

Breckland Biodiversity Audit



FOOTPRINT
ECOLOGY

Results and impacts



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The Problem

- Incorrect use of the word “Biodiversity” – what do we mean? How many species? – a single group “plants”? Single flagship species?
- Conservation approaches: Species vs. habitats:
 - Species plans – conflicting single species, can be difficult to relate to management, only a few flagship species considered
 - Habitats plans – national / generic, lack species detail / specific conditions required, habitat correct for “biodiversity”?
- Evidence base for conservation? cost-effective delivery of biodiversity needs a prioritisation of landscapes and management actions
- Providing connectivity – for what and where?

A vertical photograph of a field of purple flowers, likely heather, with a green rectangular box at the top. The flowers are in the foreground, and the background is a blurred landscape. The green box is at the top of the image.

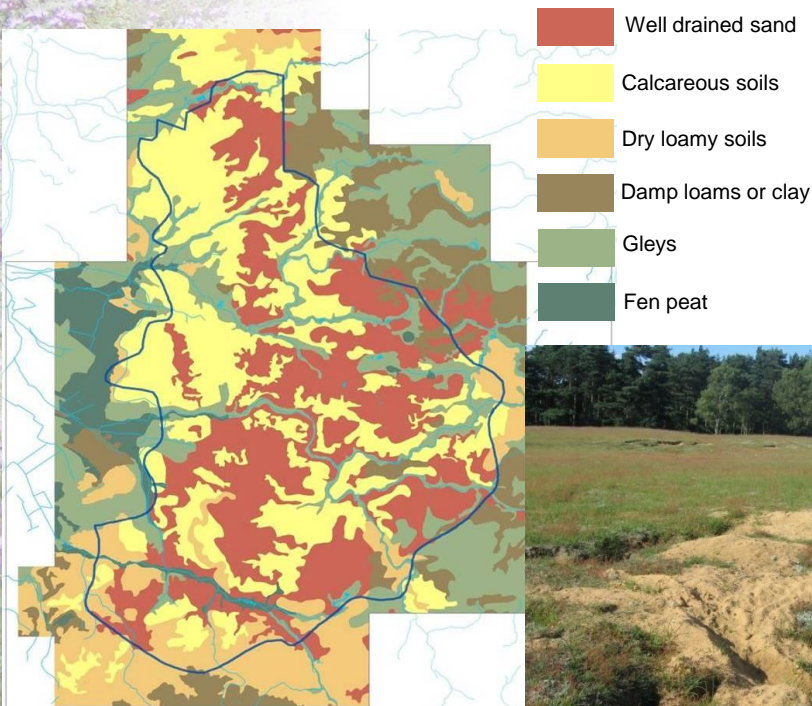


Breckland area



Characteristics:

- ~1,000km²
- Unique climate in UK (semi-continental)
- Light sandy soil, low nutrients
- Grass - heath
- long history of human land-use
- Resulting unique, distinctive species



Audit Approach Step 1: Species records

- **Amazing resource** – recorded mostly by members of the public
- We collated c. 1,200,00 records
- 12,845 species!!



Define priority species

**National lists: BAP,
Red Data Book,
Notable, Rare/Scarce**



Regional specialists: Species known or considered to be
Breckland Specialists

***Recognises species not otherwise
designated - Not parochial species!***



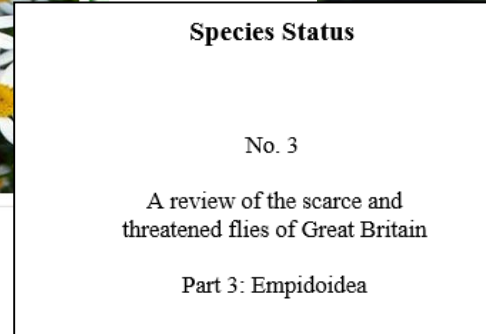
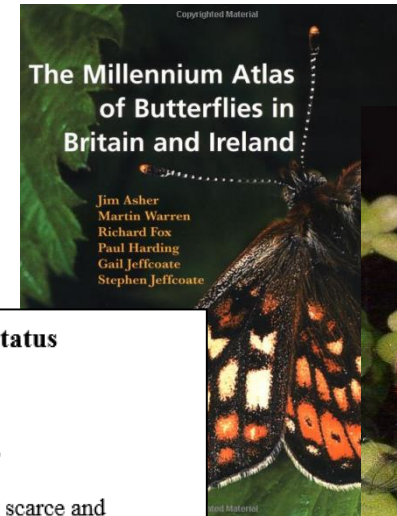
2,149 priority species!

**Great... but how to managed for all these species?
what do the species need?**

Guild process

Sources of species information:

wide range of literature (Invertebrate Site Register, RDB accounts, atlases and websites)



Each priority species (c.2,000) coded for association with 120 **broad habitats**, **micro habitats/structures**, **processes/management**

HEATHLAND

VERTICAL
BANKS

DEADWOOD

ROTOVATION

SWARD
MOSAICS

ARABLE

REEDBED

STANDING
WATER

POACHING

BARE
GROUND

RABBIT
GRAZING

UNGRAZED
NECTAR

Guild process

Processes not habitats



c. 40% of species not
associated with a single
habitat

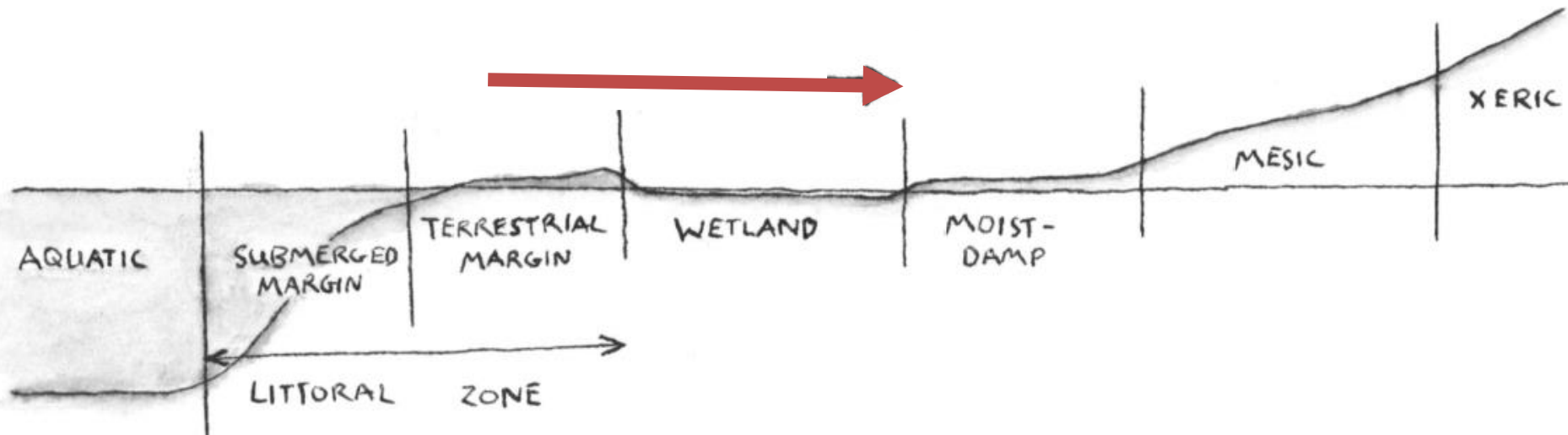


Guild process

Group species to form 'guilds' - species with similar requirements

3 gradients:

- Hydrology gradient – *wet to dry*

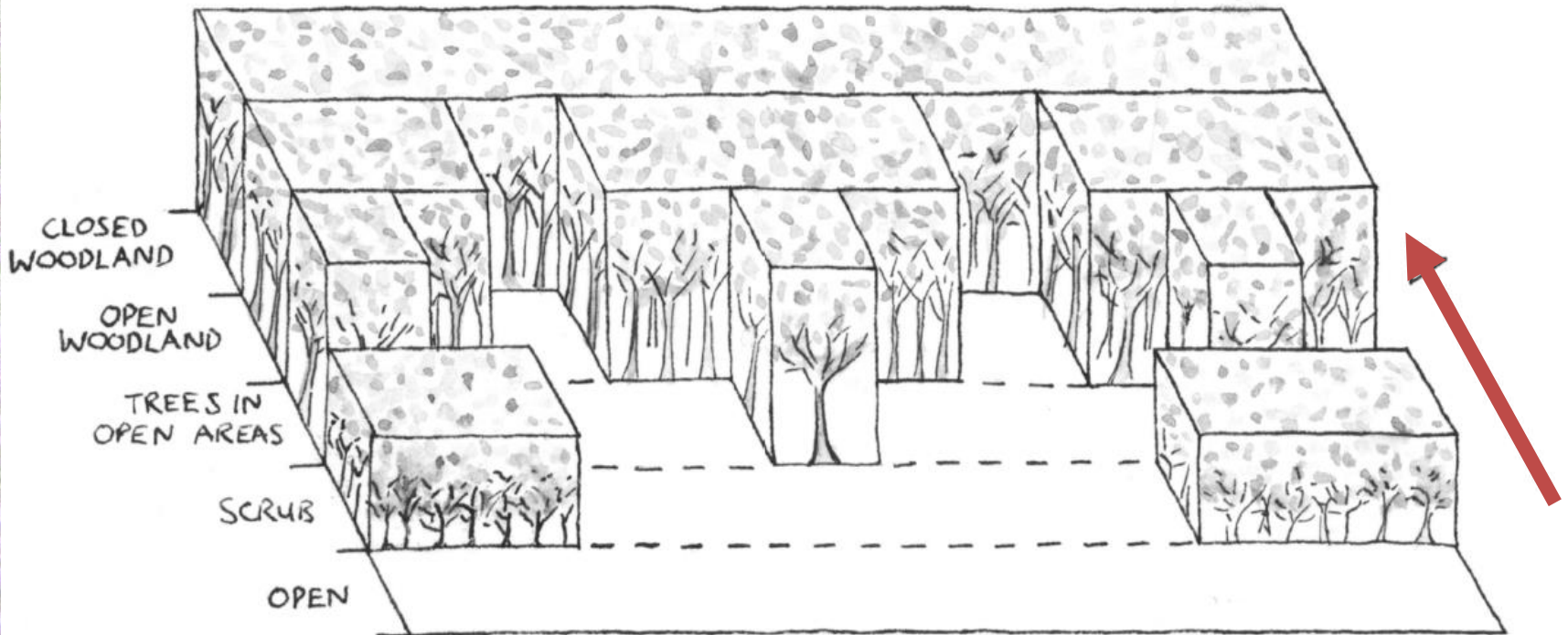


Guild process

Group species to form 'guilds' - species with similar requirements

3 gradients:

- Hydrology gradient – *wet to dry*
- Tree/canopy cover gradient – *unshaded to shaded*



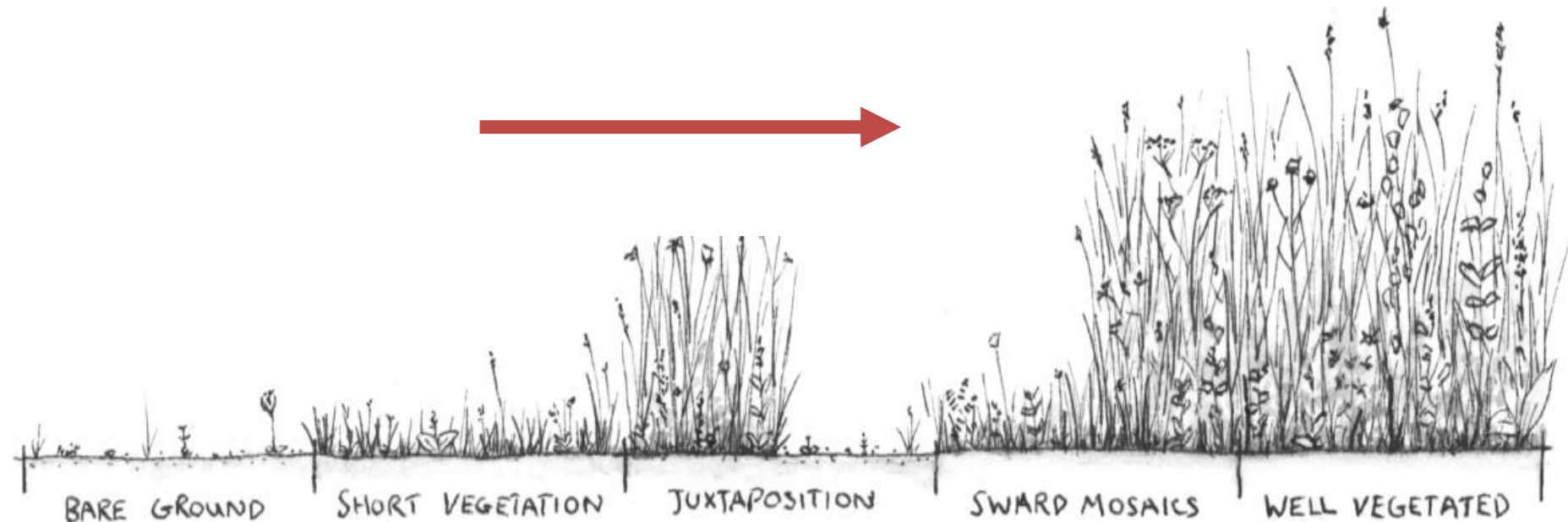
Guild process

Group species to form 'guilds' - species with similar requirements

3 gradients:

- Hydrology gradient – *wet to dry*
- Tree/canopy cover gradient – *unshaded to shaded*
- vegetation structure/ management (c. gradient) – *unvegetated to vegetated*

-> ***Disturbance vs undisturbed, grazed vs ungrazed***



Key: Quantifying importance

Key to Audit - Quantify importance of habitats/ conditions

- For dry, open habitats (e.g. grassland, heathland, arable):
- 32% of priority (non-vertebrate) species; 61% of regional specialist species



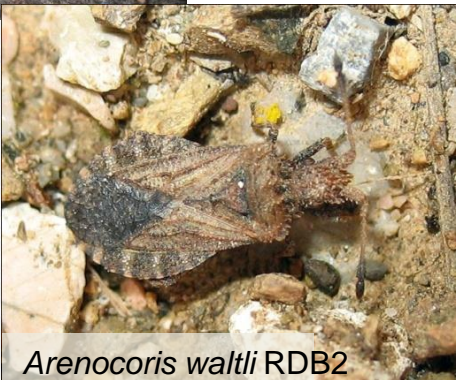
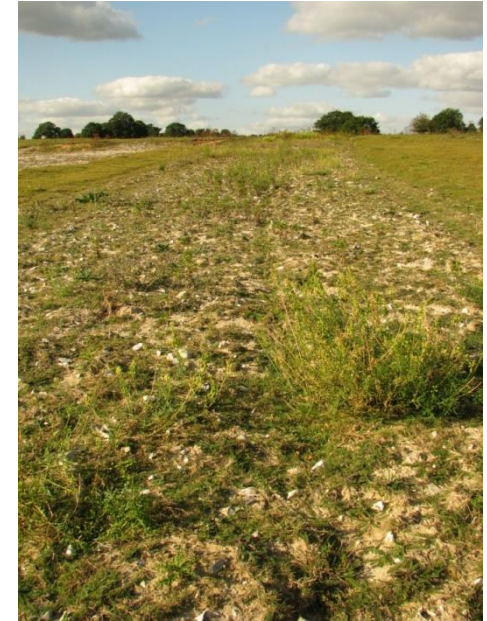
Grazing

- 43% of the grass heath area managed by light to moderate grazing
- BUT only 14% of the dry, open priority species (80 species) require light to moderate grazing!



Grazing and Disturbance

- Disturbance and grazing long known to be best – but now quantified
- 25% of dry, open species, 35% specialists.



Arenocoris waltli RDB2



Disturbance and Ungrazed

- Disturbance and ungrazed conditions are also recognised
- A further: 24% dry, open species, 29% specialists.



Disturbance and Ungrazed

This group is threatened

- 25 species are now considered extinct
- some remaining species are highly localised

Spotted sulphur



Flixweed flea beetle

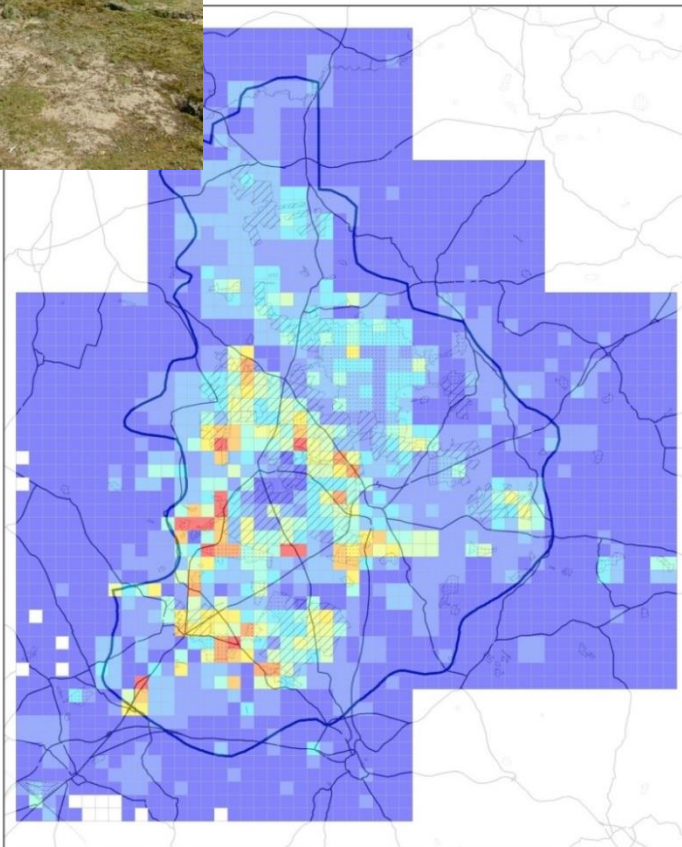


Set-aside downy-back beetle

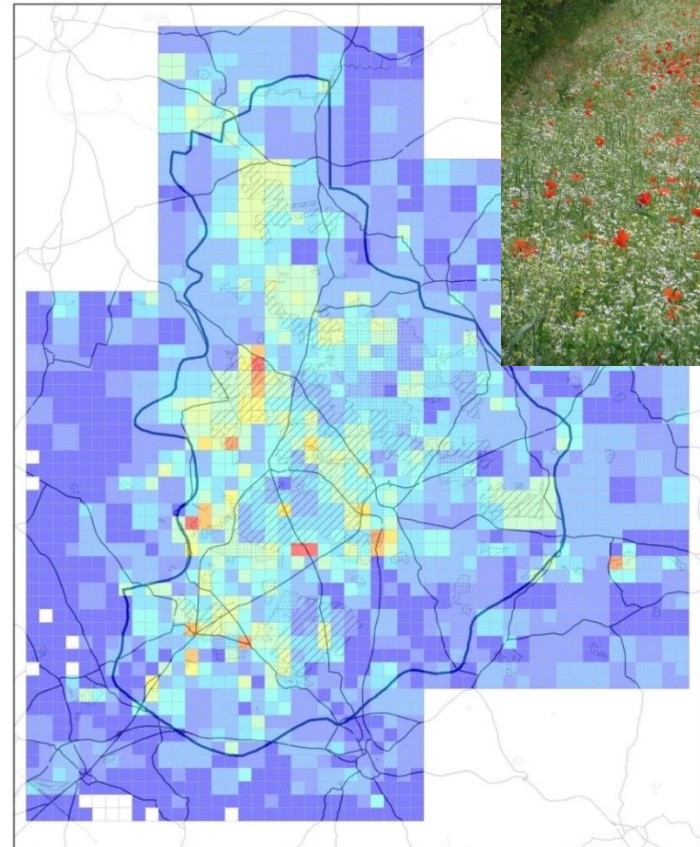


Where?

In “wildlife sites”, but also wider landscape and arable fields



Number of species



Number of species



Future work??

Securing Biodiversity in Breckland

Guidance for conservation and research

**Securing Biodiversity in Breckland:
Guidance for Conservation and Research**

First Report of the Breckland Biodiversity Audit

Paul M Dolman, Chris Panter, Hannah L. Mossman

30th November 2010

Journal of Applied Ecology



Journal of Applied Ecology 2012, **49**, 986–997

doi: 10.1111/j.1365-2664.2012.02174.x

The biodiversity audit approach challenges regional priorities and identifies a mismatch in conservation

Paul M. Dolman*, Christopher J. Panter and Hannah L. Mossman

School of Environmental Sciences, University of East Anglia, Norwich, UK



Future work??

EVIDENCE



Implementation

Targeting
Research at
Evidence gaps

Integrated into
Local Authority
Planning
guidance

Method adopted
elsewhere:
Fens, Broadland Audit

Anglian Water
project

FC Creating Connectivity
Networks

NE Regional
Script – guide for
advisers on
arable margins

Back from the
Brink: Shifting
Sands Project

Plantlife
Grantscape project

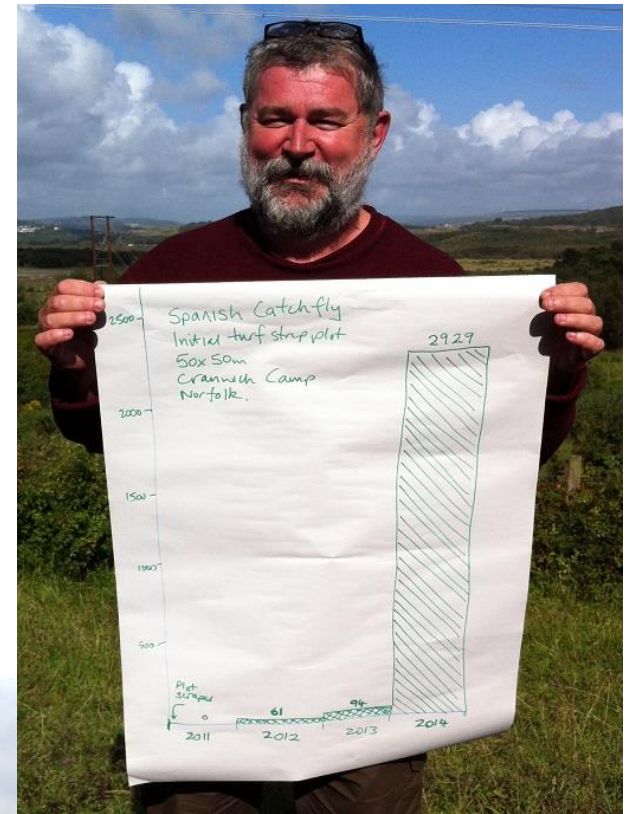
Improved
recording

Plantlife GrantScape project



Evidence base to secure funding to undertake bare ground experiments (2010-2013) :

- Excavation
- Banks
- Soil inversion
- Pits
- Rotovation



Back from the Brink

- Back from the Brink
£4.6 million national project
- the Brecks scheme starting this year:
Shifting Sands –Securing
a Place in the Brecks
£500,000

Back From The Brink

**Funding raised by
The National Lottery**

and awarded by the Heritage Lottery Fund

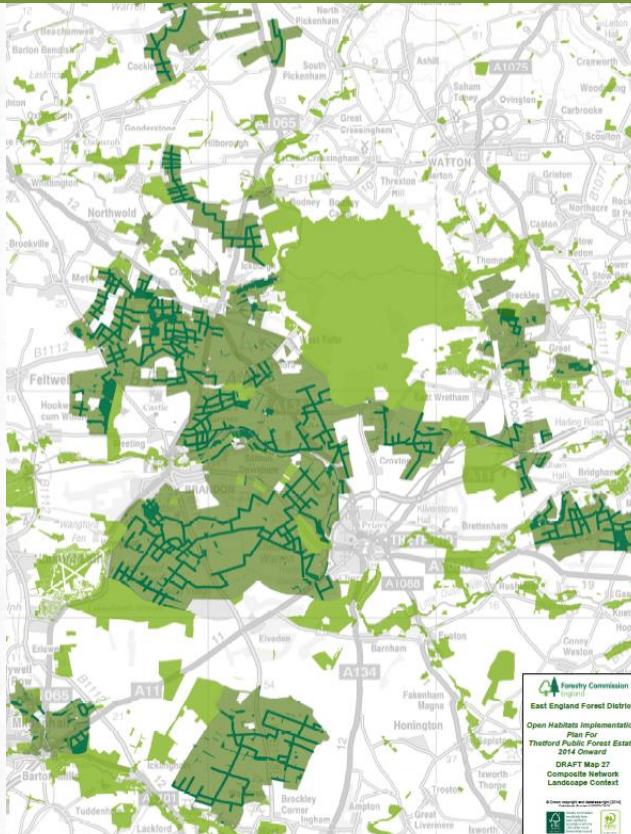


LOTTERY FUNDED

Objectives

- inform and inspire volunteers, landowners and managers.
- improve the conservation methods
- Manage Breckland grass heaths and create an open forest corridor network.

Forestry Commission connectivity



- Enhance the existing ride network
- Join heathlands through the forest
- 278 km open-habitat connectivity



Undisturbed
grass verge

Compacted trackway

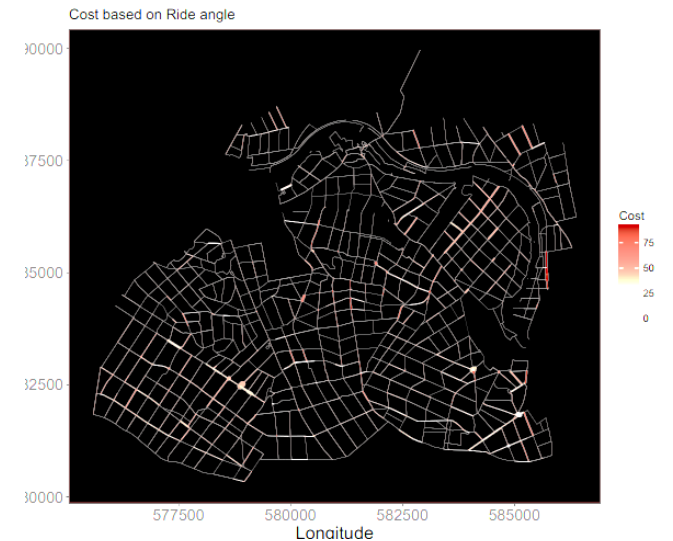
Frequently rotated strip

Undisturbed
rank/permanent?
grass strip

Uncultivated field
margin

Forestry Commission connectivity

- On the ground experimentation
- Modelling to predict connectivity



Recognition of wider important biodiversity



Flagship effectiveness



- Considered dedicated feeding and breeding conditions and other compatible conditions.
- Management for Stone Curlew can deliver for:
- 64% of all dry, open species - 75% of dry, open specialists

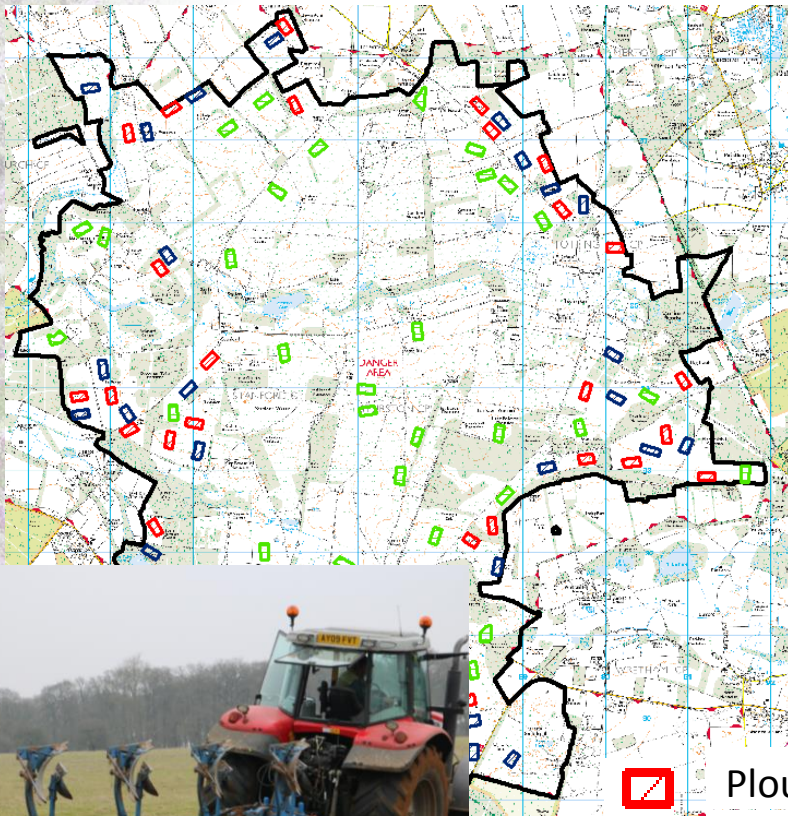


STANTA (Stanford Training Area):

- c. 4,500 ha site: 2/3rds grass-heath
- 76% in poor condition
- One pair Stone Curlews in 2014 - Potential for 164



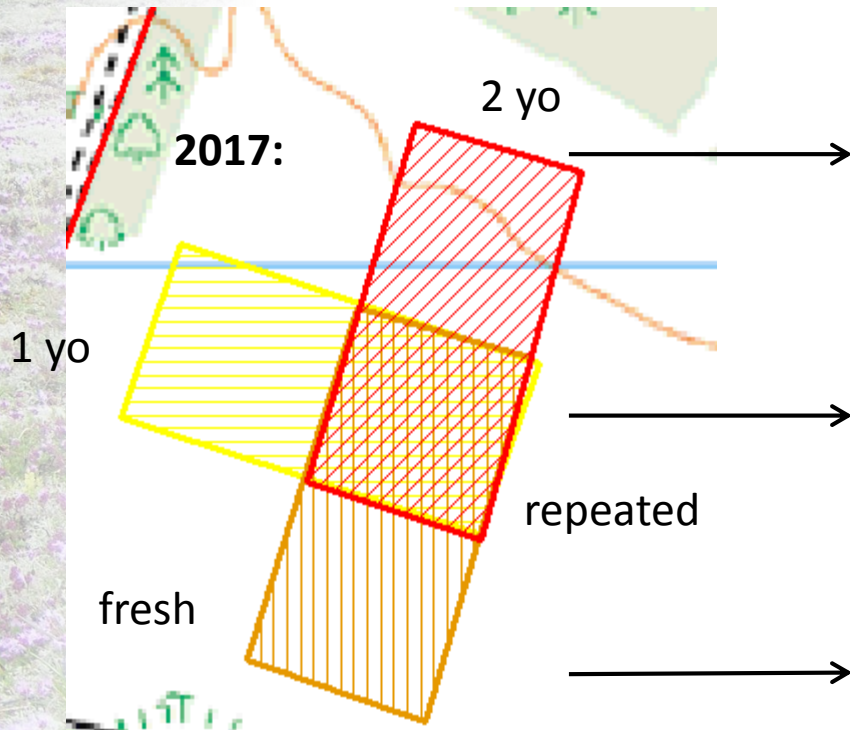
STANTA (Stanford Training Area):



- Government funding, £6.5 M (10 year) for 260 ha ground-disturbance
- 2016: 8 SC nests
- 48 priority non-vert. species, incl. 8 RDB
- GPS tracking of Stone Curlews to examine areas used



Overlapping plots to create mosaics



1 ha



1 ha



1 ha

Conclusions

Feasibility of the approach

- Approach – ‘painful but effective’
- Citizen science recording is incredible and natural historians keen to help
- Utilise and stimulate further improvements in monitoring and surveillance
- Regionally important species previously off radar – if lost then at risk of national homogenisation
- Value in thinking about processes in habitats – this thinking is much more management relevant
- Set methodology - Refined and tested in three areas to date
- Partnership approach and getting involvement is important – extra time for co-ordination is worth effort

Thanks go to the funding partners....



Suffolk Biodiversity
Partnership



... and the hundreds of members of
the public who submit records

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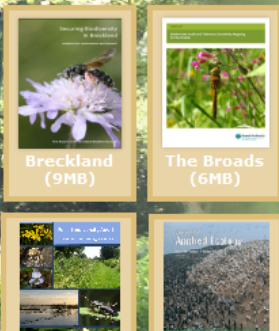
Thank you for your attention

Biodiversity Audit Approach

Evidence-base for conservation

- Home ▶
- Methodology ▶
- Regional Audit ▶
- Our Vision ▶
- Contact Us ▶

Our audits and reports are available for download below:



Biodiversity Audit Approach

Conservation generally lacks robust quantified evidence as to: what biodiversity is present, what we should be focusing our efforts on and whether our conservation activity is efficient at conserving the true biodiversity priorities.

We have developed an innovative methodology, the Biodiversity Audit Approach, to:

- 1) quantify the biodiversity of a region - generally an order of magnitude greater than previously recognised,
- 2) identify priorities for conservation,
- 3) synthesise requirements across diverse taxa to give habitat based prescriptions that deliver conditions for multiple priority species
- 4) summarise the relative importance of different management groups within a region
- 5) map the distribution of species groups requiring different management.

Further details of our approach are available on the other pages of this website.

Recent journal publications:

Biodiversity Audits: *J. Appl. Ecol*

Modelling Biodiversity: *Landsc Urban Plan*

News articles:

The Fens:

BBC News

Fens are rare wildlife 'hotspot', a new report finds

ITV News

Fens home to rarest species

The Broads

BBC News

BBC News

'Broads are home to rare plants and animals'

'Norfolk Broads home to a quarter of UK's rarest species'

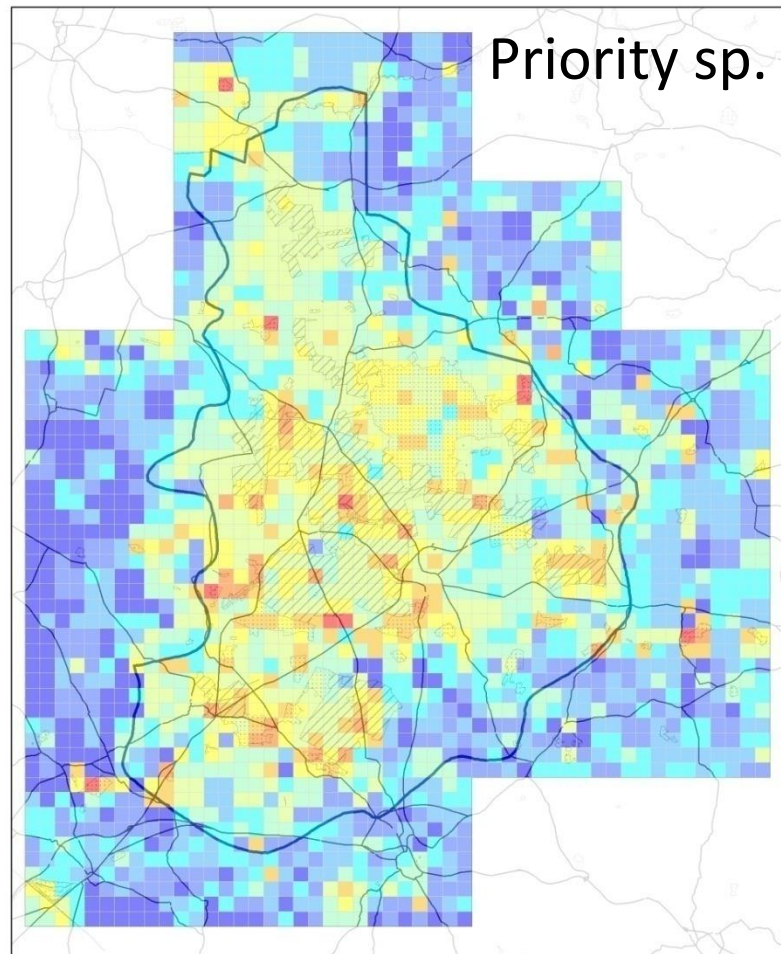
Telegraph

'Norfolk Broads are wildlife hot spot for rare species'

www.biodiversityaudit.co.uk

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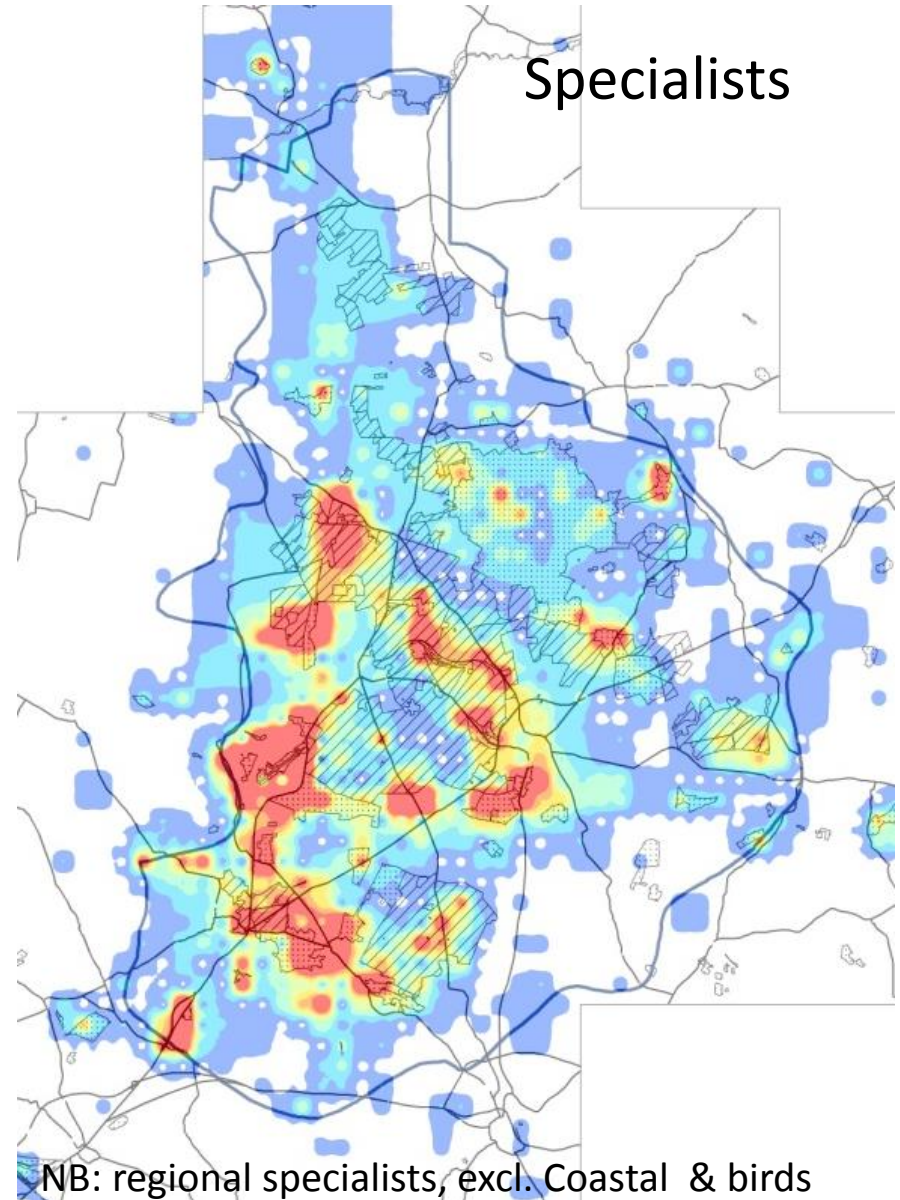
Where?



Number of priority species - post 1980 only
(excluding bird and mammals)



NB: excl. birds & mammals



NB: regional specialists, excl. Coastal & birds

Bare Ground

Species accounts

- 308 sandy conditions - *Cionus longicollis* feeding on Great Mullein, particularly in sandy areas (grassland, verges, disturbed ground)
- 202 early successional stages – Spanish catchfly *Silene otitis*, grass-heaths/roadside verges, low, open vegetation where disturbance produces plenty of bare ground for seedlings.
- 261 bare ground – *Harpalus froelichii* feeds on seeds on Fat Hen in bare ground
- 113 soft cliffs
- (283 deadwood, 169 veteran trees)



Bare Ground

Species accounts:

- 33 wind blown sand e.g. *Arachnospila wesmaeli* favours coastal dunes and blown sand – “looser than typically occurs on heathland”
- 30 compaction e.g. Mossy Stonecrop *Crassula tillaea* rutted paths and tracks – compacted, gravelly/sandy ground
- 39 rabbit scrapes e.g. *Orthocerus clavicornis*, bare ground, associated with *Peltigera* lichens and areas of rabbit grazing.

Arachnospila anceps



Crassula tillaea



Orthocerus clavicornis



Juxtaposition: Bare Ground & Nectar

10% dry open species (61 species), 4% of specialists (4)



Bee Wolf *Philanthus triangulum*

Habit is disturbed, sandy locations.

Prey and larvae on mostly honey bees.

Nesting in both vertical and level sand (fully exposed to the sun, often in large aggregations).

Nectar resources for prey and possibly adults



Marbled Clover *Heliopsis viriplaca*

Foodplants and nectar are plants of disturbed ground (e.g. Viper's bugloss, *Echium vulgare*), but disturbance management always needs to maintain nectar resource, also trackways/verges favoured.



Heather

- Species accounts; 53 list “heather”/ “heathers” or sp.
- 4 obligates (leaf beetle; *Altica ericeti*, Heath Rustic *Xestia agathina*, Neglected Rustic *X. castanea* and Shoulder-striped Clover *Heliothis maritima*)

Shoulder-
striped Clover



- Other “Heather specialists” e.g. Heather Colletes *Colletes succinctus* will collect pollen from other flowers
- Important nectar resource and structure

Wet habitats



Wet open: 23% (446), 37 specialists



Wet wood: 5% (98), 2 specialists

1/5th of ponds open
34% of UK's snail killing flies

Overlooked guilds



51, 0

Brachyopa bicolor – hoverfly,
larvae under dead bark



122, 2

Hololepta plana



Bigger, Better, Joined

