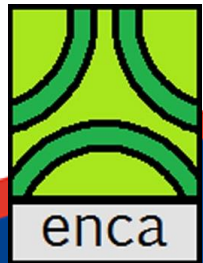


Embedding Climate Change Adaptation into the management of National Nature Reserves

Simon Duffield

ENCA climate change interest group

Senior Specialist Climate Change



Aims

- National Nature Reserves in England
- The challenge and approach taken
- Findings & lessons learnt



National Nature Reserves in England



The challenge



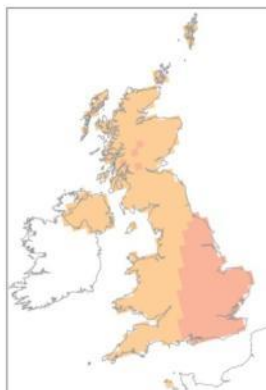
10% probability level
Very unlikely to be
less than



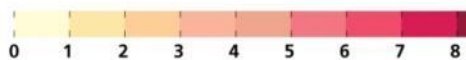
50% probability level
Central estimate



90% probability level
Very unlikely to be
greater than



Winter



Change in winter mean temperature (°C) for the 2050s



Global average temperature an

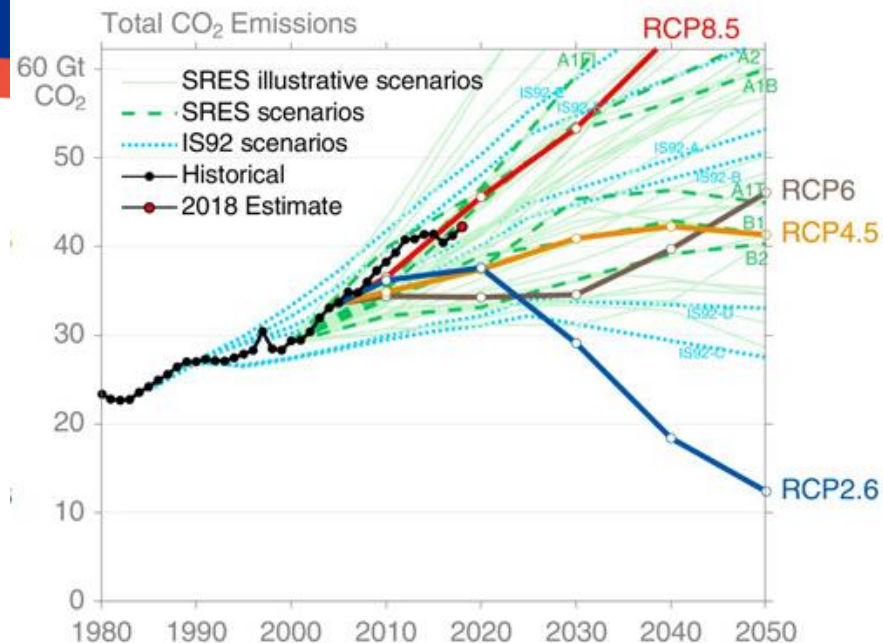
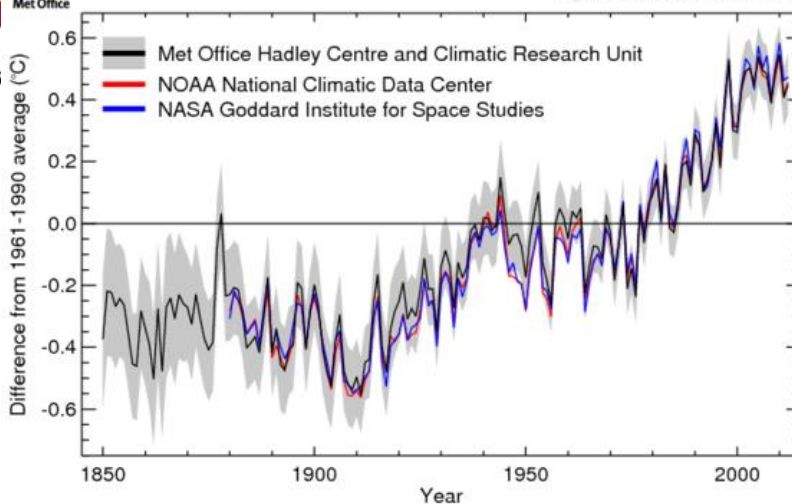


Figure: @robbie_andrew, @Peters_Glen

The challenge



Pragmatic
Hands off
Timely

The embedding process



1. Projected Climate Change

1. Projected Climate Change

**Regional
projections**

**NE climate
change briefing**

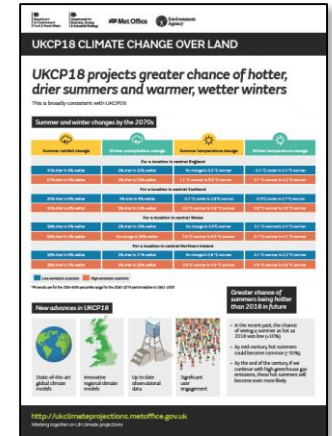
**UKCP18
summaries**

Climate change projections for NNR
management planning

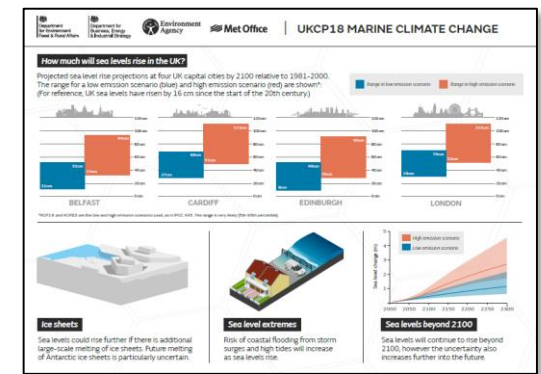


Updated Apr 19

Climate change briefing
April 2019



UKCP18 Climate change over land



UKCP18 Marine Projections

2. Climate change impacts

2. Impacts

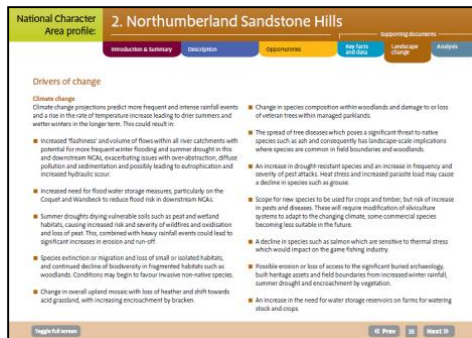
NCA profiles

Terrestrial & Water report cards

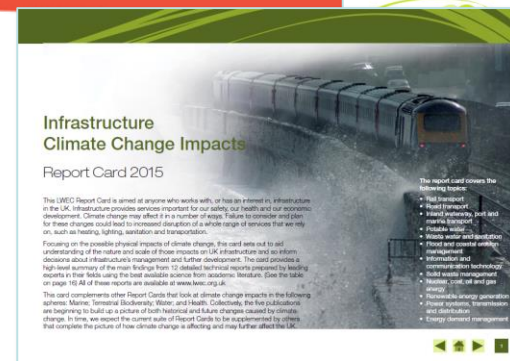
Other report cards

NE NCA profiles

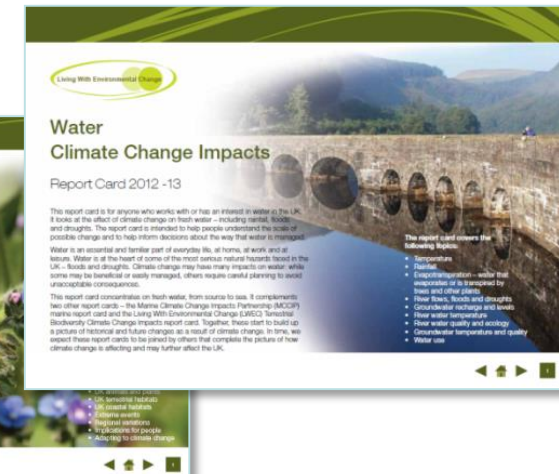
Each profile includes a section on climate change impacts



Infrastructure



Agriculture & Forestry



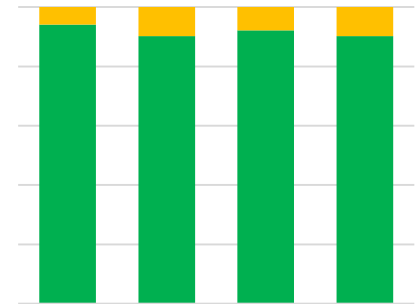
Step 3: Vulnerability Assessment

Feature name	Temperature	Rainfall	Extreme Events	In Combination	Confidence
Eutrophic Standing Open Water	L	M	H	M	L
Aggregation of non-breeding species					M
Water vole					H
Landscape - glacial hummocks and ridges					
Archaeological & historical features					
Economic use					
Community involvement					
Education					
Research					
Demonstration					
Public access					
Estate assets					

↑
Key NNR features

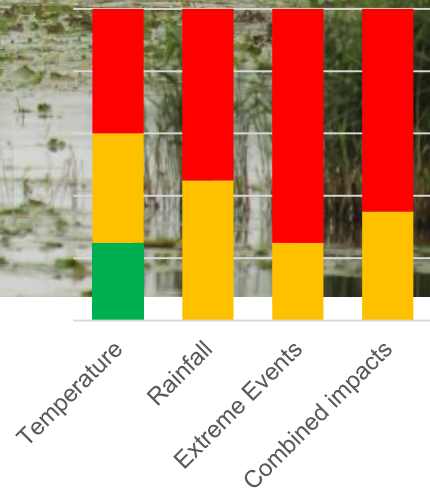
└──────────────────┘
Main elements of climate change

Martin Down

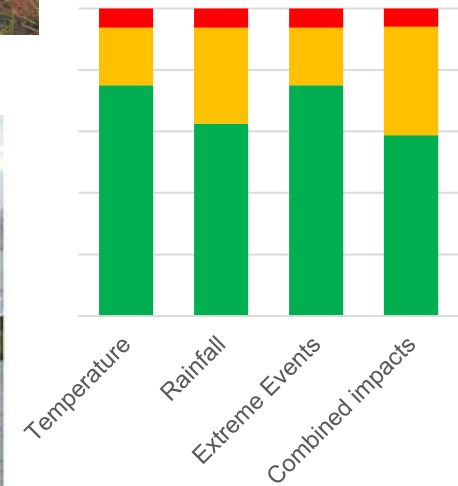


Temperature
Rainfall
Extreme Events
Combined impacts

Rob



Teesmouth



Step 4. Identifying responses



<http://publications.naturalengland.org.uk/publication/5679197848862720>



Mountain (Bilbury) Bumblebee *Bombus monticola* Smith.

Climate Change Sensitivity: **HIGH**
Non climatic threats: **MEDIUM**

Ability to Manage: **LOW**
Vulnerability: **HIGH**

Summary

The mountain bumblebee is a cool-loving species of the uplands. In the past it was widespread in north and western Britain, but its population has declined. The causes of this decline are thought to be related to habitat loss and degradation of which reduce or eliminate the flowering plants it relies on. However, the recent decline is consistent with that projected under a warming climate, and suggests a further contraction of suitable climate space.

Maintaining a mosaic of suitable habitat that includes upland heathland and meadows that support bilberry and legumes such as clover and birds-foot trefoil is a key adaptation response.

Climate Change Adaptation Evidence to support nature conservation in a changing climate



Baltic Bog-moss *Sphagnum balticum* (Russow) C.E.O. Jensen

Climate Change Sensitivity: **HIGH**
Non climatic threats: **MEDIUM**

Ability to Manage: **MEDIUM**
Vulnerability: **HIGH**

Summary

Baltic bog-moss is a nationally rare and endangered bryophyte that is now restricted to four known sites in Britain, having been lost from several sites in the last century due to development, drainage and afforestation. It is considered likely that it is vulnerable to the effects of climate change as it requires very cold winters for optimum growth, and is most prolific in the Arctic tundra and northern boreal zone. Thus, more frequent mild winters in Britain are likely to be damaging to the species, giving other more common species of bog-moss a competitive advantage.

Baltic bog-moss is also vulnerable to changes in hydrology and water quality, and may be adversely affected by atmospheric nitrogen pollution. The management of existing sites to ensure optimum conditions is of prime importance for the protection of existing sites in Britain. In addition, the restoration of former sites, or the creation of new sites, in parts of the country that will remain climatically suitable for the species should be considered, possibly combined with species introductions or reintroductions where restored sites are distant from existing populations.

Climate Change Adaptation Evidence to support nature conservation in a changing climate

Adaptation responses

600+ actions

Evidence

0.14

Ways of Working

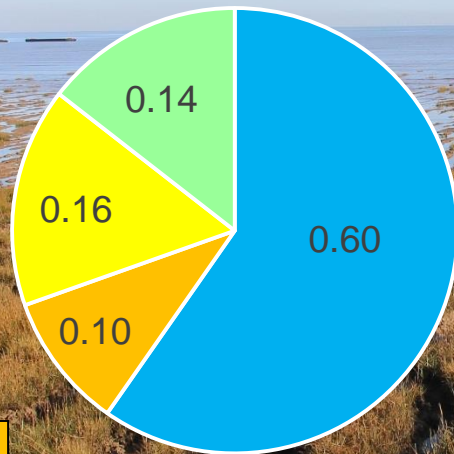
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0.10

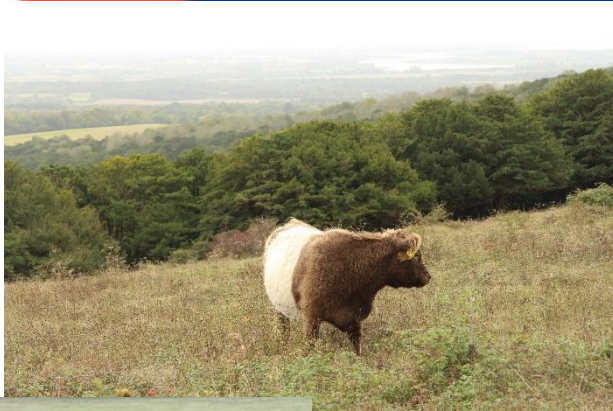
Managing
change

0.60

Building
resilience



Building resilience



Implementation of
optimal management



Building resilience



Addressing non-climatic adverse pressures



Building resilience



Addressing climate
change specific
impacts

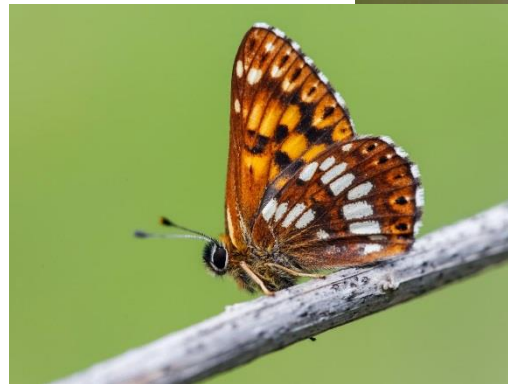


Managing change



Adjustment of management
to reflect new conditions

Adjustment of aims and
objectives



Ways of Working



Flexibility

Contingency planning

Forward planning



Summary

Conclusions:

It empowers local decision making

Resilience dominates responses

Tension - preservation vs change

How is as important as what

Answers lie outside the boundary

