to consider scientific uncertainty on ecosystem service provision, current status and future change in status
 - Selection of peatland sites and projections of future change in status need to draw heavily on (science) expert judgment

Limitations and challenges



- No precedence of similar peatland valuation studies
 - How to best provide supporting information to enable informed decisions by respondents?
 - No guarantee that theoretical concepts e.g. related to spatial preferences actually apply in the context of peatland restoration
- Cost-benefit information should be used alongside other decision support tools (e.g. WISE multi-criteria tool); and information regarding cultural ecosystem service provision
- Timeline for valuation study: focus groups in fall; survey in winter 2014/15; basic data analysis completed in 2015

Thanks to Chris Evans, Mark Reed, Aletta Bonn, Andrew Moxey and the Valuing Nature Network (VNN) peatland restoration team

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