Knepp and Rewilding

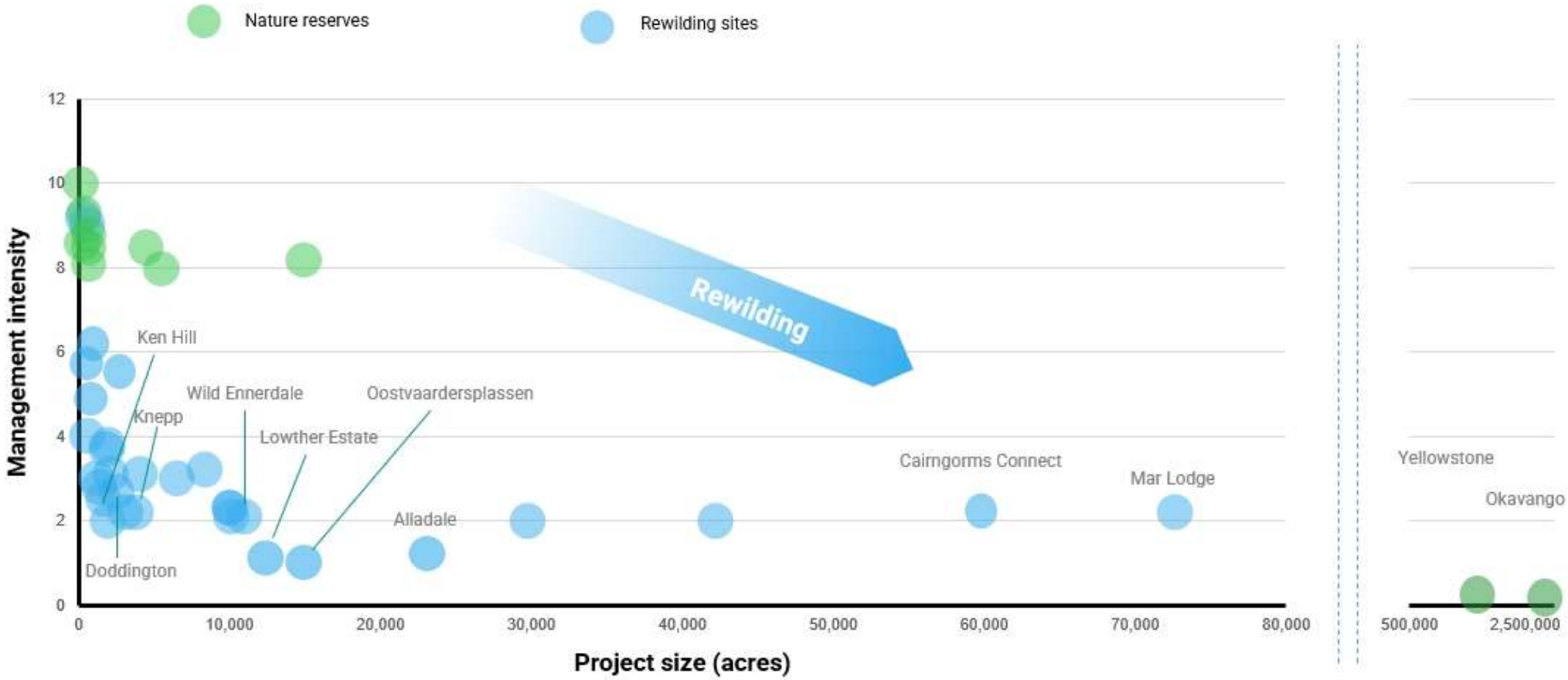
12 June 2023

Rather than being in competition with farming, rewilding is farming's natural ally

Co-funded by the
Erasmus+ Programme
of the European Union

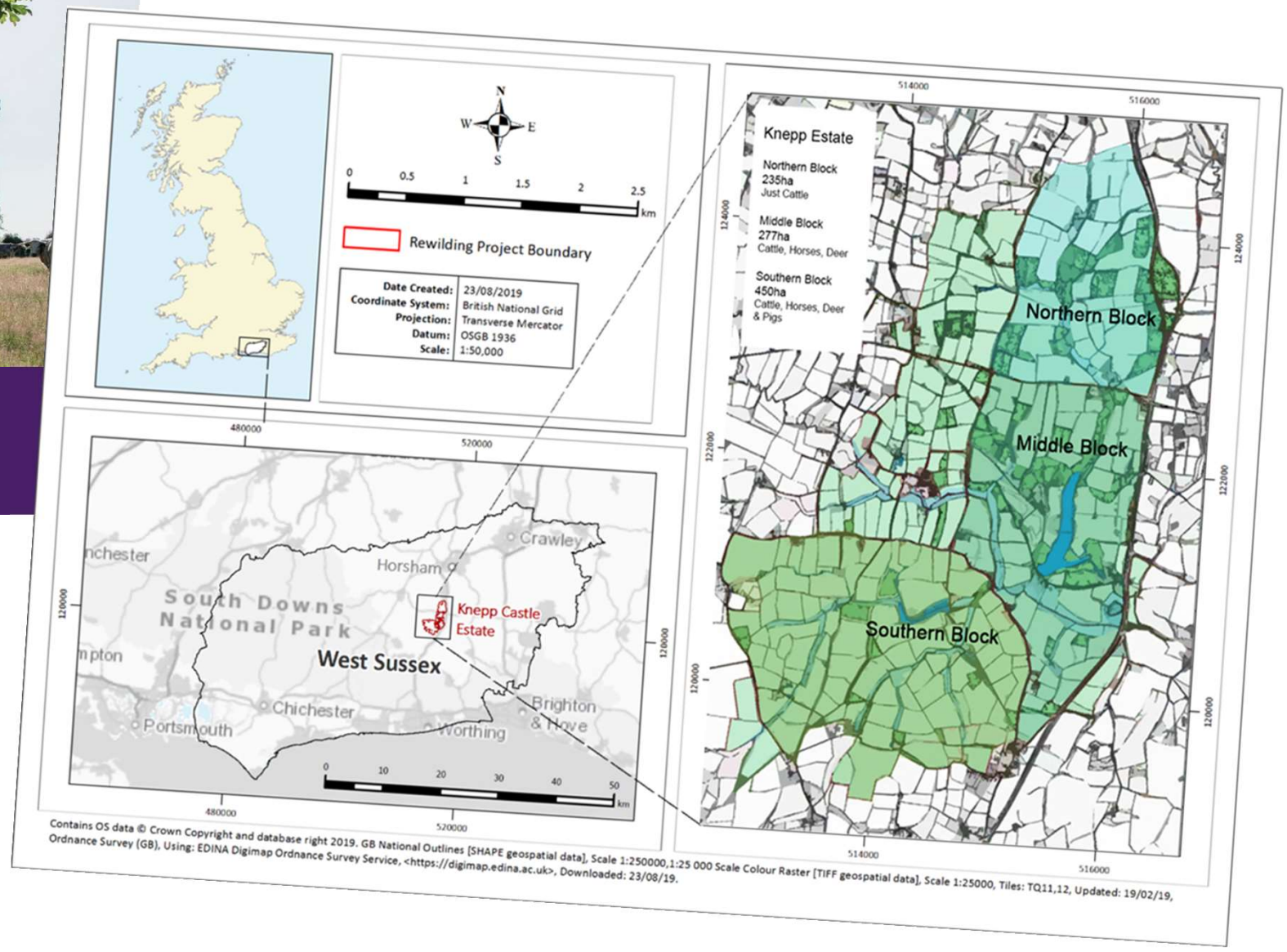
PONC

THE REWILDING SPECTRUM



Adapted from Prof. Sir John Lawton's cartoon by www.rewildingbritain.org.uk/

KNEPP
1,400 ha of low Weald clay



DIG FOR VICTORY: 1941, when these pictures were taken, Knepp's land had mostly reverted to scrub

op. Duke of Gloucester reviews Canadian 3rd Div. 1

Mrs Middlebrook. Selby

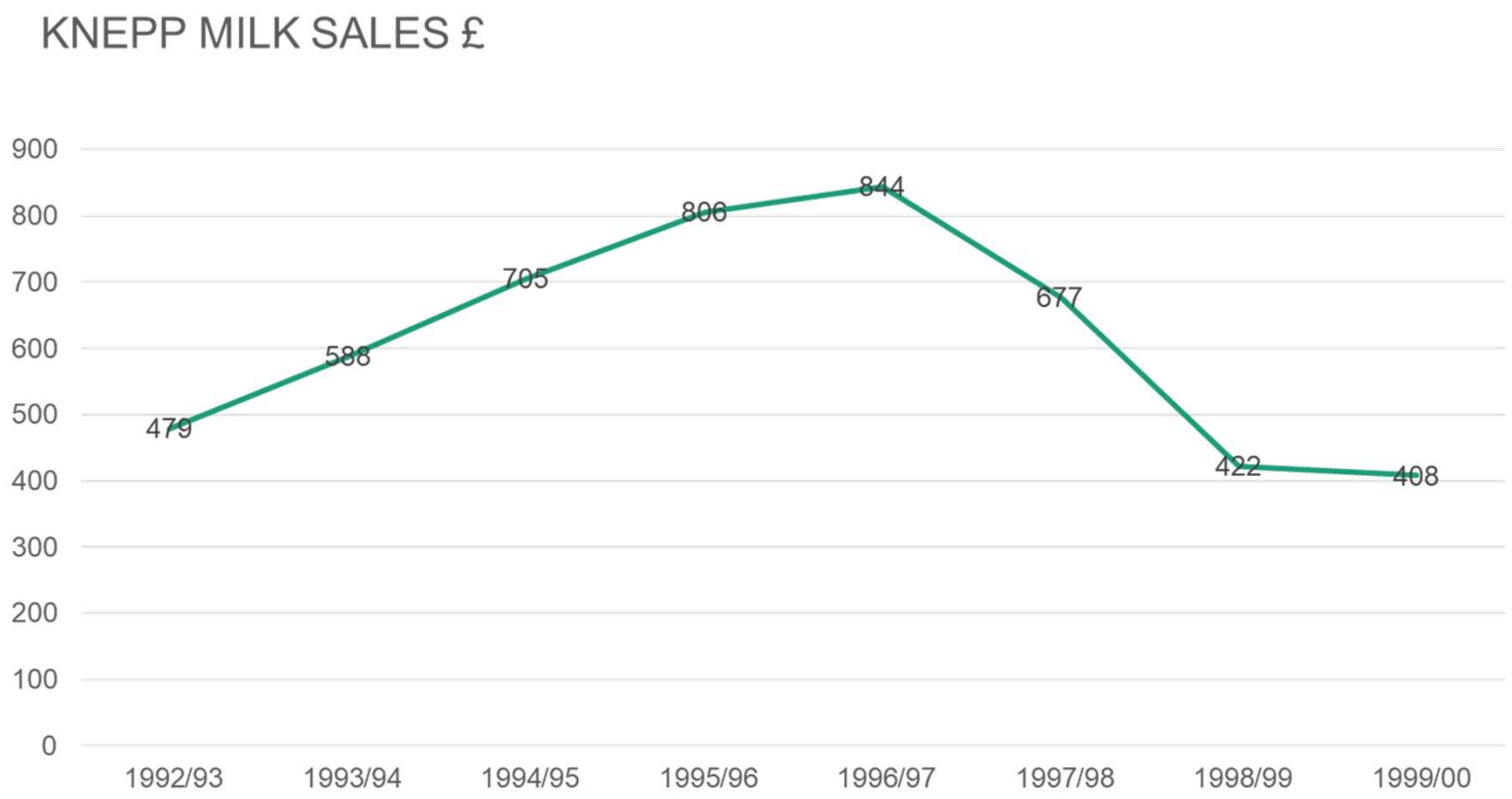
Knapp Prudence 20th Bob Head.

Creeping Baseline Syndrome

Knepps farming enterprise was 1.8 t/ha light of the UK average

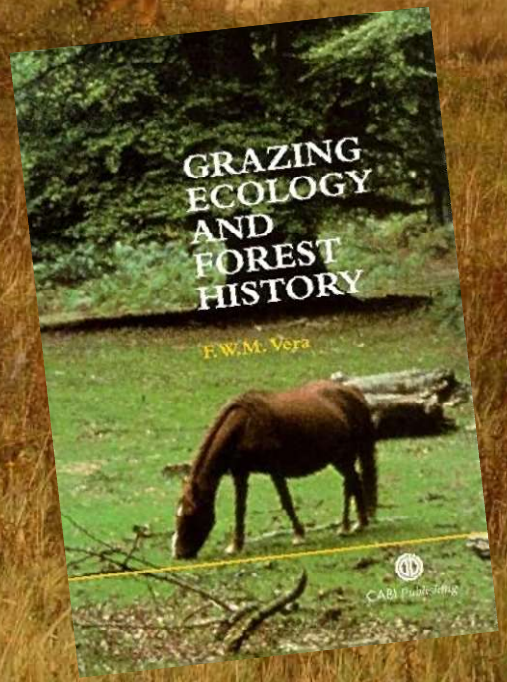
Dairy at the end of the 1990s

- Milk quota looked likely to be abandoned
- Dairy industry looked like it was heading for some pretty big rocks
- Knepp dairies needed further huge investment to keep us competitive
- We were good at producing milk at a low cost but….



Grazing Ecology and Forest History

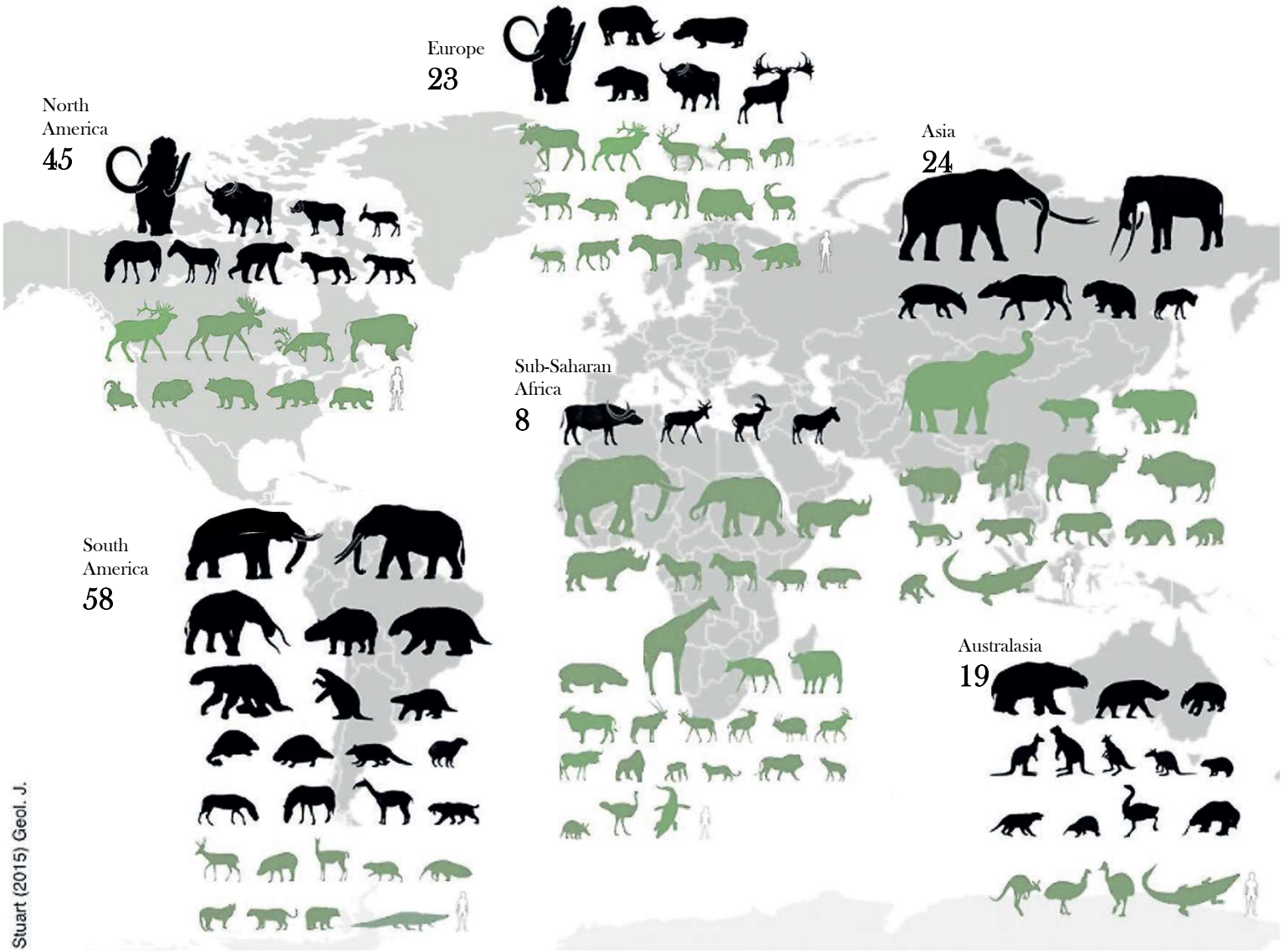
By Frans Vera



Worldwide numbers of mammal megafauna extinctions
(species over 40kg)

during the Pleistocene / Holocene transition.

Extinct animals shown in black

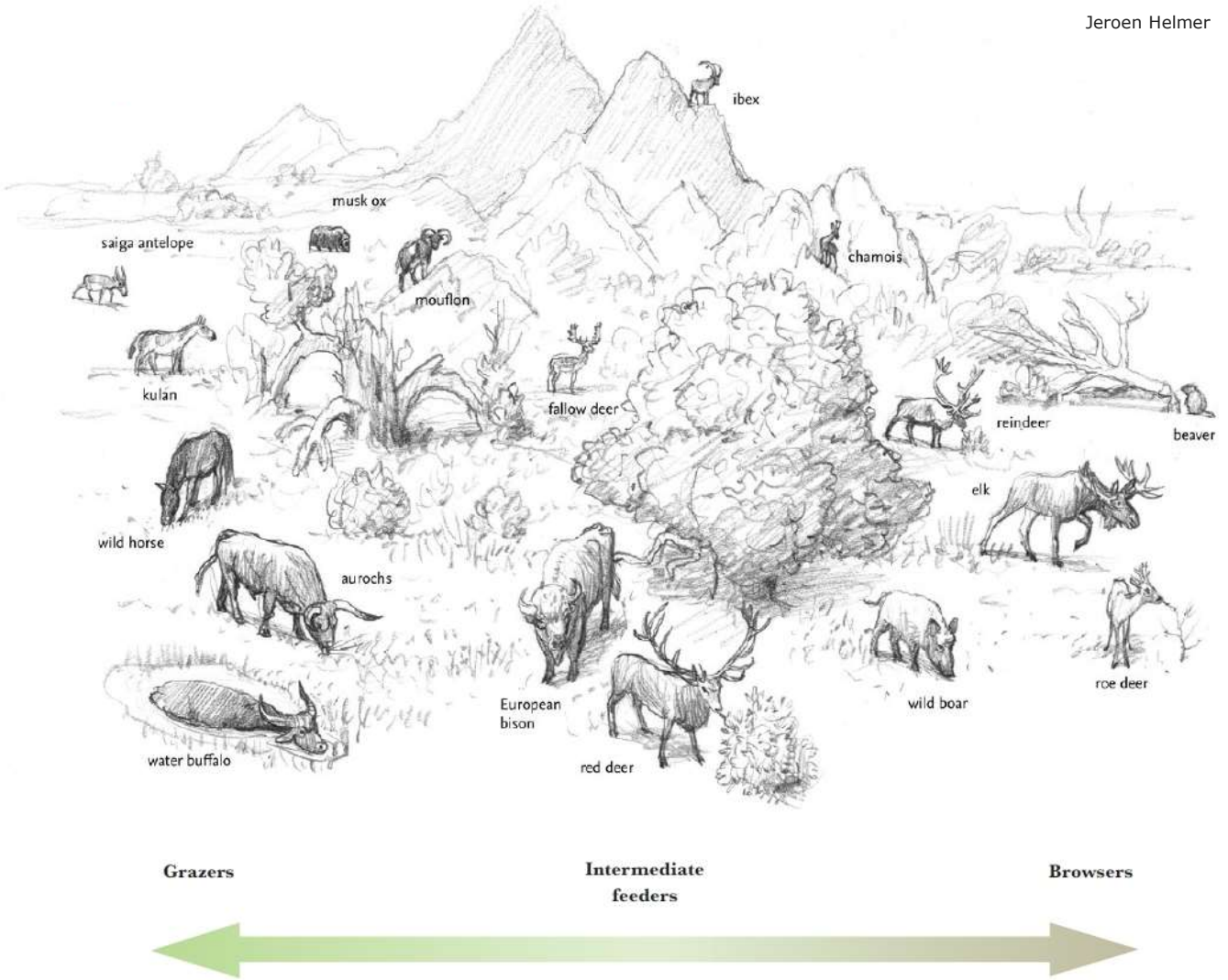


Choosing your herbivore

Temperate Zone Europe

1. saiga antelope
2. kulan
3. musk ox
4. mouflon
5. wild horse
6. aurochs
7. water buffalo
8. European bison (wisent)
9. red deer
10. fallow deer
11. ibex
12. chamois
13. reindeer
14. beaver
15. elk
16. wild boar
17. roe deer

Jeroen Helmer



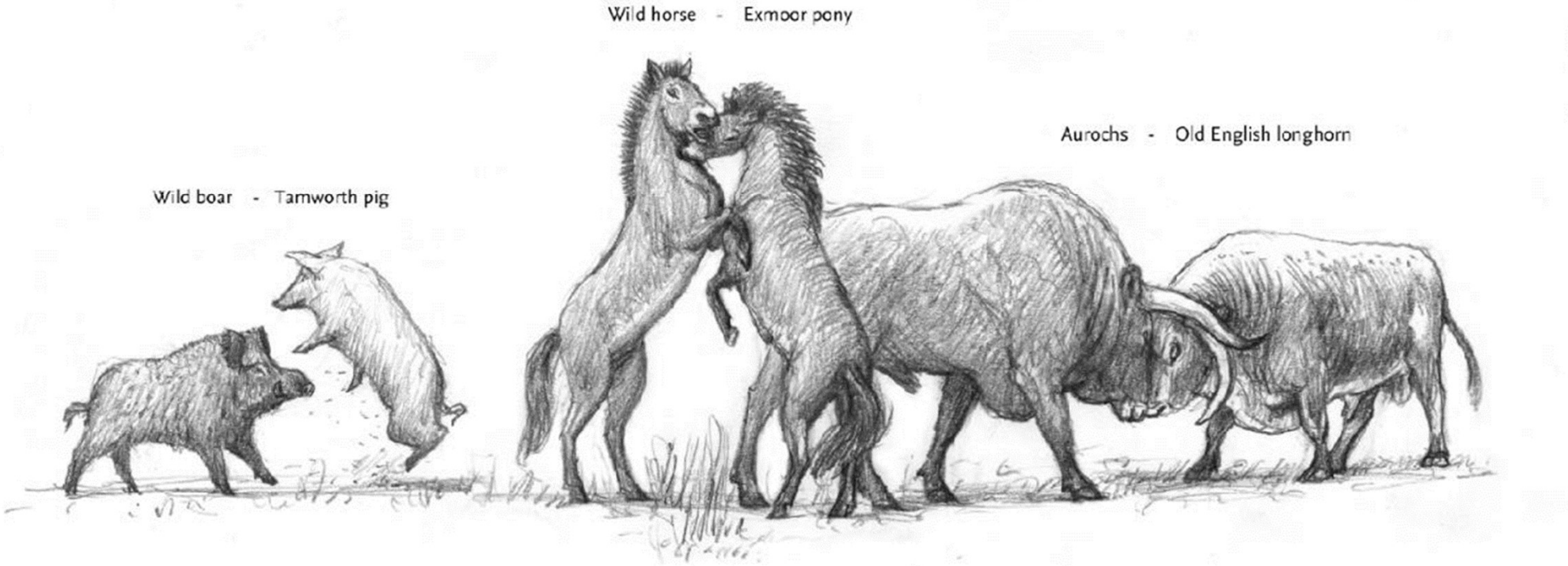
Recent extinction in Europe

1627	**Aurochs**
1790	**Carpathian wisent**
1892	**Portuguese ibex**
1909	**Tarpan**
1900	**Sardinian lynx**
1925	**Caucasian wisent**
1950	**Caucasian Moose**
1927	**Last European Bison in the wild killed**
1969	**Last Przewalski's Horse seen in the wild**
1980	**Majorcan hare**
1970	**Caspian tiger**
2000	**Pyrenean ibex**

We now have to use PROXIES

PROXIES

Jeroen Helmer



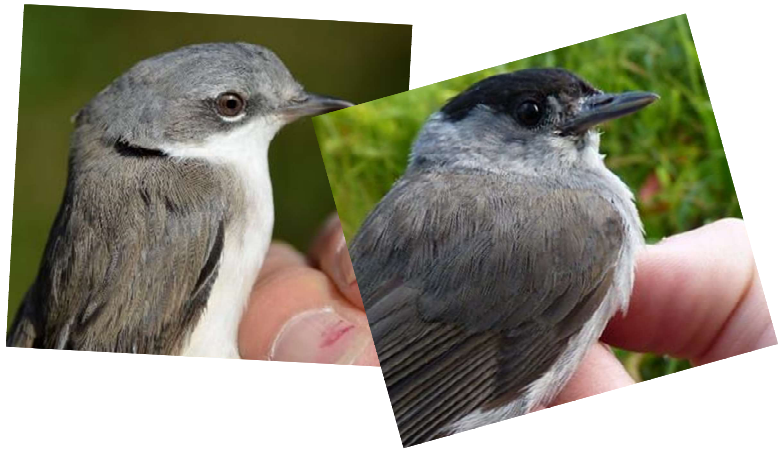


Knepp's DRIVERS



Knepp bird ringing - Sept 2018

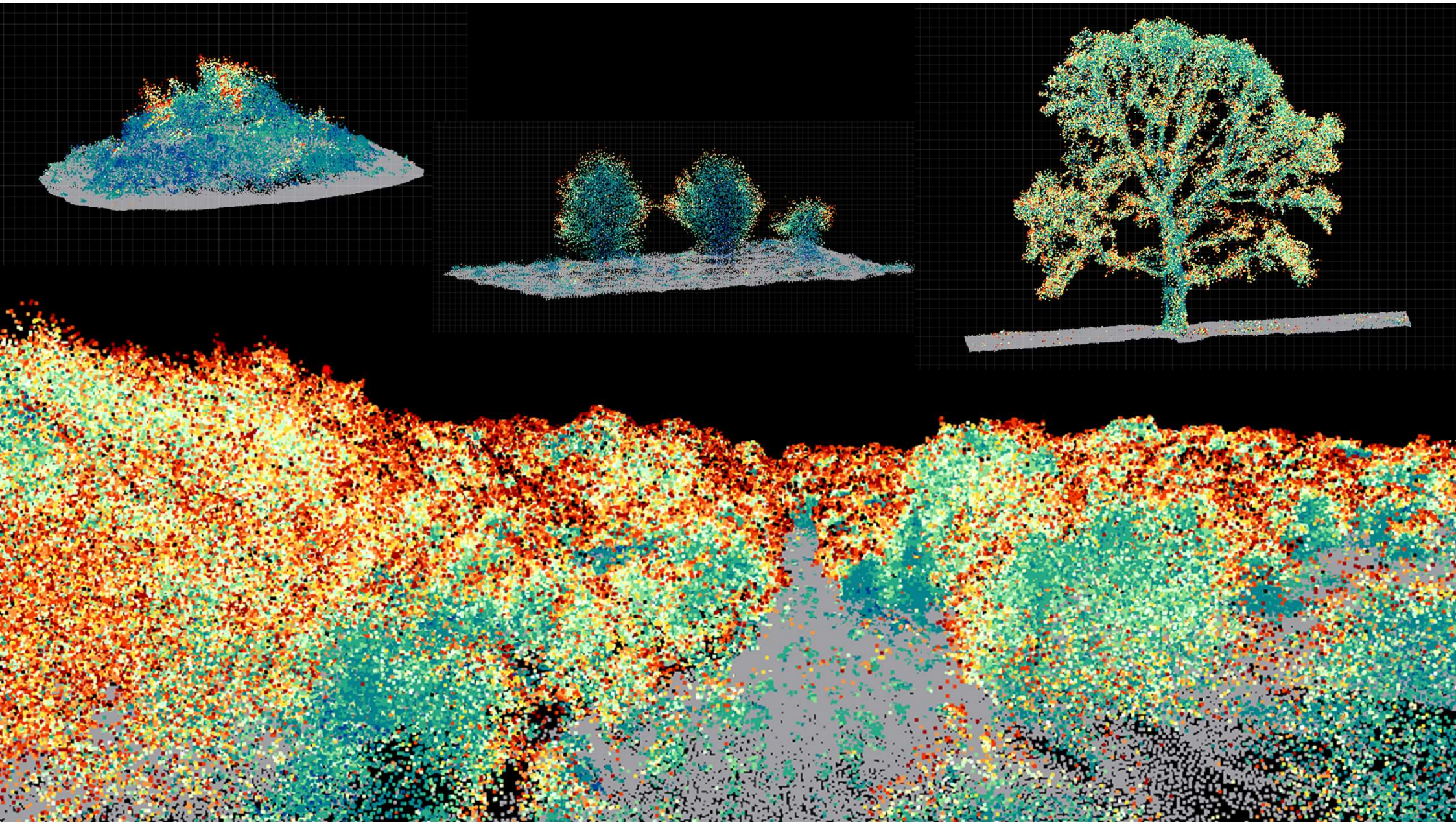
Tony Davis has been ringing birds for 35 years. over a couple of weeks in Sept 2018 … he ringed more lesser whitethroats and black caps ... in two fields, on Knepp … than he has ringed in his entire career …



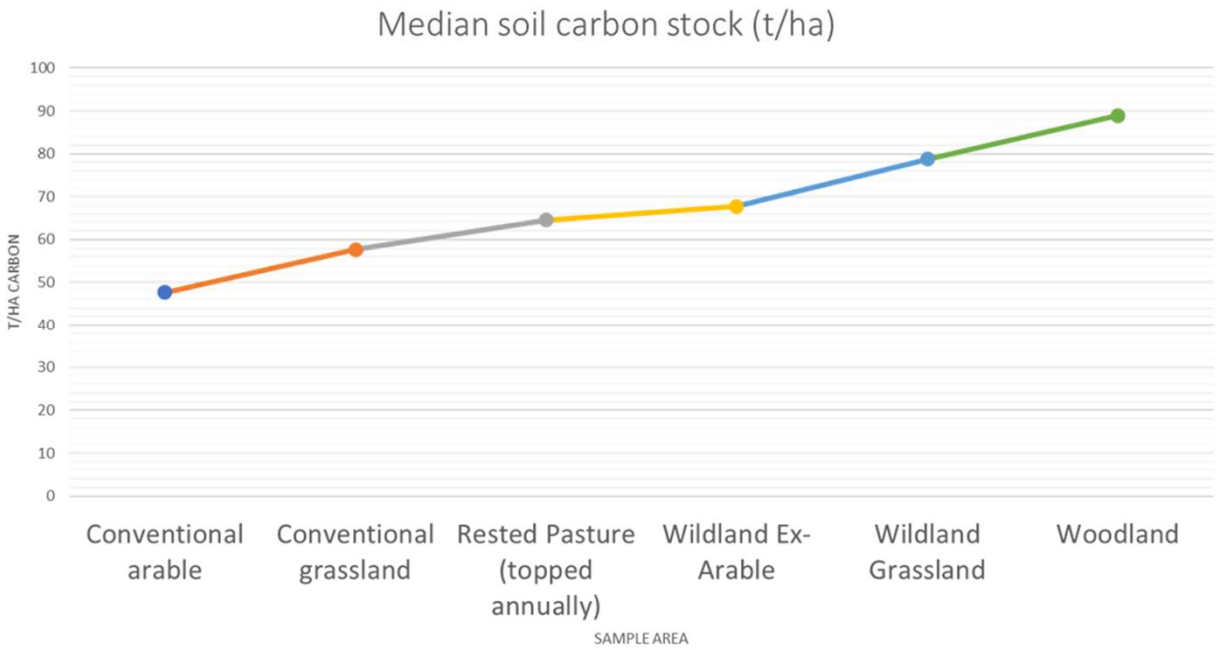
We are working with

Universities of Oxford, Exeter, Cranfield, Nottingham and Queen Mary of London

- Destructive sampling
- Flux towers
- Drone multispectral cameras
- LiDAR point cloud
- Spatial distribution
- Multispectral satellite image
- Capturing vegetation regeneration in 3D



a **NEIRF** funded project – very much preliminary results – but breaking news!



Soil carbon stocks – Knepp Rewilding Project:

0.9 – 1.3 tonnes of carbon / ha / year

or

3.3 – 4.8 tonnes of CO2 / ha / year

in addition to the soil results, Knepp has 37 million m3 increase of above ground vegetation over the 20 years

"It is a remarkable result. I haven't seen such a clear demonstration of soil recovery on anything like this scale, or with this level of evidence to substantiate it, anywhere in the world. Let me know if you find any!"

Annie Leeson Co-Founder and CEO Agricarbon

NATURAL ENVIRONMENT INVESTMENT READINESS FUND

Agricarbon

QUEEN MARY UNIVERSITY OF LONDON

Treeconomy

ARUP

How does rewilding fit into our farmed landscape?

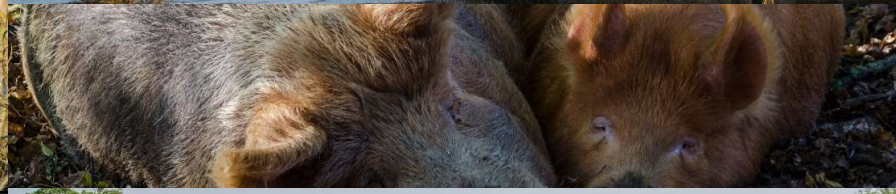


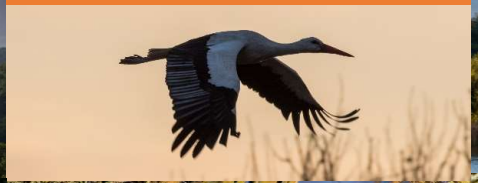









National Food Strategy

An independent review for Government

The Dimbleby report

THE food system we have today is both a miracle and a disaster. Defying Malthusian predictions of mass famine, modern intensive agriculture produces more than enough calories (albeit unevenly distributed) to feed 7.8 billion of us: the biggest global population in human history.[1]

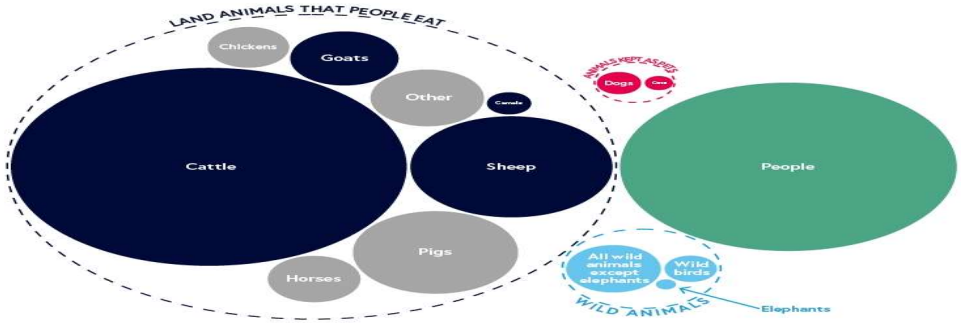
WHY IT MATTERS: GLOBAL IMPACTS

National Food Strategy

The global mass of farm animals is now 22 time heavier than all wild animals combined

LAND ANIMALS BY MASS: 11,000 YEARS AGO

LAND ANIMALS BY MASS: PRESENT



Note: for this visualisation 'animals' refers to terrestrial vertebrates. Terrestrial invertebrates and all life in the oceans are excluded.

SOURCE: National Food Strategy analysis based on: Bar-On, Y. M., Phillips, R., & Milo, R. (2018). The biomass distribution on Earth, Proceedings of the National Academy of Sciences, 115(25), 6506-6511 [online]

The National Food Strategy: The Evidence - July 2021

7

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The National Food Strategy: The Evidence - July 2021

7

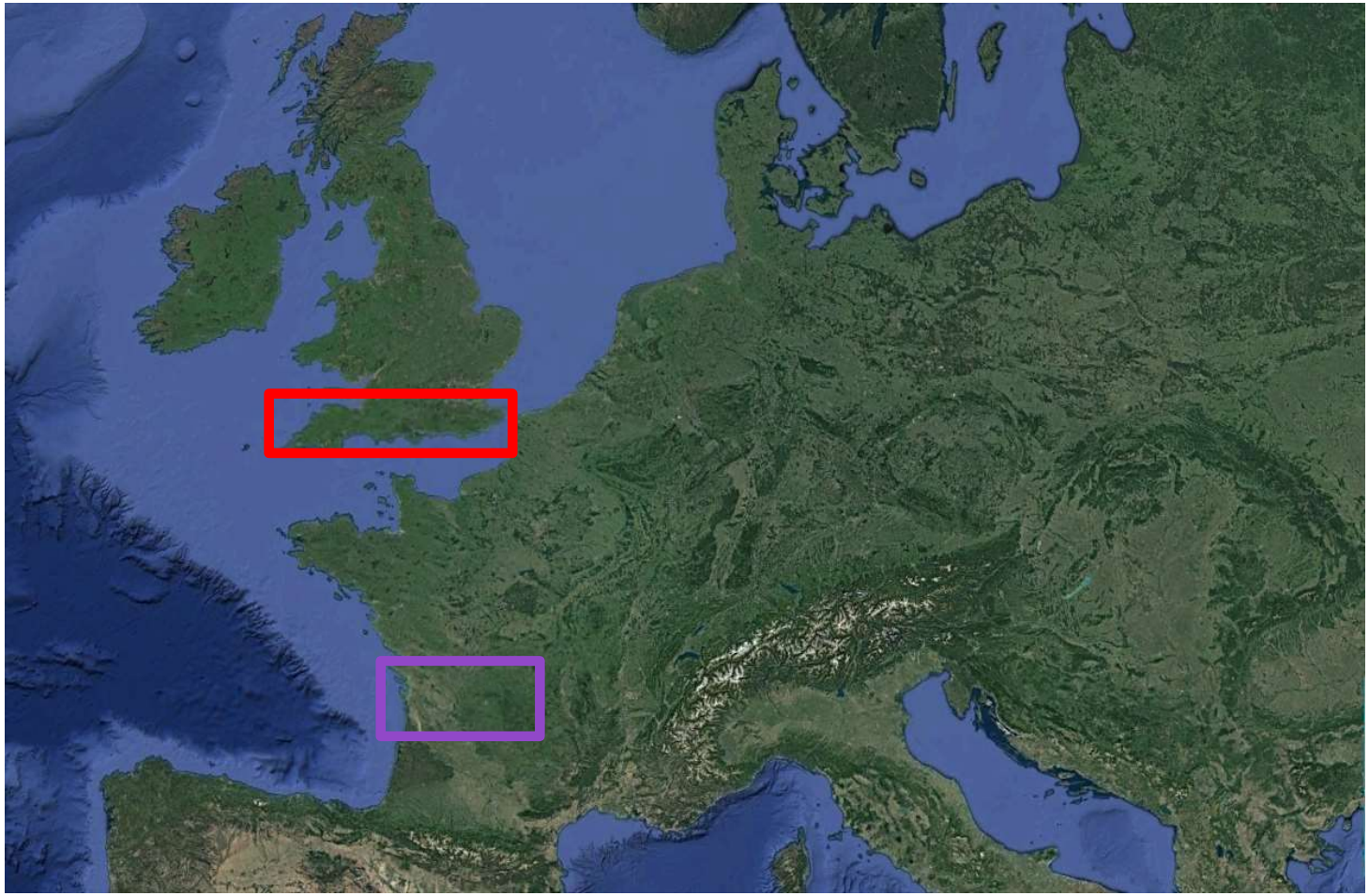

COMPANY

OUR GREEN AND PLEASANT LAND


Jeroen Helmer
jeroen.helmer@ark.eu


Rewilding


Climate Corridors



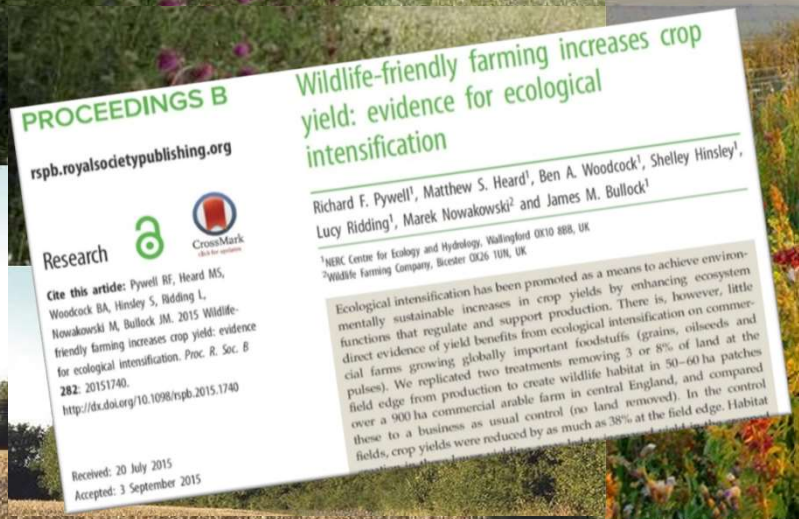

Climate Corridors


Green bridges and hedges – part of the Nature Recovery Network (NRN)

3 nightingale territories in this 170 meter hedge and dormice are back

Farming for nature – nectar margins, sacrificial crops, bare earth strips for bird dusting, reservoirs for insects as pollinators and pest control….

Wildlife-friendly farming increases crop yield: evidence for ecological intensification



PROCEEDINGS B

rspb.royalsocietypublishing.org

Research

Cite this article: Pywell RF, Heard MS, Woodcock BA, Hinsley S, Ridding L, Nowakowski M, Bullock JM. 2015 Wildlife-friendly farming increases crop yield: evidence for ecological intensification. *Proc. R. Soc. B* **282**: 20151740.
http://dx.doi.org/10.1098/rspb.2015.1740

Received: 20 July 2015
Accepted: 3 September 2015

Wildlife-friendly farming increases crop yield: evidence for ecological intensification

Richard F. Pywell[1], Matthew S. Heard[1], Ben A. Woodcock[1], Shelley Hinsley[1], Lucy Ridding[1], Marek Nowakowski[2] and James M. Bullock[1]

[1]NERC Centre for Ecology and Hydrology, Wallingford OX10 8BB, UK
[2]Wildlife Farming Company, Bicester OX26 1UN, UK

Ecological intensification has been promoted as a means to achieve environmentally sustainable increases in crop yields by enhancing ecosystem functions that regulate and support production. There is, however, little direct evidence of yield benefits from ecological intensification on commercial farms growing globally important foodstuffs (grains, oilseeds and pulses). We replicated two treatments removing 3 or 8% of land at the field edge from production to create wildlife habitat in 50–60 ha patches over a 900 ha commercial arable farm in central England, and compared these to a business as usual control (no land removed). In the control fields, crop yields were reduced by as much as 38% at the field edge. Habitat

"…yields at the field scale were maintained—and, indeed, enhanced for some crops—despite the loss of cropland for habitat creation."


Regenerative farming, conservation farming….


"A SAND COUNTY ALMANAC OF AGRICULTURE, A WALDEN POND OF LOAM AND TILTH."
—PAUL HAWKEN, AUTHOR OF THE ECOLOGY OF COMMERCE
GROWING A REVOLUTION
BRINGING OUR SOIL BACK TO LIFE
DAVID R. MONTGOMERY
Dirt to Soil
One Family's Journey into Regenerative Agriculture
Gabe Brown
Third Edition
HOLISTIC MANAGEMENT
A COMMONSENSE REVOLUTION TO RESTORE OUR ENVIRONMENT
Groundswell
Allan Savory
with Jody Butterfield
THE SOIL FOOD WEB
Joel Salatin
Folks, this ain't normal
CALL OF THE REED WARBLER
A NEW AGRICULTURE
A NEW EARTH
CHARLES MASSY


Treescapes of the future – Natural colonization

Natural regeneration promotes genetic adaptation

Joan Cottrell

The Government has ambitious plans to increase woodland cover in the UK and this involves important decisions on preferred species of trees and shrubs, how new trees are established (via natural regeneration or planting), and what land can be used for this expansion. The familiar mantra 'the right tree in the right place' is an acknowledgement that species are adapted to grow in particular conditions. Depending on management objectives, natural regeneration is one means of promoting well-adapted and resilient woodland expansion.

Joan Cottrell is the science group leader for the Gene, Species and Habitat Conservation Programme at Forest Research.

A tree species is not a single entity as populations differ depending on where in the distribution range they come from. A population of a given species is, therefore, adapted to the conditions in which it grows. This aspect of diversity – within-species diversity – needs to be considered when deciding what plant material to use to extend existing woodlands or establish new ones. Poor understanding of within-species diversity can lead to inappropriate choice of material when planting woodlands. One option is to promote natural regeneration to extend our existing woodlands, which removes the need to choose what material to plant and harnesses natural processes to determine what survives on a given site.

It is vital that we recognise, understand, and conserve the within-species component of diversity. We need to consider three key processes that allow individual trees and tree populations to survive and adapt to current and future conditions.

1. Phenotypic plasticity

Phenotypic plasticity represents the process whereby a tree can alter many of its traits in response to the environment in which it is growing. For example, during particularly dry seasons, trees alter the structure of their leaves and tend to produce smaller leaves in which the stomata (pores) are reduced in size and are more densely arranged. This provides a means whereby the individual tree can maximise its ability to manufacture photosynthates during optimal years but can alter its structure in order to conserve more water when conditions are particularly dry. This process will assist existing individuals to respond to the drier environment predicted in the future and increase their chances of survival. However, an individual's phenotypic plasticity is finite and if conditions exceed the plastic limits of the individual, it will die.

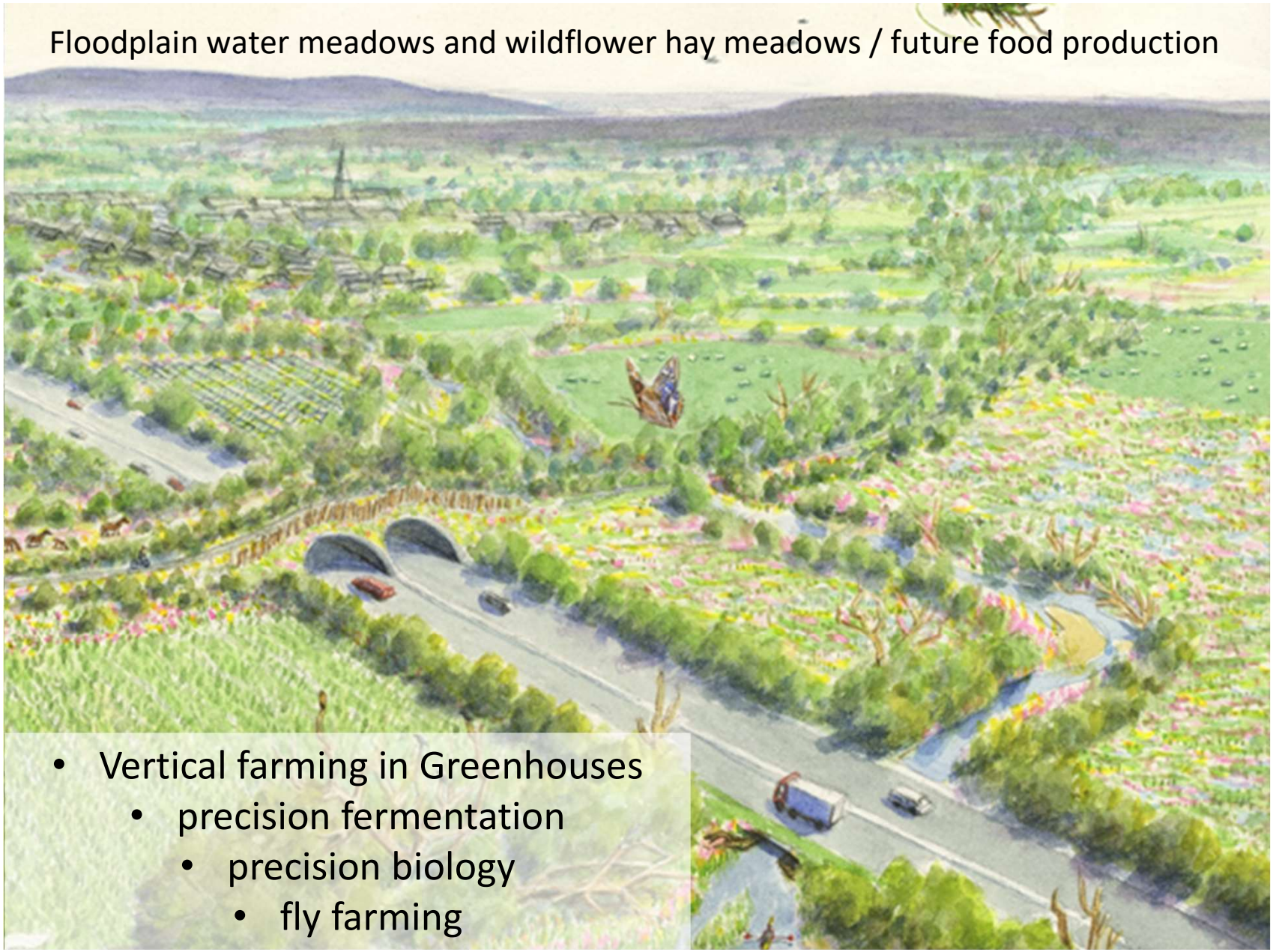
2. Genetic diversity and genetic adaptation

Tree populations are known to contain high levels of genetic diversity which provides the raw material for genetic adaptation. Several characteristics of trees promote the maintenance of high levels of genetic diversity. These include prolific and frequent production of flowers so that the seed crop of a single tree can be the product of a multitude of fathers, growing both in the immediate neighbourhood as well as a considerable distance away. Trees also tend to be intolerant of self-pollination so that outbreeding predominates. The flowers and the seed are held high above the ground so that pollen and seed are favourably positioned for long-distance dispersal to sites which may experience very different environmental conditions from those of the mother tree.

The genetic diversity present in a population is shaped by the mixing caused by this local and long-distance geneflow. The population is replenished with a continuous supply of genetic material adapted to a range of conditions. This ensures that genetic diversity is maintained at a high level and adaptive variation from elsewhere is continually

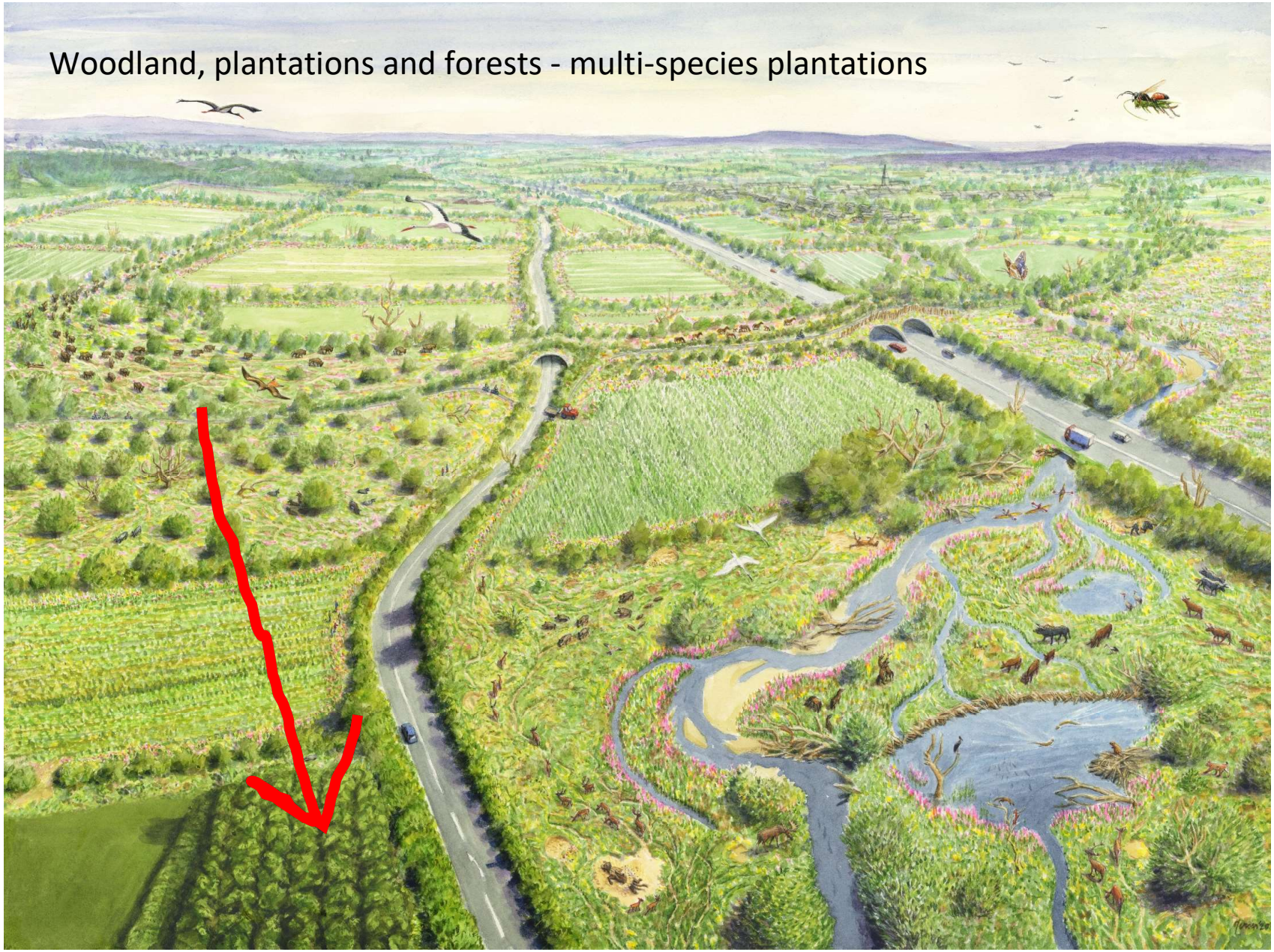

Restoration of wetlands

Floodplain water meadows and wildflower hay meadows / future food production

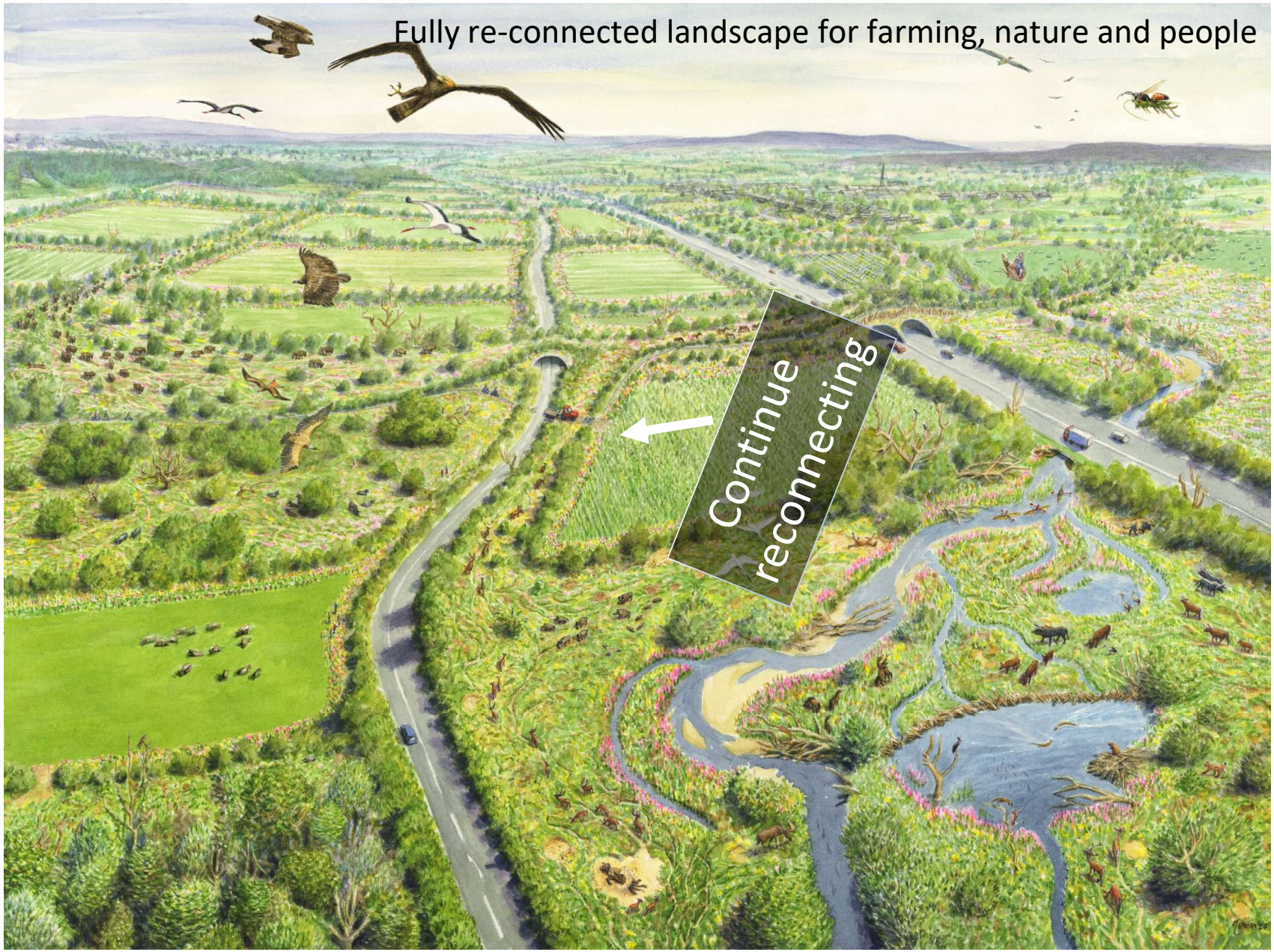


- Vertical farming in Greenhouses
  - precision fermentation
    - precision biology
      - fly farming

Woodland, plantations and forests - multi-species plantations



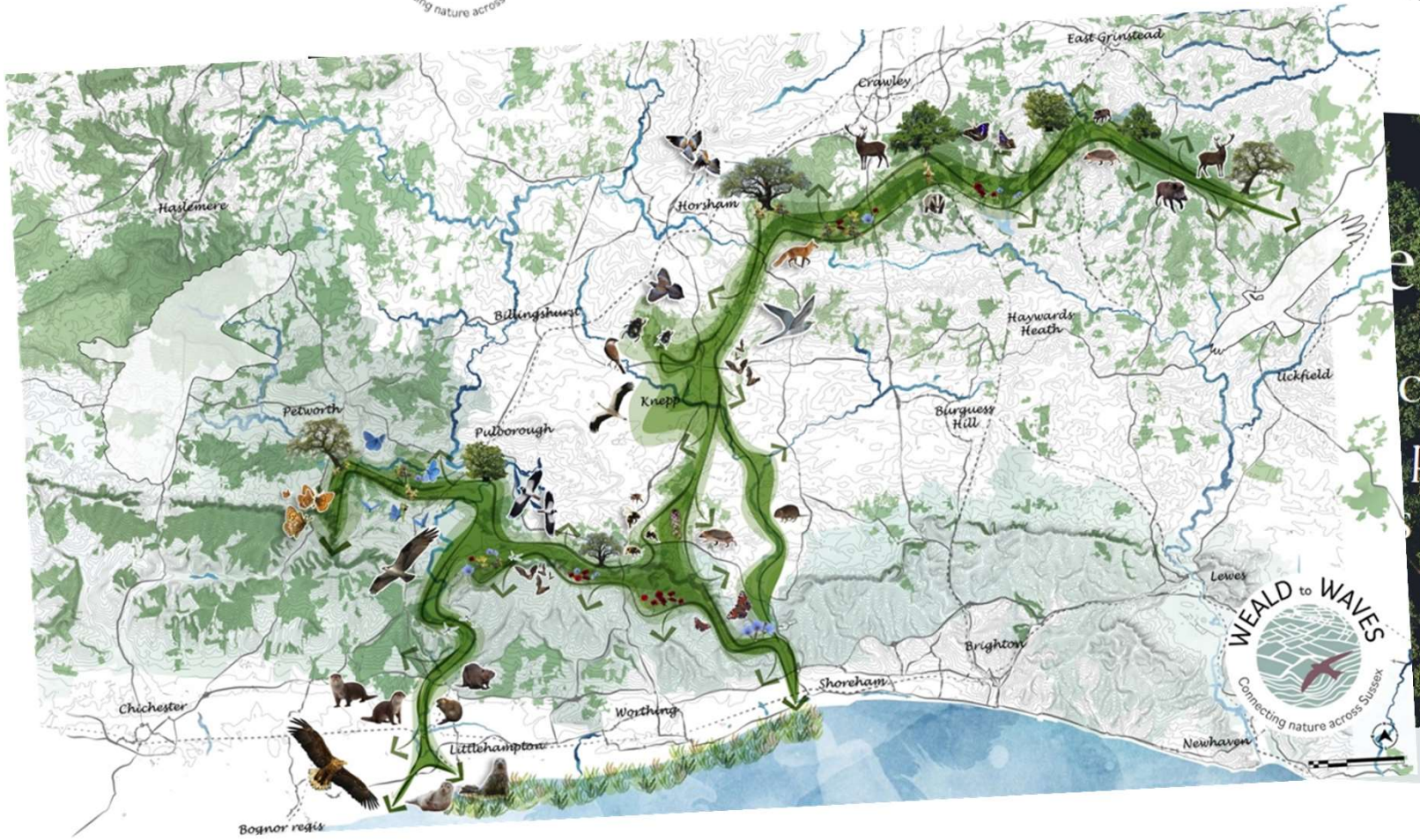
Multi-species plantations


Fully re-connected landscape for farming, nature and people
Continue reconnecting

W2W

WEALD to WAVES
Connecting nature across Sussex

OUR MISSION THE WIDER WORK WHO'S INVOLVED? GET IN TOUCH Join the corridor




MONEY

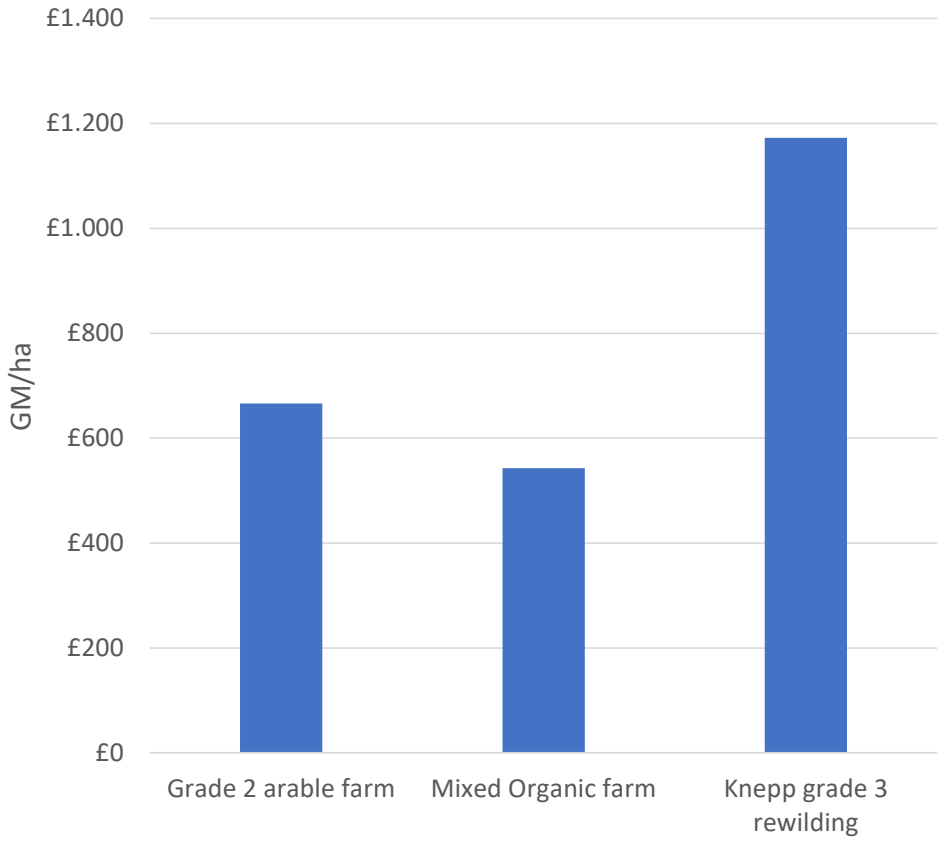
Knepp

Rewilding Knepp turnover 2020/21
a **partial budget** on the Home Farm

Savills 2020 Gross Margin figures

Grade 2 arable farm	£666 GM/ ha
Mixed Organic farm	£543 GM/ha
Knepp grade 3 rewilding	£1,173 GM/ha

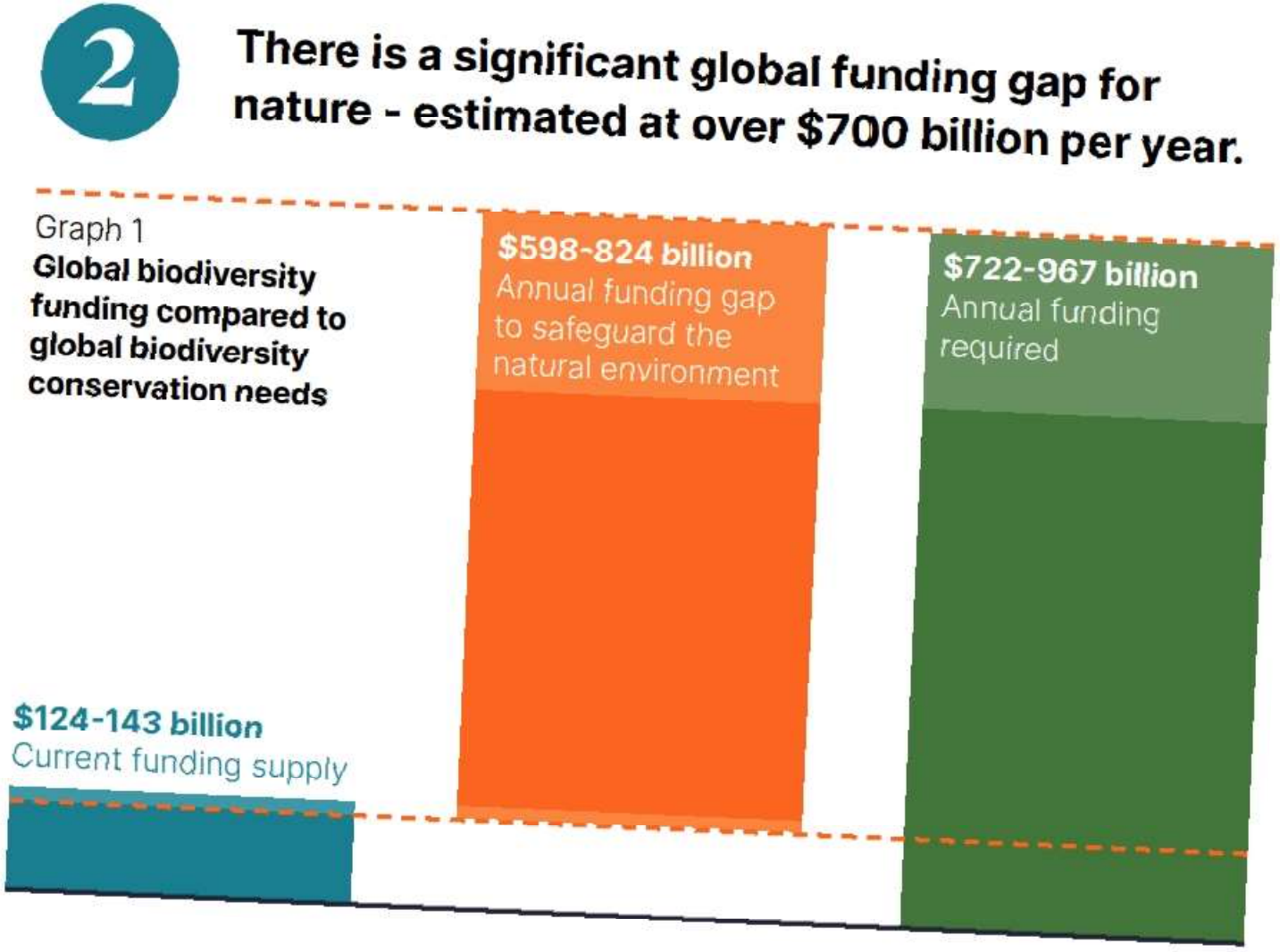
Knepp has gone from employing 23 FTE to 50 FTE



World

Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Centre for Sustainability at Cornell University

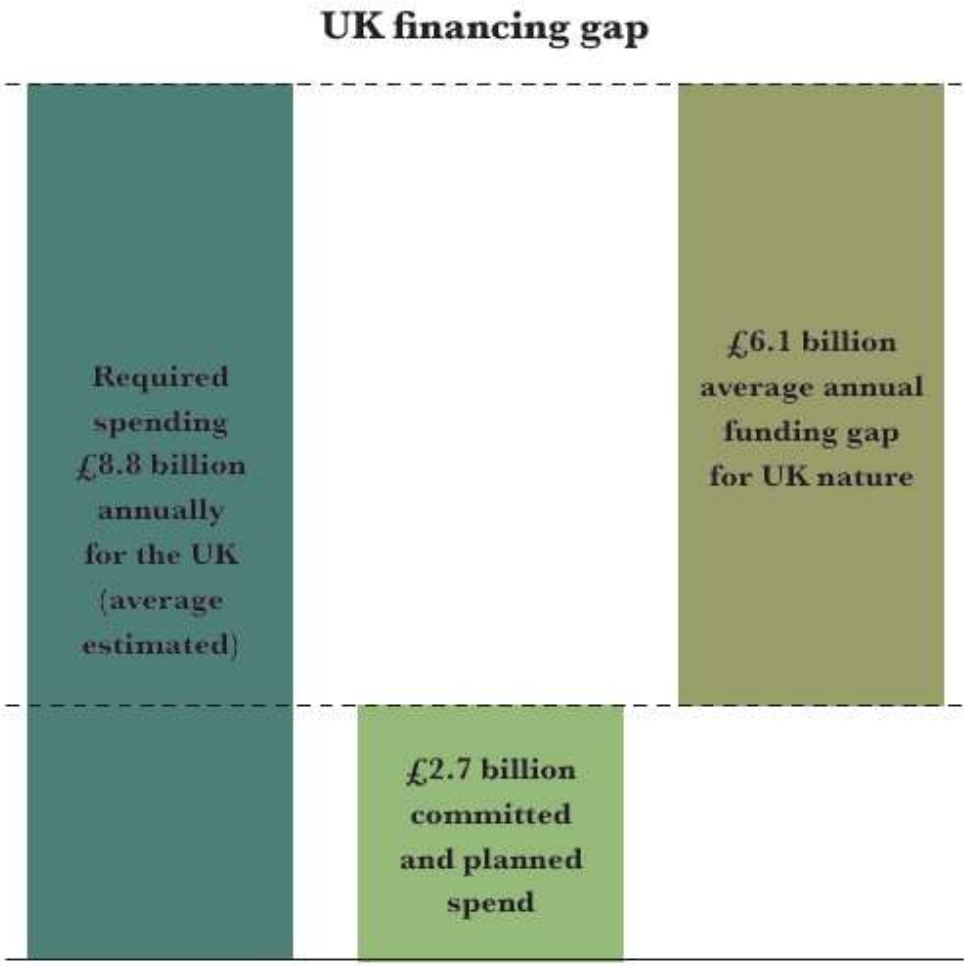
"*To reverse the decline in biodiversity by 2030, our analysis suggests that, globally, we need to spend between US$ 722-967 billion each year over the next ten years. That puts the biodiversity financing gap at an average US$ 711 billion or between US$ 598-824 billion per year.*"



www.finance.earth/wp-content/uploads/2021/05/Finance-Earth-GPC-Market-Review-of-NbS-Infographic-May-2021.pdf

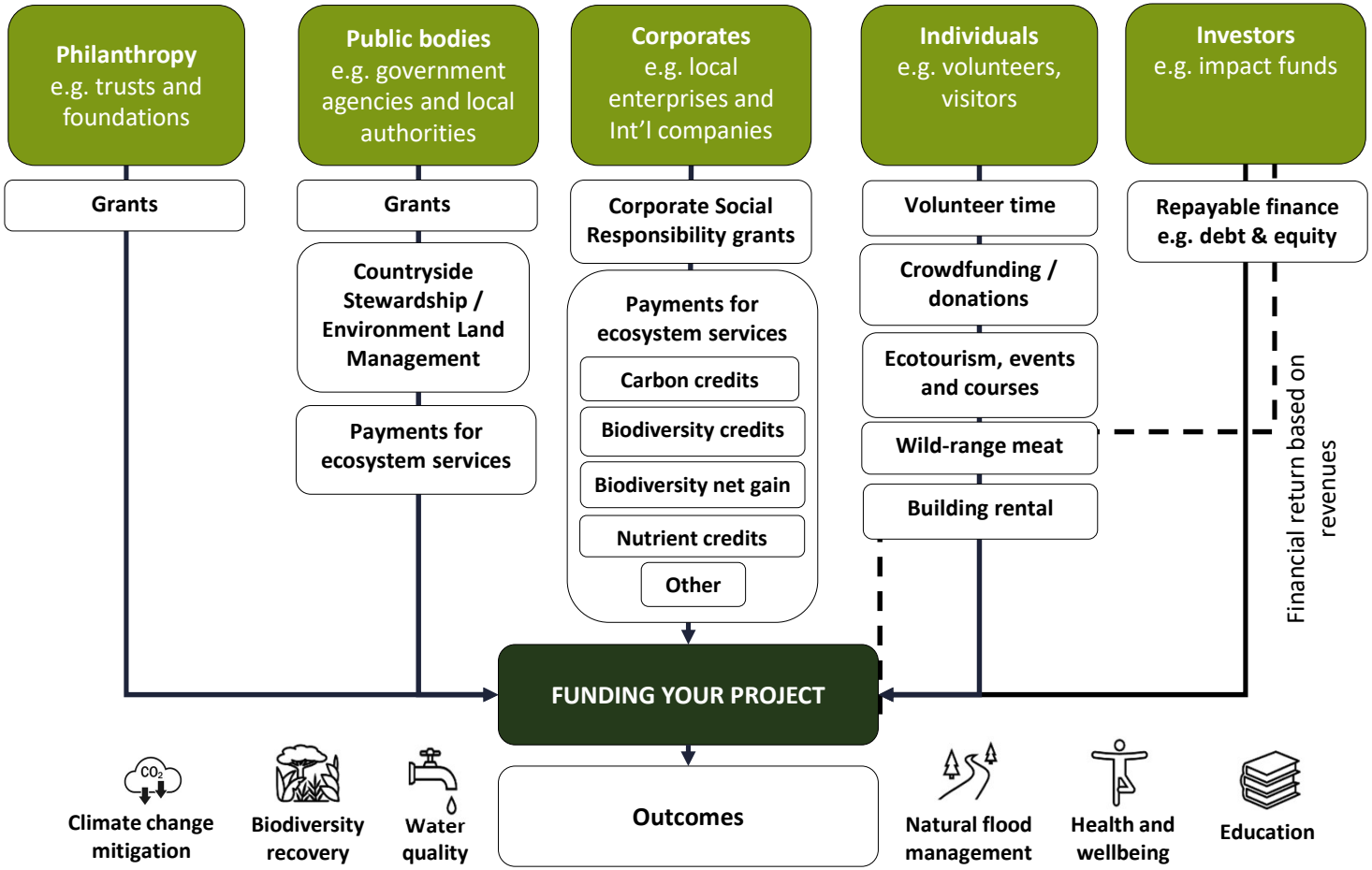
UK

Approximately £8.8 billion of annual investment is required to safeguard the natural environment in the UK but current planned and committed spending from the public sector is only around £2.7 billion, leaving £6.1 billion left to find every year. The private sector has an important role to play in filling this funding gap.



England

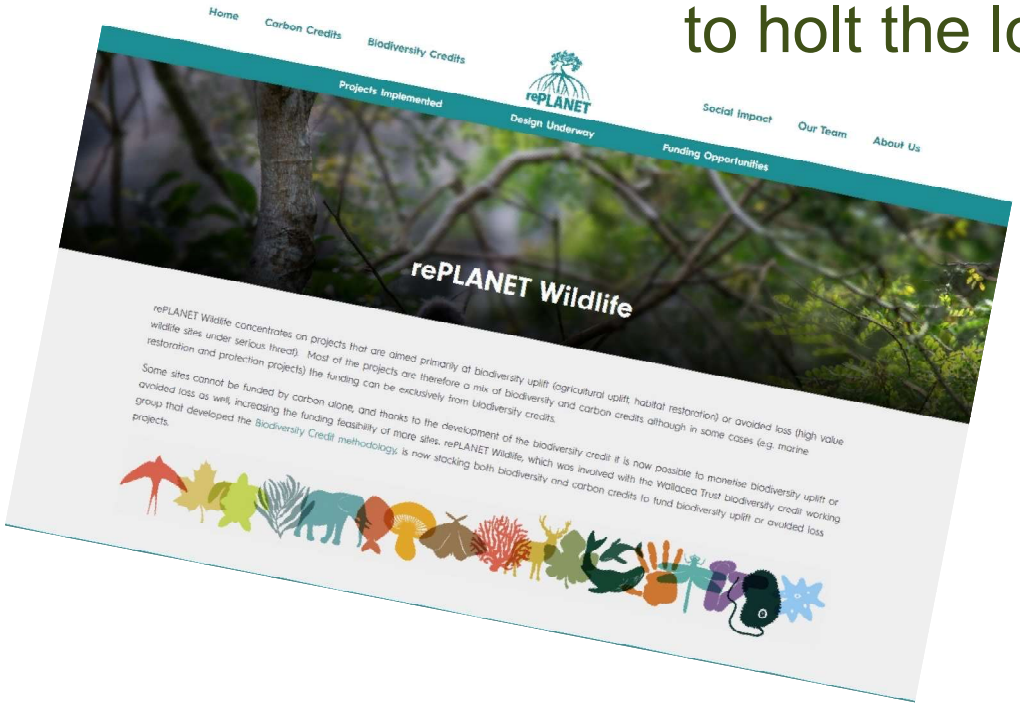
Funding your rewilding project



Commissioned from Alicia Gibson and Sarah Darrah

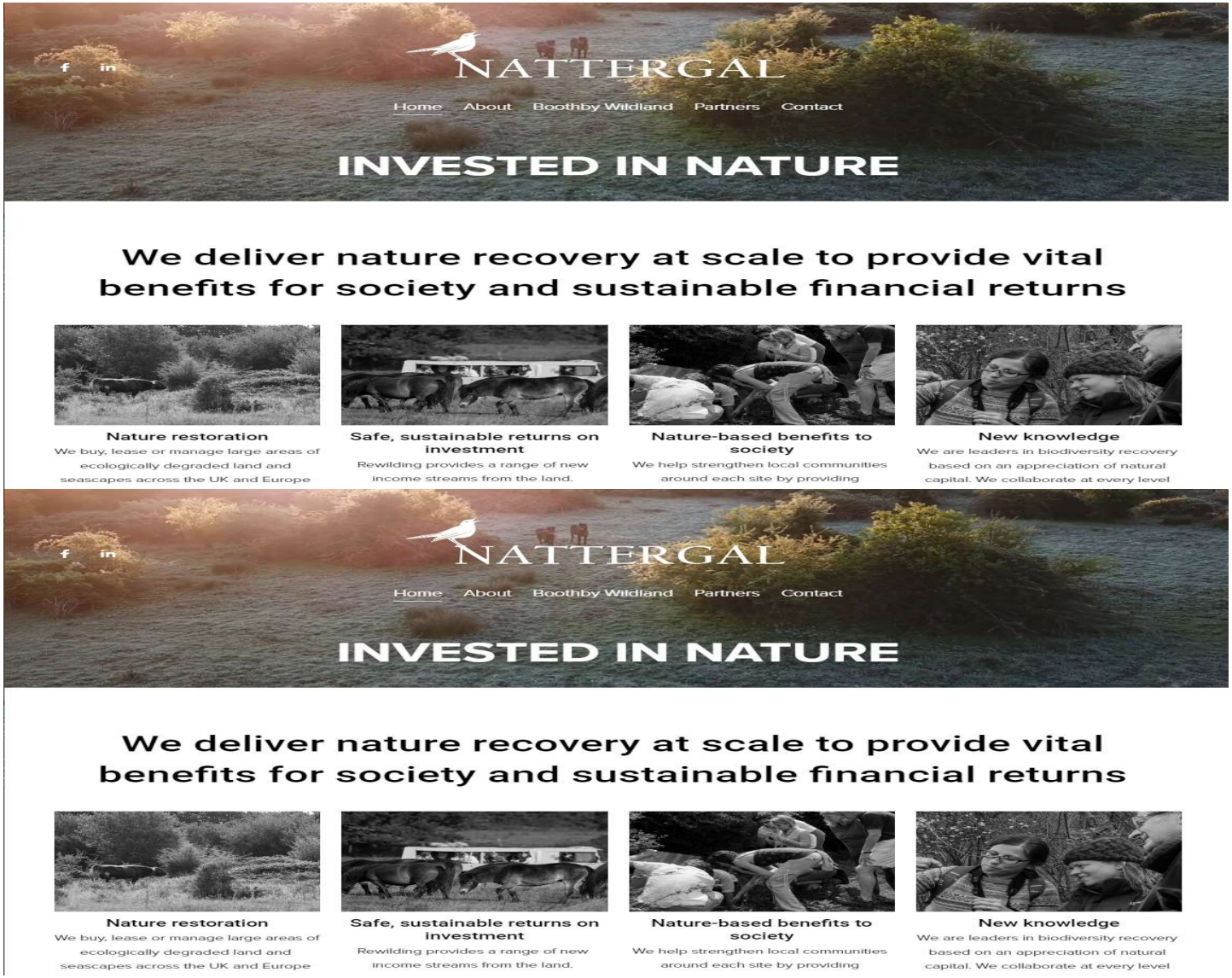
finance earth

How do we raise the estimated $700 billion a year to holt the loss of nature?

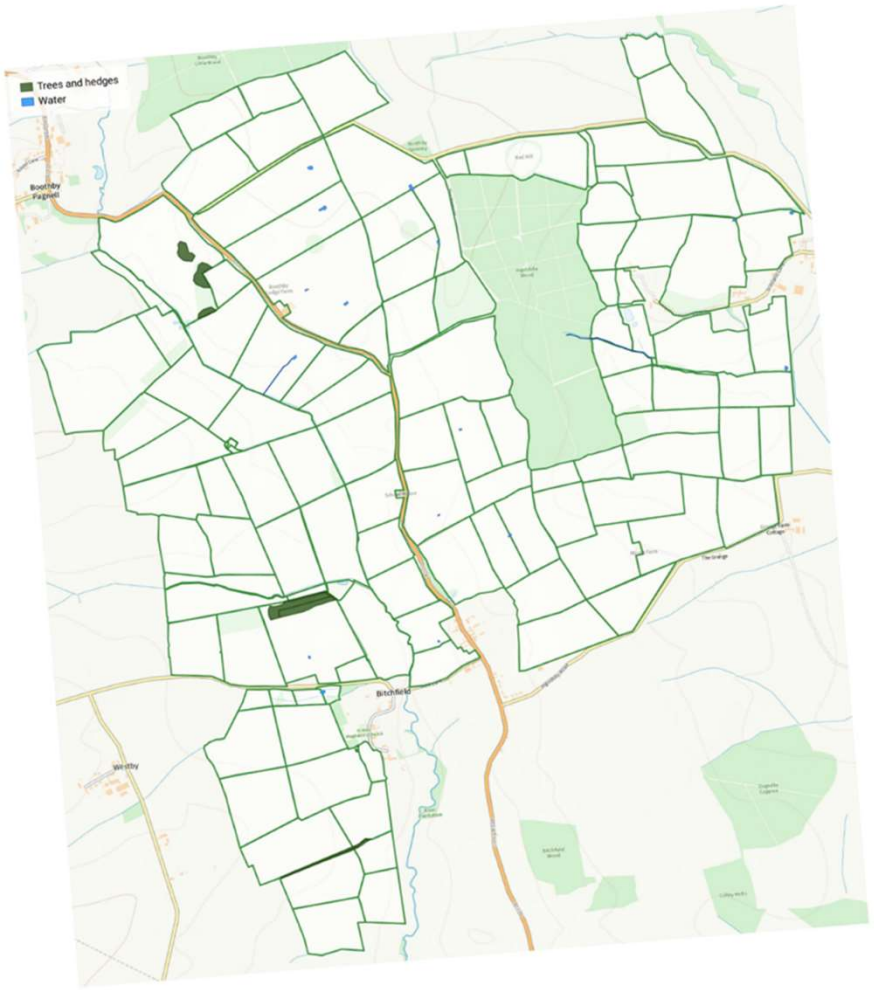


Nattergal

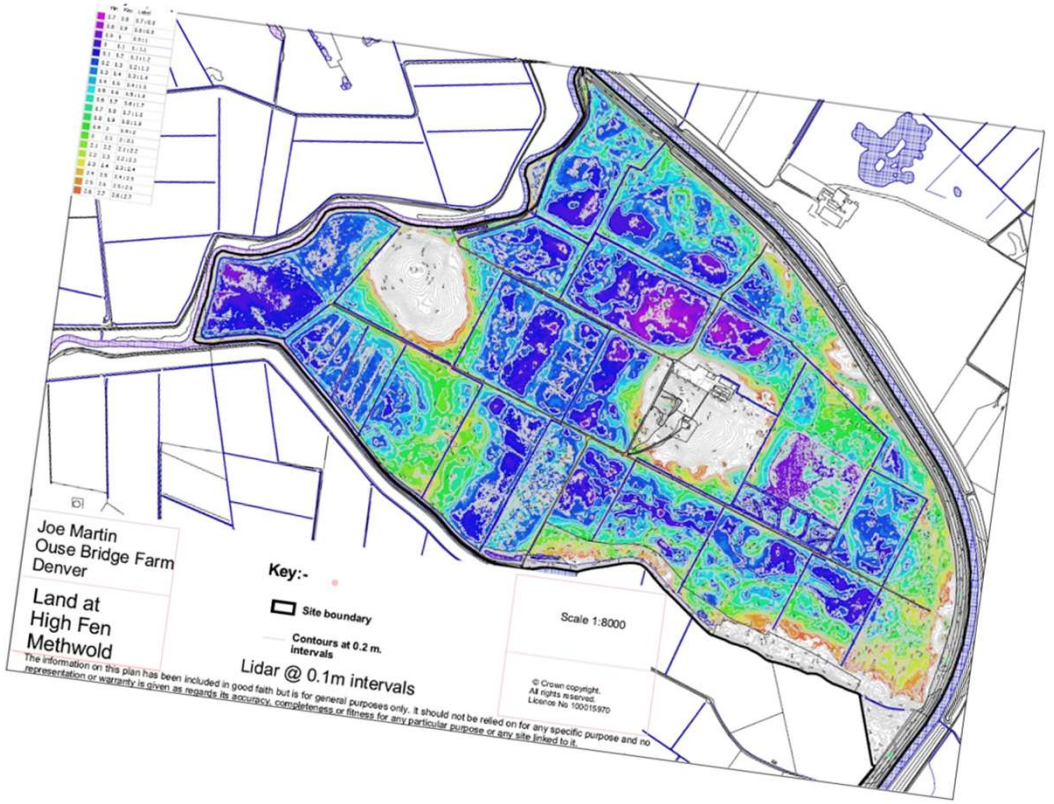
- Dec 2021
- 2 properties purchased so far
- Looking to expand into Europe in phase 2



Nattergal



Boothby, Lincolnshire - 607 ha



High Fen, Norfolk - 294 ha

Nattergal – Lincolnshire - Boothby

- Purchased 2022
- 617 ha (93% ploughed)
- Contract farmed (1.2 FTE)
- Landscape Recovery – awarded £280k

RePLANET Wildlife

- Biodiversity and Carbon Credits
  - Avoidance of loss
  - Uplift

Home Carbon Credits Biodiversity Credits rePLANET Social Impact Our Team About Us

Projects Implemented Design Underway Funding Opportunities

Methodology for awarding biodiversity credit

Biodiversity quantification approach dev
Wallacea Trust working group

Version 1.5

10 February 2022

1

Watch Dr Tim Coles' Talk from COP27

Operation Wallacea
1.26K subscribers
SUBSCRIBE

Watch Later Share

Scientific rigour

- Independent international group of academics being formed by multiple universities and funded by NERC and ESRC in the UK to develop a peer review group of academics for biodiversity credit applications
- This Technical Advisory group can provide independent advice to certification bodies on whether the metrics selected reflect the conservation objectives for the submitted site and that stratified random sampling has been used to construct the survey programme with sufficient replicates.
- The TAG can audit the biodiversity data sets when submitted by selecting sample sof digital data to copare against results submitted, checking quality standards of metabarcoding labs, randomly checking samples used or photographs submitted and checking the qualifications and experience of the surveyors
- Provides same role as the Netherlands Environmental Assessment Agency does for EIA's – assesses scientific rigour.

Dr Tim Coles, OBE
CEO, rePLANET
tim.coles@replanet.org.uk

MORE VIDEOS

replanet.org.uk

6:45 / 32:01

YouTube

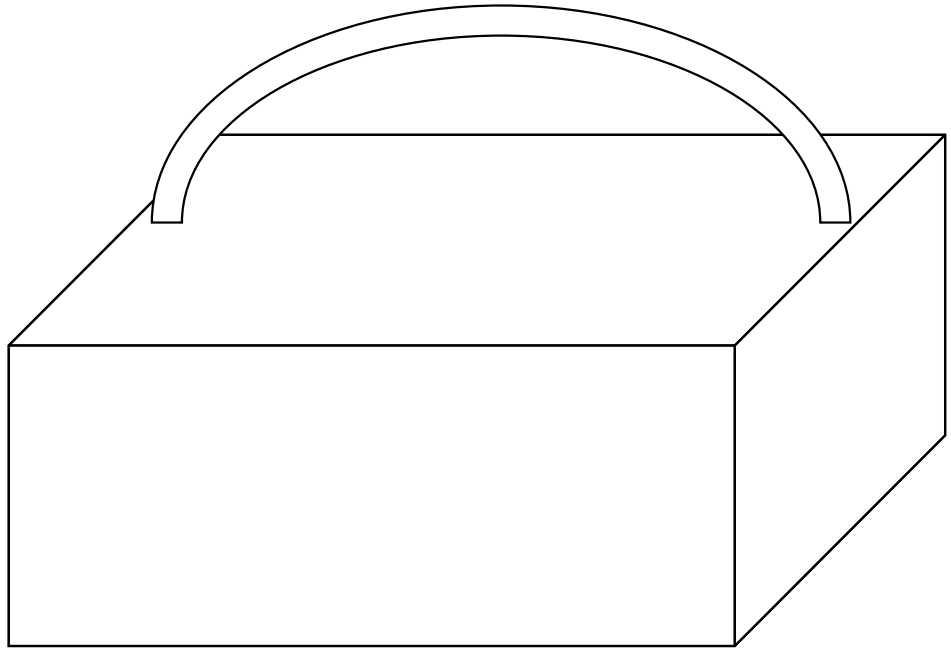
How does the biodiversity credit work?

The solution to the problem was inspired by the Consumer Price Index (CPI)

Species richness and abundance of pollinator bees and hoverflies

DEFRA biodiversity metric 3.1 to measure uplift in habitats

Changes in butterfly and macro-moth species richness and abundance



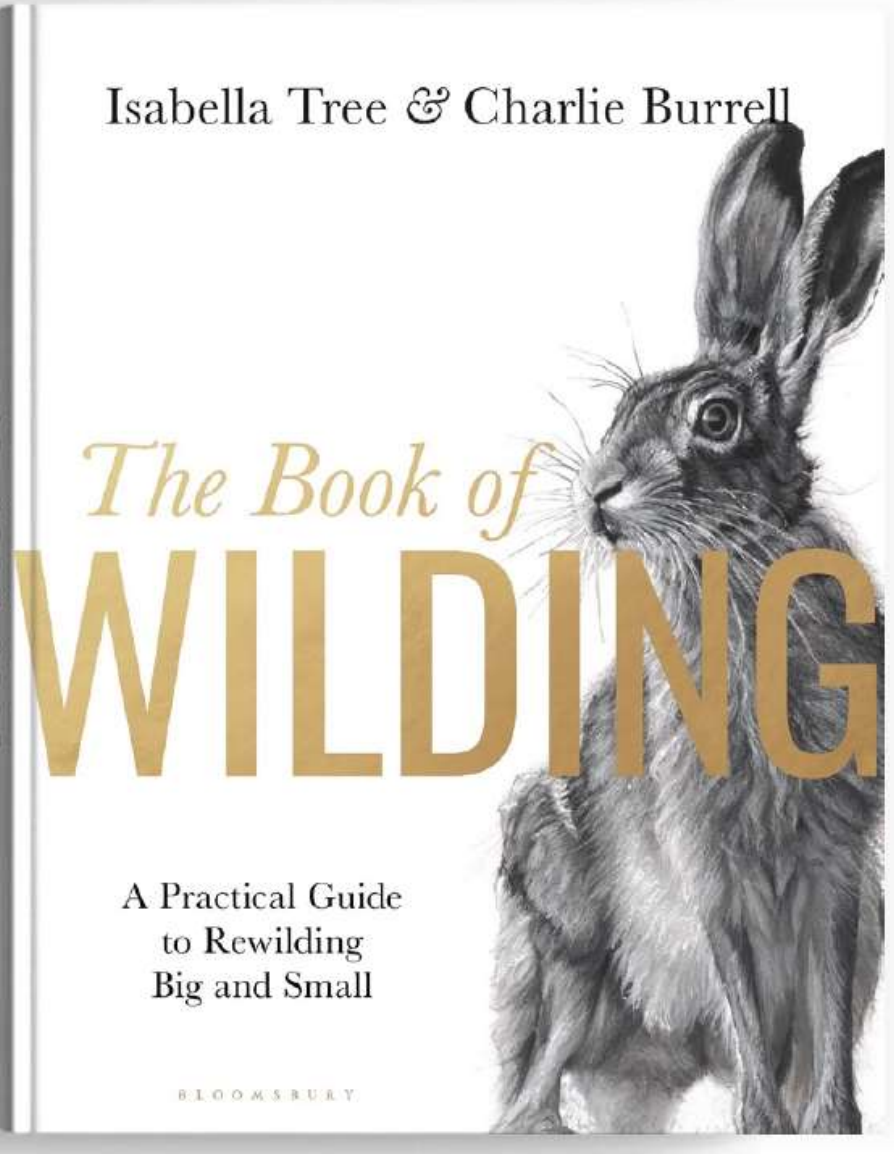
Biomass of arthropods to measure changes in total food availability for insectivorous birds

Changes in UK Red, Amber or Local Biodiversity Action Plan breeding birds

Changes in bat species richness and abundance

New Book out in May

The Book of Wilding: A Practical Guide to Rewilding Big and Small




That’s all folks