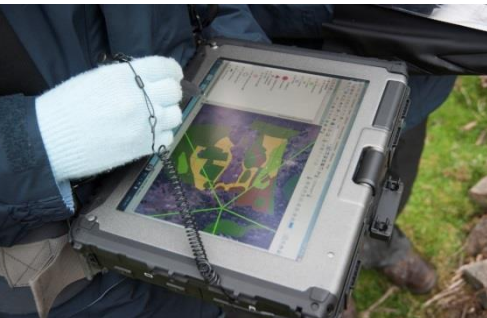


GMEP Overview

Bridget Emmett & Bronwen Williams
Centre for Ecology and Hydrology



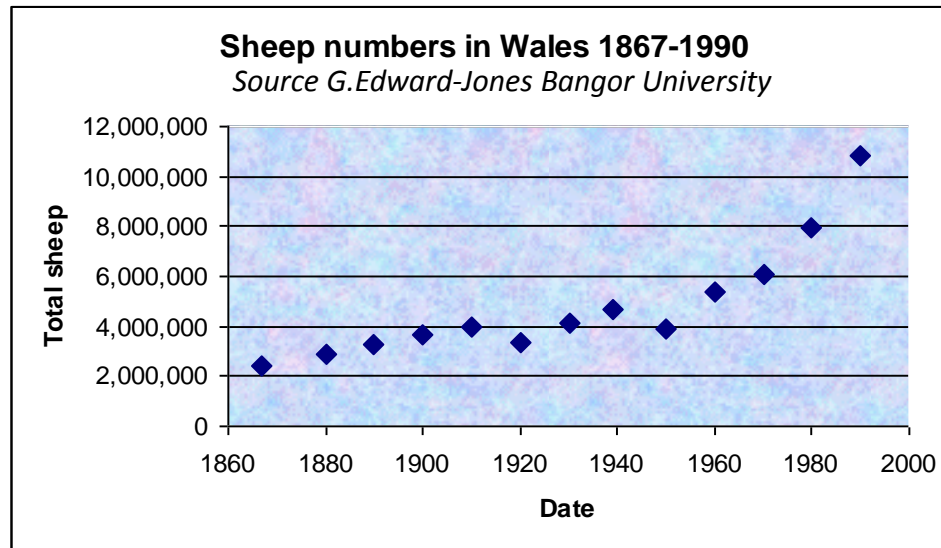
Glastir Monitoring and Evaluation Programme

Aim

- Quantify impact of Glastir payments against 6 strategic objectives:
 - Climate change mitigation
 - Diffuse pollution
 - Biodiversity
 - Soil
 - Landscape, historic and access
 - Woodland
- Set these within the context of **ongoing change** of our Natural Resources in Wales

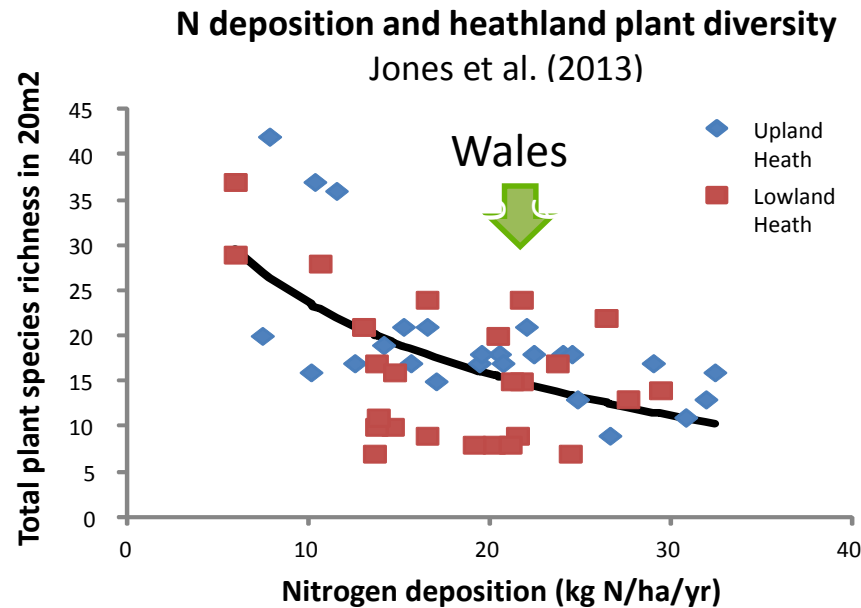


Ongoing change of Wales' Natural Resources: Direct



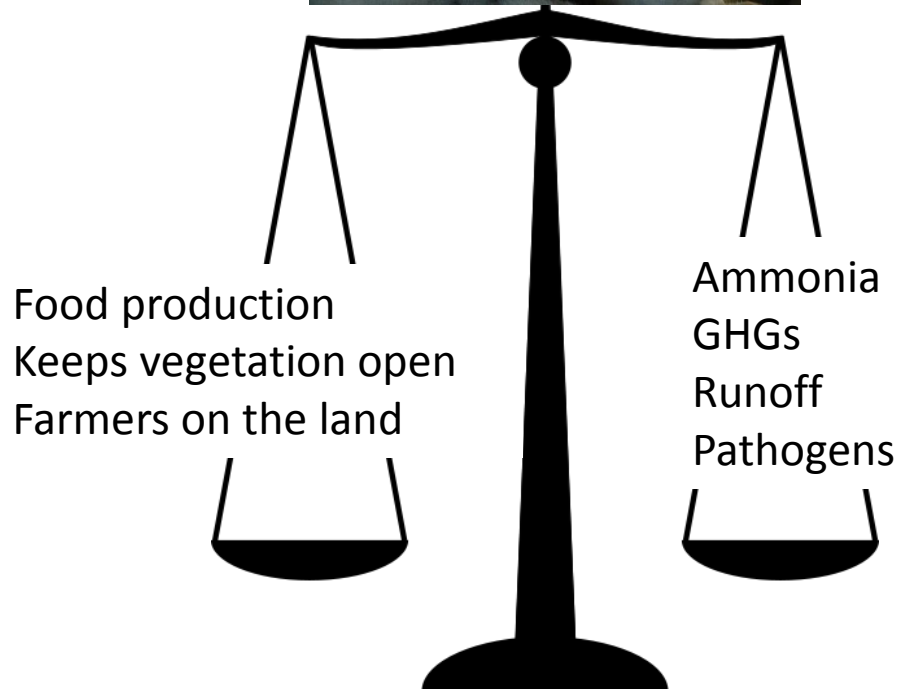
- Grazing animals
 - 5 fold increase over 150 years = > 50% decrease in soil rainfall infiltration rates
- Forestry
 - Major afforestation programme = 25% reduction in water yield and 40% acidification of soil and rivers
- Drainage
 - 70% of uplands drained = loss of stored carbon
- Recreation
 - Conversion of agricultural land to recreation (£1M pa in Scotland to repair)

Ongoing change of Wales' Natural Resources: Indirect



- Air pollution
 - 100 fold increase in N deposition in 150 years = 50% loss of vegetation species richness
- Climate change
 - Increased winter river flows; likely future loss of soil water holding capacity

Each change we have made in Wales has had benefits and dis-benefits



How to choose the right balance?

- Scientific evidence (e.g. stock, condition, thresholds, benefits of unseen or unattractive assets) →
- Economic evidence (e.g. cost – benefit assessments)
- Social demands and preferences

A combination is usually recommended



How to deliver this?

- Scientific evidence
 - Monitoring / survey work
 - Modelling
 - Provides the under-pinning data for.....
- Economic studies
 - Most studies struggle due to lack of data for value transfer functions
- Social studies
 - Many benefit from empirical approaches

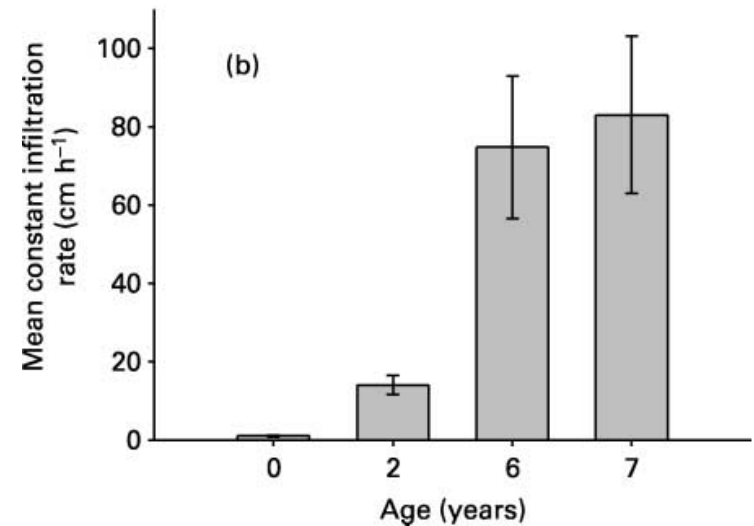
GMEP: Delivers an integrated monitoring approach to deliver the scientific evidence

- Explicitly recognises the linkages between plants, soil and water and the atmosphere

e.g. New planting of native trees benefits:

- Wildlife
 - Carbon
- and depending on location:
- Flood mitigation
 - Water quality

- Separate surveys would struggle to quantify these co-benefits efficiently

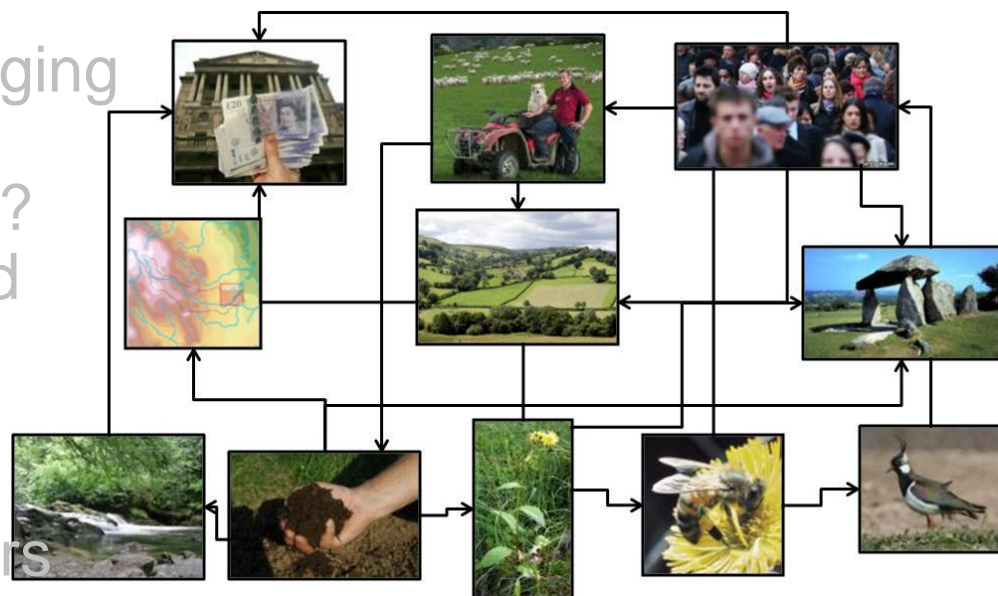


The challenges set for GMEP

- Use an integrated Natural Capital Approach
- Must be flexible to a changing political landscape / RDP
- What scale to measure at?
- How to exploit historic and ongoing monitoring for national trends?
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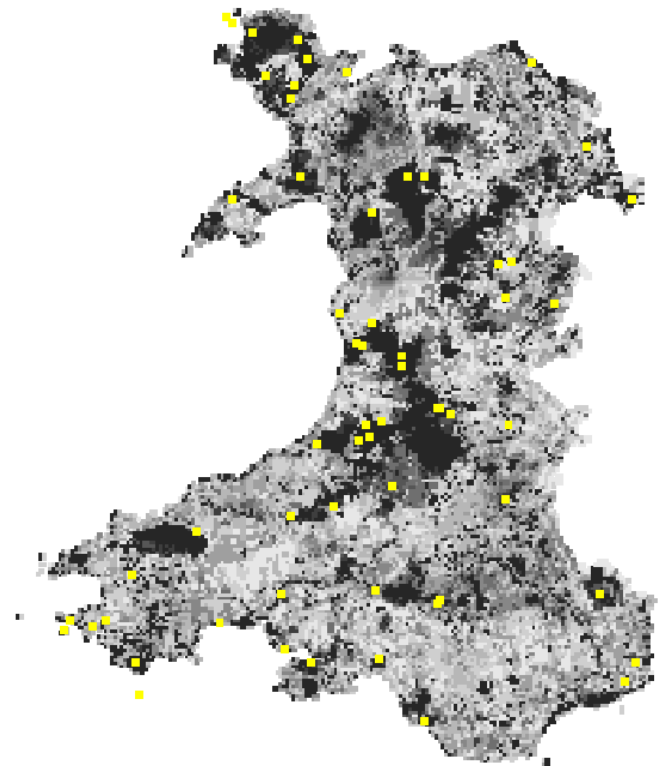


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Two surveys:

- 1) National Resources Monitoring Programme
- 2) Targeted survey where most money is available



Centre for
Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

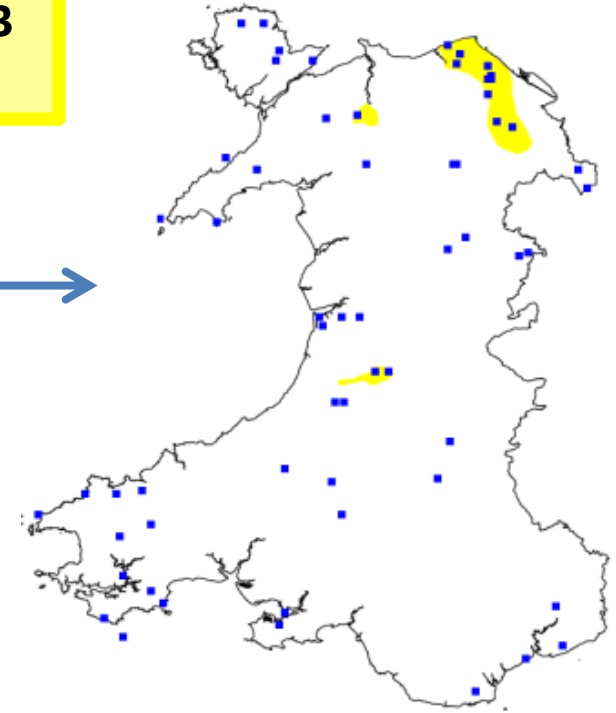
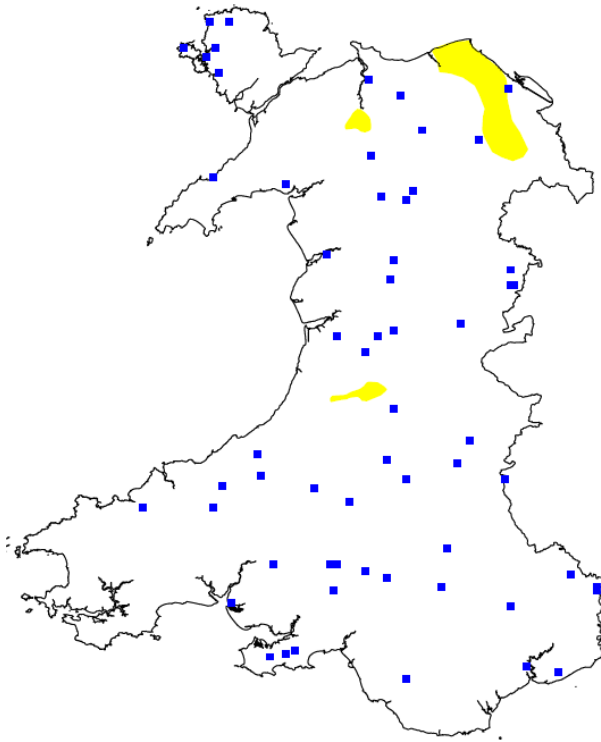
ring and
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nme

Flexible to changing WG priorities

Squares selected using the current scoring system

If score for
**Calaminarian
Grassland** is
changed from its
current score of 3
to 60

Squares selected using a
new theoretical scoring
system



The challenges set for GMEP

1km square selected as:

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Scale ensures a range of habitat types

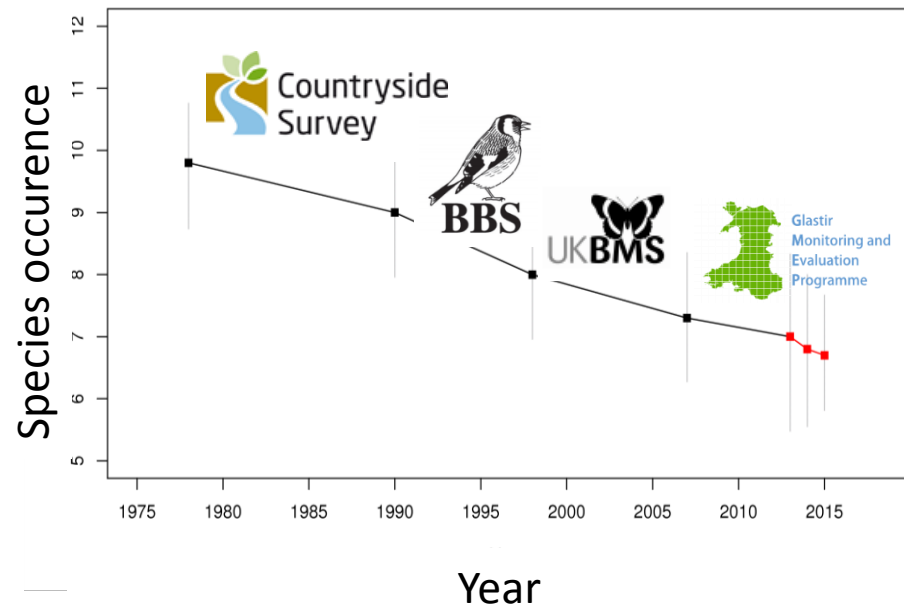
Unbiased by land ownership

Can be upscaled to national scale

Connects to CS; BBS; UKBMS

The challenges set for GMEP

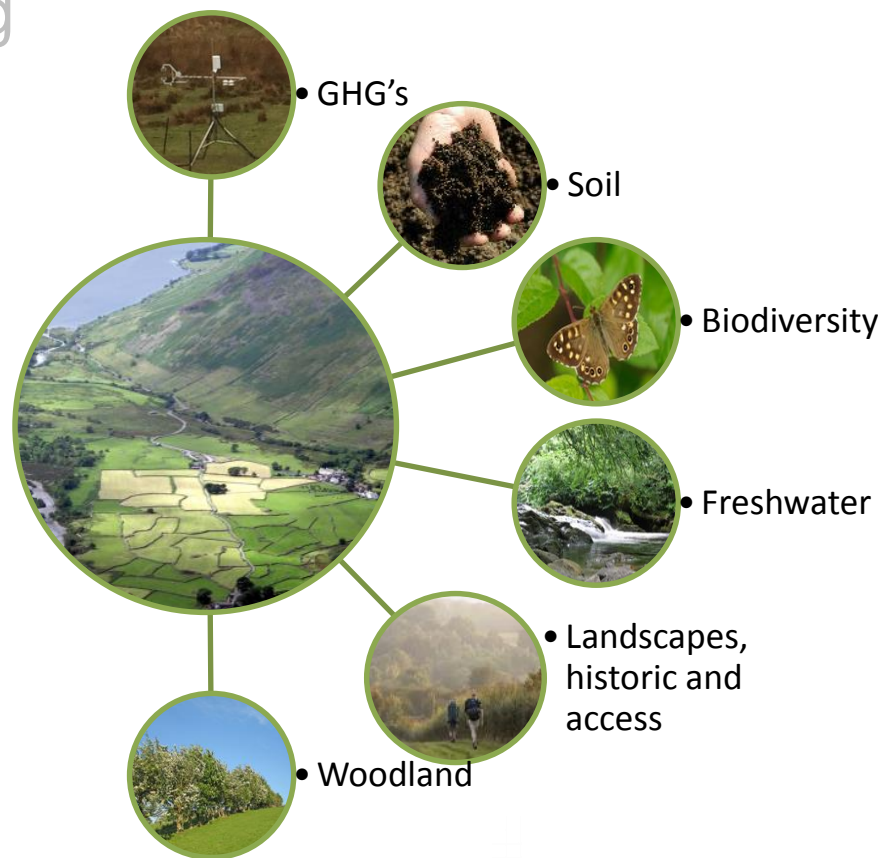
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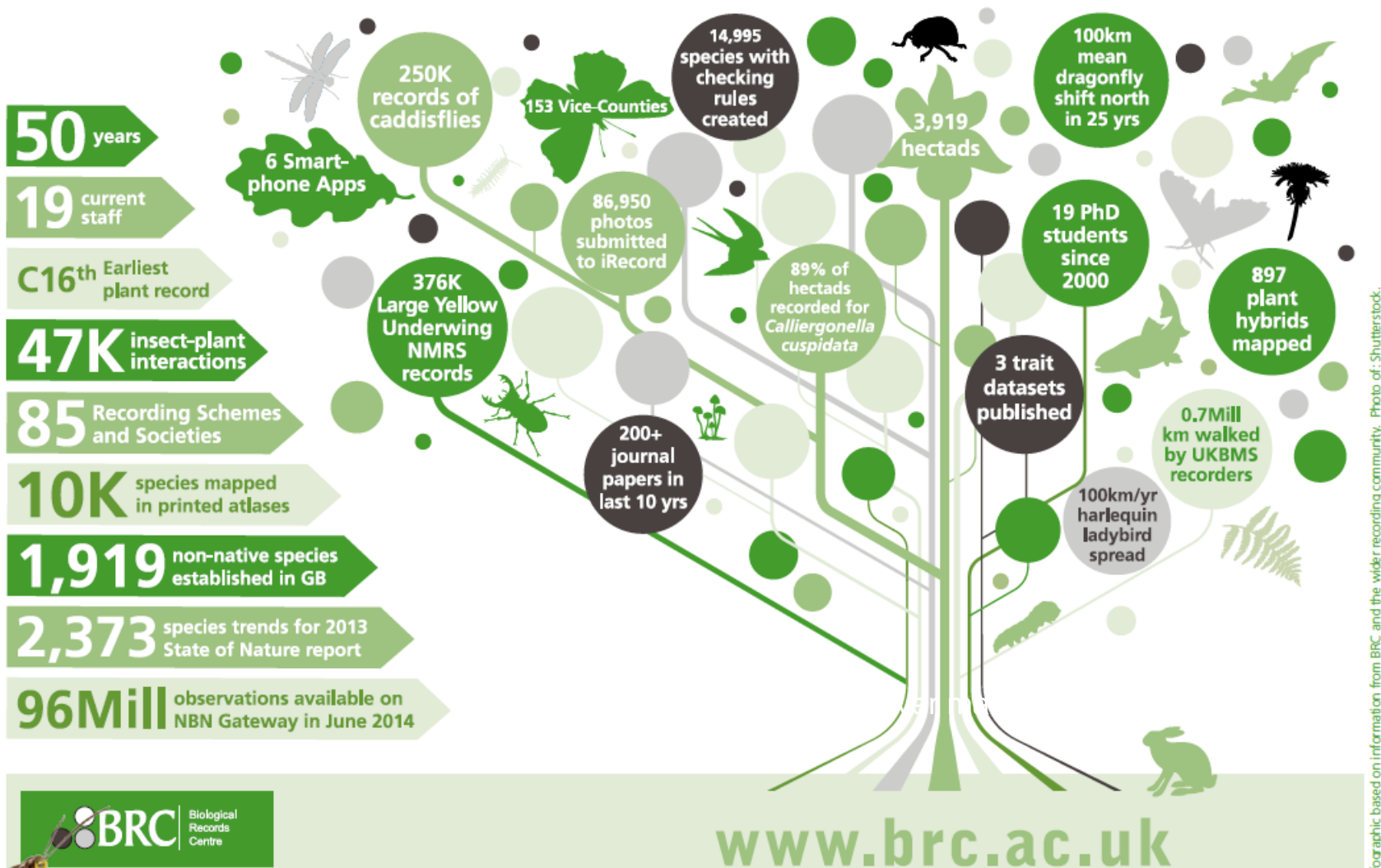
Indicators required for all 6 outcomes



Criteria for selecting indicators

- Build on historic data and ongoing volunteer schemes
- Add in new indicators only if a WG priority (GHG; peat)
- Keep some proportionality across outcomes
- All 'Outcomes' had to accept an indicators approach (i.e. not everything)
- Ensure contextual data was included to enable links to land management and their spatial configuration to be used in analysis

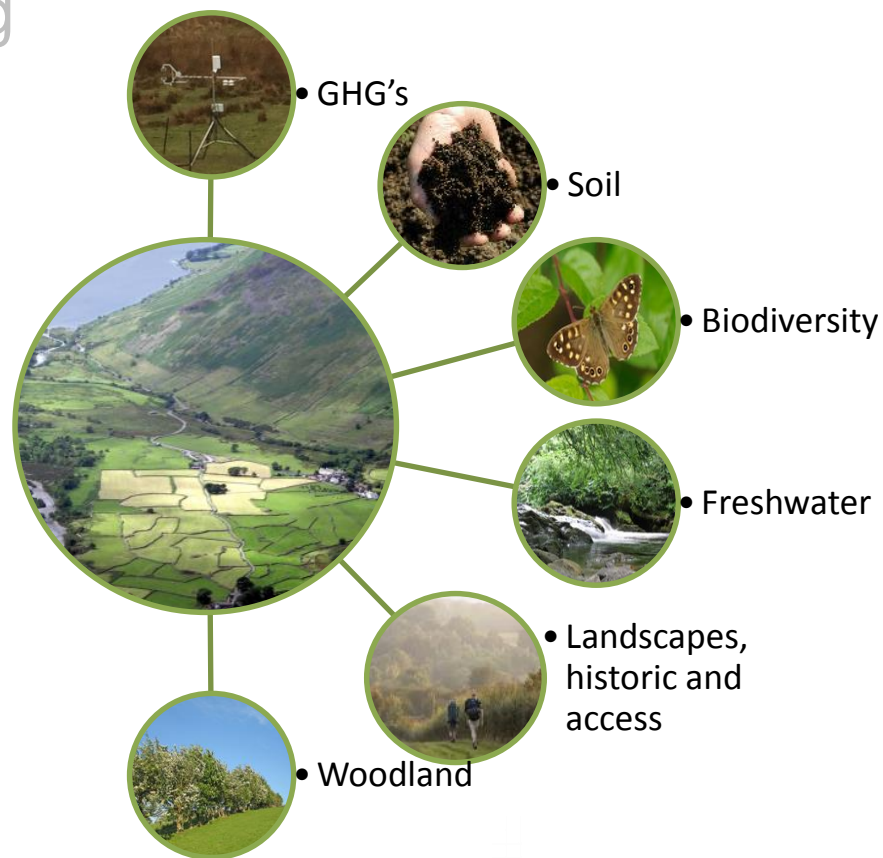
BIOLOGICAL RECORDS CENTRE



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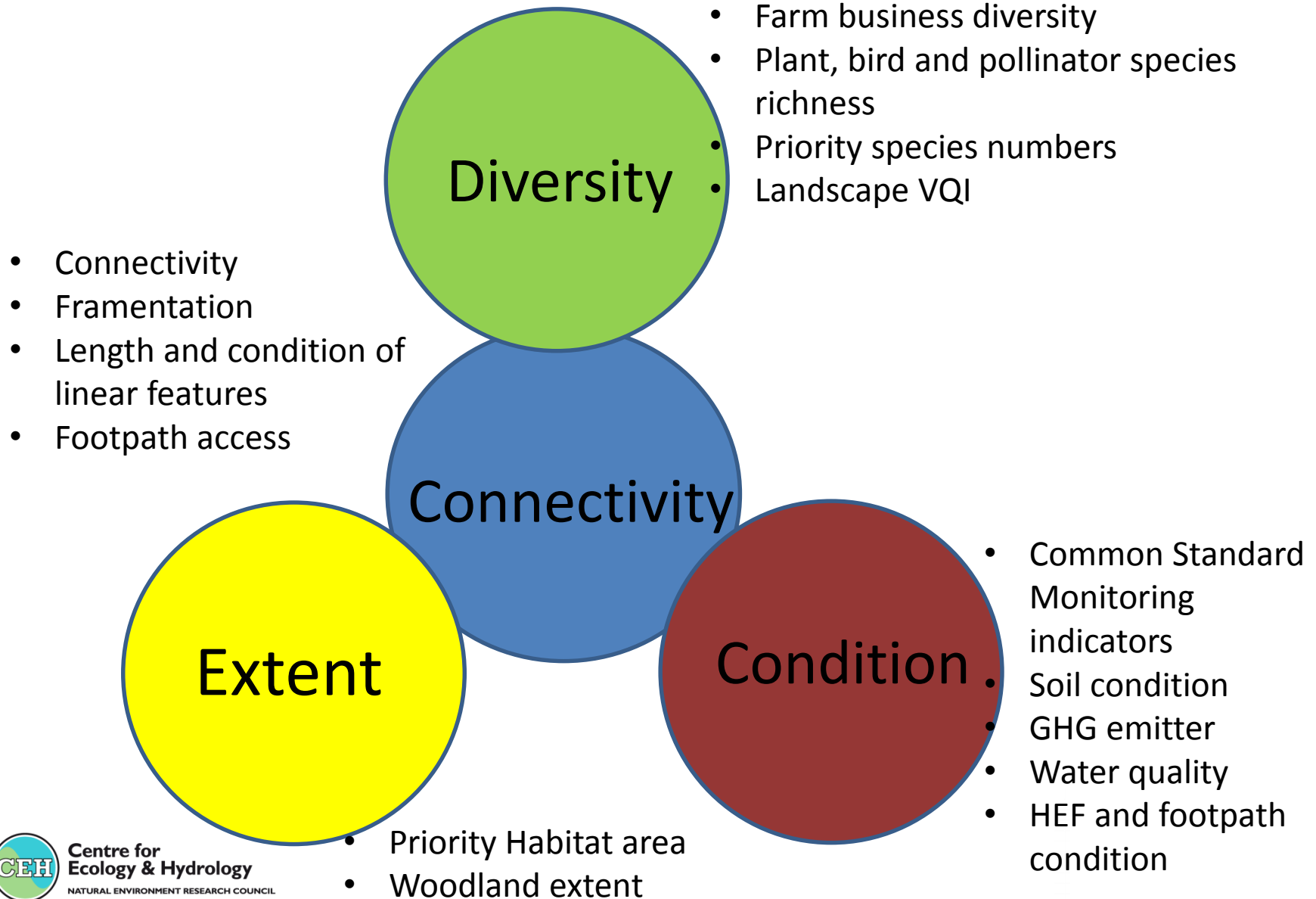
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Indicators

Outcome	Reportable Indicator
Climate change	GHG from agricultural land GHG from land use and conversion Embedded /indirect GHG (average farm only)
Water quality and flow	Water Framework Directive indicator of headwater streams and ponds.
Biodiversity	<i>Diversity:</i> Plant, pollinator and bird species richness Priority species number (birds & pollinators; habitat condition for other species) Priority Habitat area Habitat diversity metric <i>Condition:</i> Common Standard Monitoring indicators + annual dicots for arable <i>Connectivity:</i> Broadleaved woodland connectivity
Landscape, historic and access	Footpath and HEF condition Visual Quality Index
Soil	Topsoil carbon, pH, N, P and biodiversity
Woodland	Area; Woodland connectivity; Ancient Woodland Indicators
Socio-economic	Resilience of farm businesses (Farmer Practice Survey); Wider economic benefits

These all map onto resilience requirements



What we are missing and what is unique

	Pros	Cons
Soil	No other soil programme in place. New peatland metrics	Only for 0-15cm (topsoil)

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Socio-economic	Targetted focussed studies	No overall cost-benefit to date

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Sub-daily



Seasonally



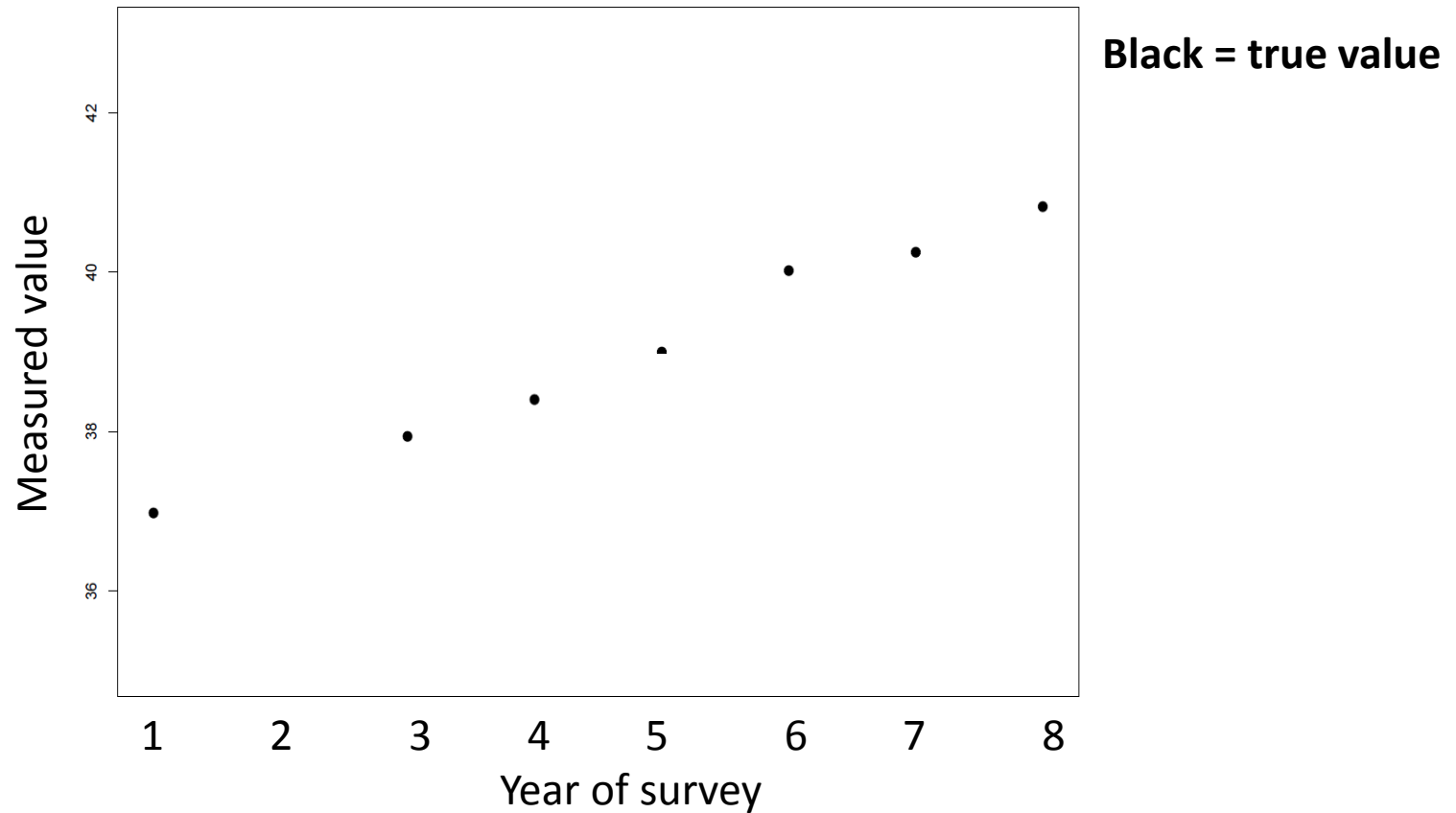
Annually



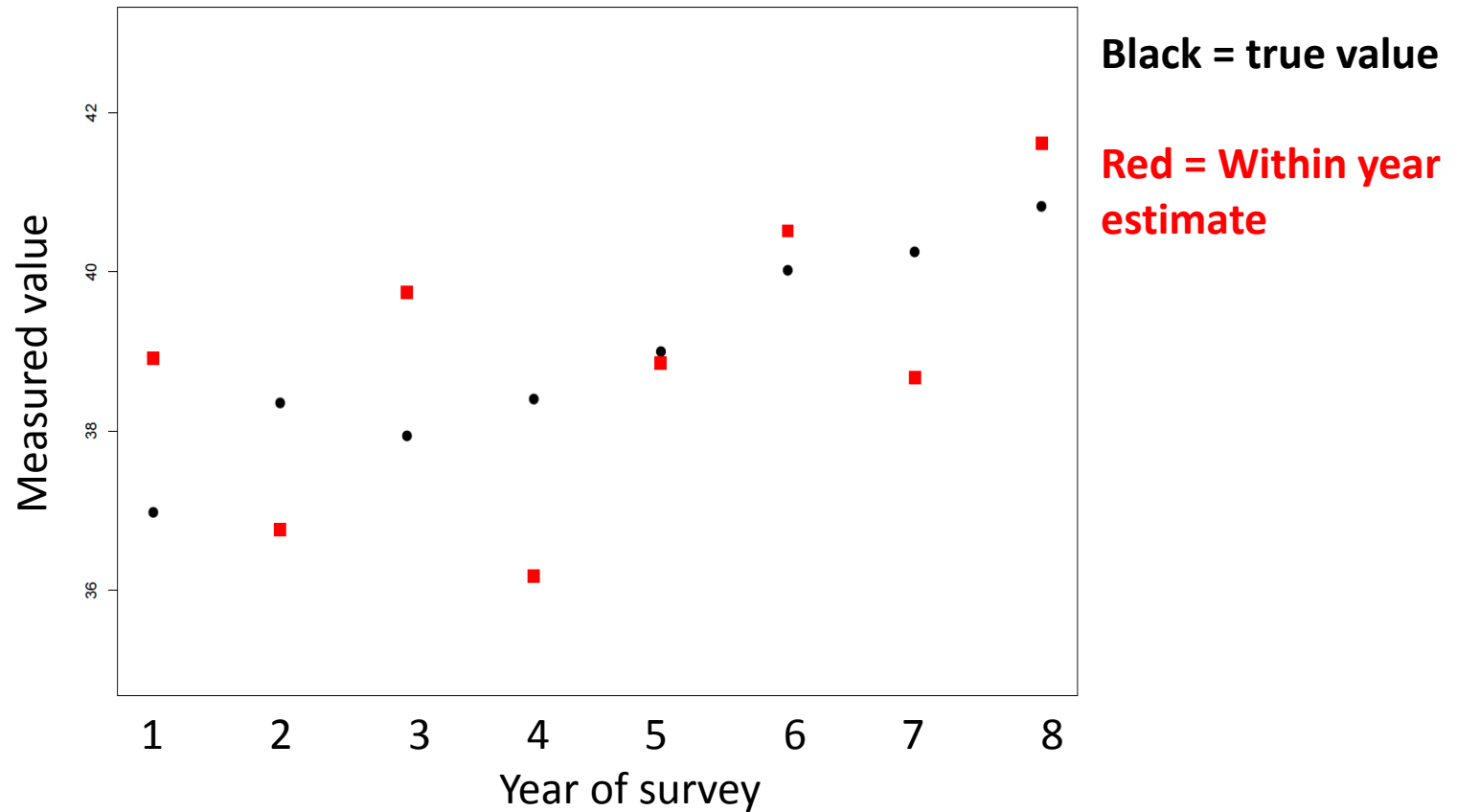
5 yearly



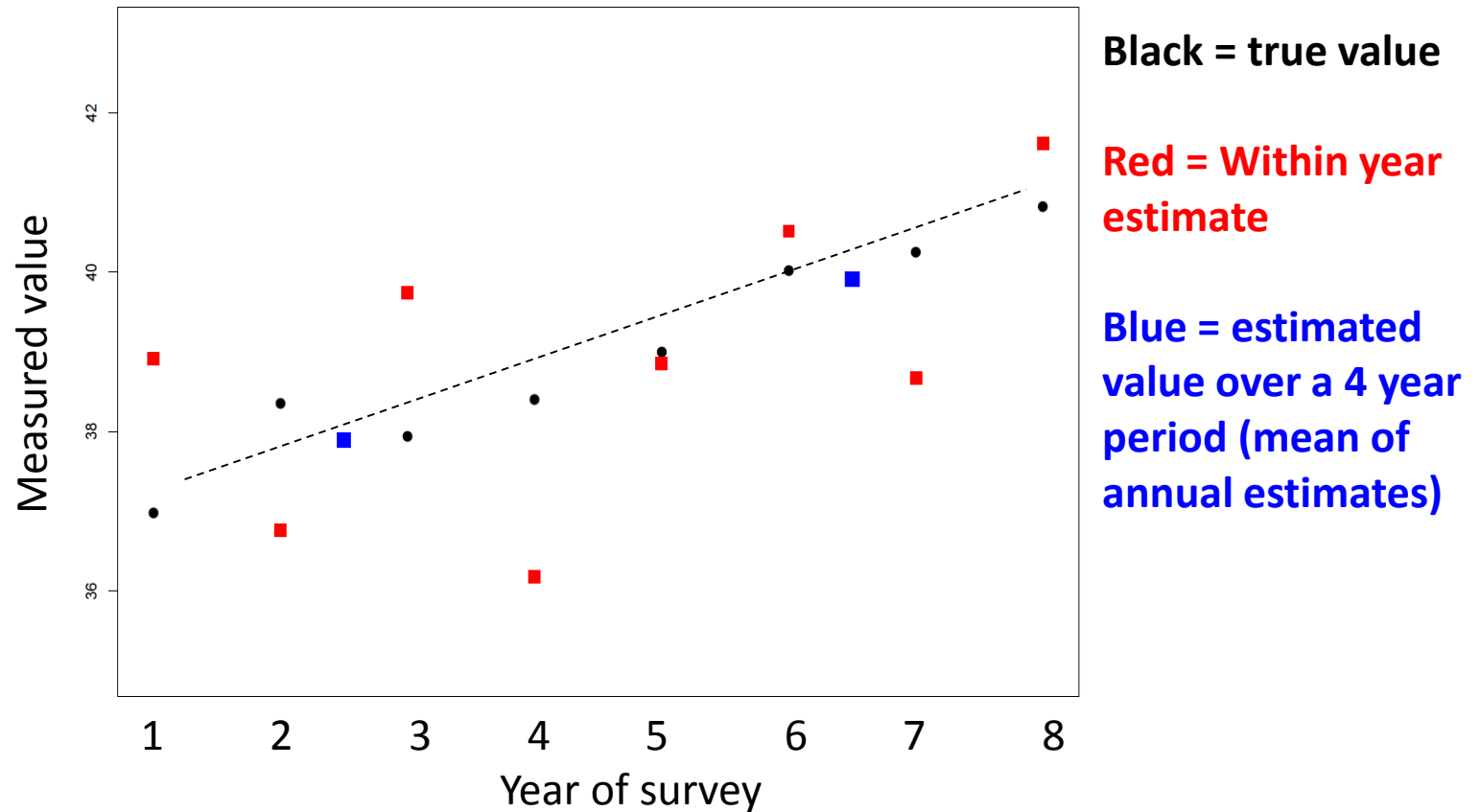
Annual cycle picks up drought / extreme years & long term trend



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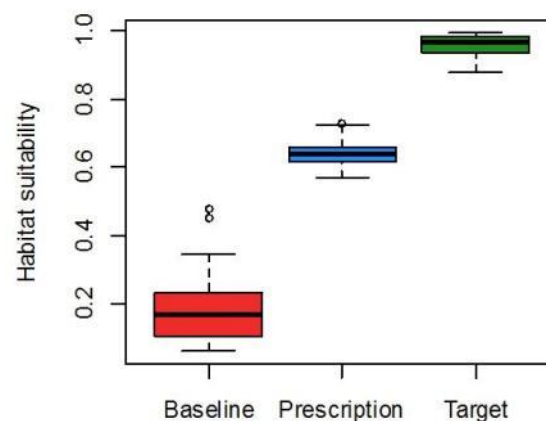


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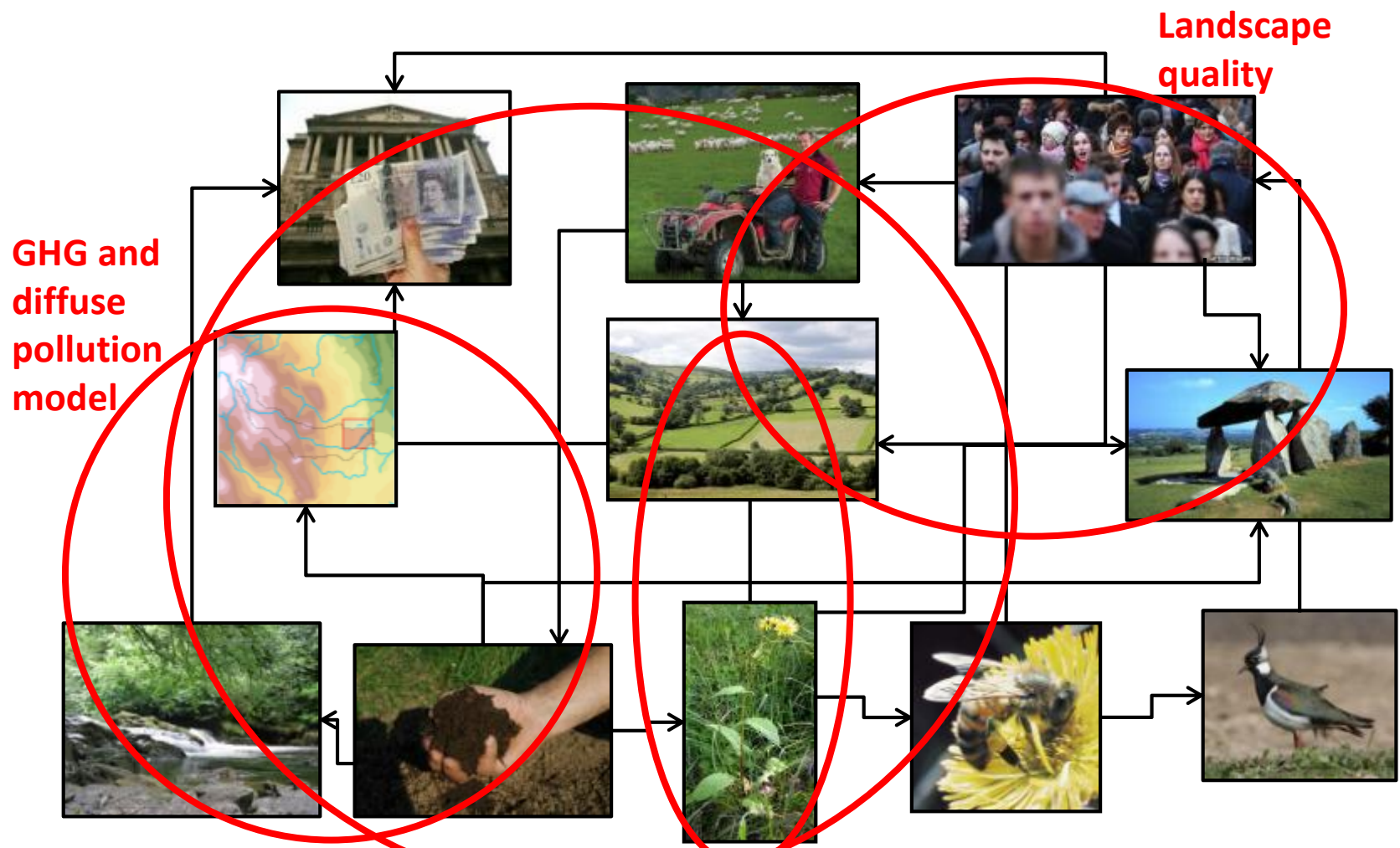
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How long will it take for this woodland to become suitable for bluebells again if woodland expansion option is introduced?

Hyacinthoides non-scripta



Modelling to provide early feedback



Modelling outcomes for 6 Glastir options

- Diffuse pollution and soil erosion reduced by 1-15 %
- Increased accessible land for broadleaf focal species by 3 to 12%,
- Reduction in flood generating land by 1 to 9%,
- Increased national carbon storage by ca. 0.4%,
- Positive changes in habitat suitability was projected for 75% of the 21 plant species modelled within 10-23 years

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Proportion effort (%£) by Outcome

Outcome	% spend
Biodiversity & Habitats	42 (30 + 12)
Woodland	In above
Soils	17
Water quality and flow	7
Climate change	5
Landscape, access and historic	3
Socio-economic	2
Integration and trade-offs	7
Underpinning	
Informatics	9
Project Management	8

Public data portal to be launched RWS 2015



Glastir
Monitoring and
Evaluation
Programme

Home

About GMEP

GMEP Data & Findings

Data Management

Integrated analysis for natural resource management

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Vestibulum tortor quam, feugiat vitae, ultricies eget, tempor sit amet, ante. Donec eu libero sit amet quam egestas semper. Aenean ultricies mi vitae est. Mauris placerat eleifend leo. Quisque sit amet est et sapien ullamcorper pharetra. Vestibulum erat wisi, condimentum sed, commodo vitae, ornare sit amet, wisi. Aenean fermentum, elit eget tincidunt condimentum, eros ipsum rutrum orci, sagittis tempus lacus enim ac dui. Donec non enim in turpis pulvinar facilisis. Ut felis. Praesent dapibus, neque id cursus faucibus, tortor neque egestas augue, eu vulputate magna eros eu erat. Aliquam erat volutpat. Nam dui mi, tincidunt quis, accumsan porttitor, facilisis luctus, metus.



Soil



Landscape and Access



Woodland



Biodiversity

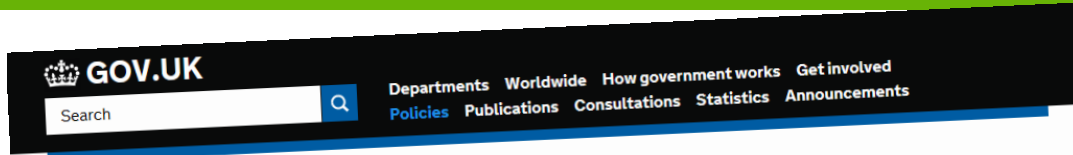


Freshwater



Climate Change Mitigation

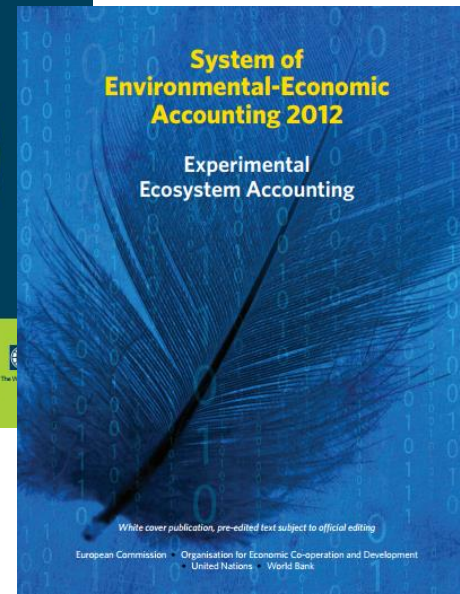
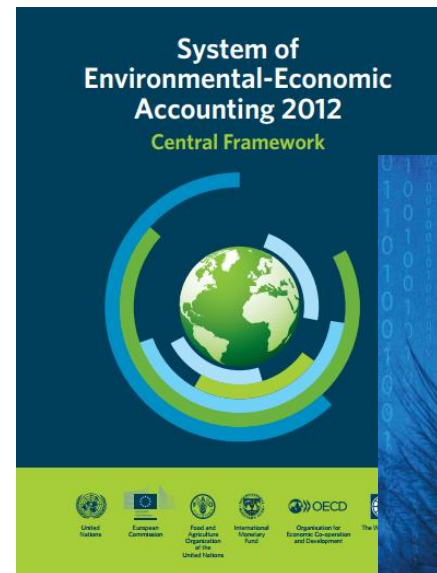
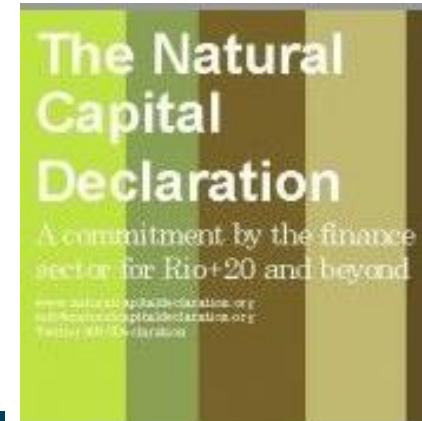
Opportunity for Natural Capital Accounting



Natural Capital Committee



mittee advises the government on natural capital, such as forests
n.



Community approach building on citizen science, academia and NGOs



Objective, independent, scientific approach led by CEH involving 17 organisations and > 100 scientists



Thank you - Diolch

