

A close-up photograph of a Shrill Carder Bee in flight, positioned on the left side of the frame. The bee is fuzzy, with a black and white striped abdomen and a brown thorax. It is flying towards a pink flower on the right. The background is a soft, out-of-focus green.

Natur am Byth!

Adfer rhywogaethau dan
fygythiad yng Nghymru

Saving Wales'
threatened species

Saving the Shrill Carder Bee in Wales *Natur am Byth!*

Lawrence Harris
Wales Project Officer
Bumblebee Conservation Trust

Bees in the UK

Around 270-280 bee species in Britain

- 1 honeybee
- 24 bumblebees
- The rest are **solitary bees**



What are bumblebees?

- Order Hymenoptera; genus *Bombus*
- Around 250-270 species worldwide
 - Cryptic species
- Annual life cycle
 - Most social, some parasitic
- Feed exclusively on pollen and nectar
 - Adapted for efficient collection
- Cold-adapted
 - Predominantly northern hemisphere
 - UK = 10% world's species



What's happening?

- 1980 *Atlas* of bumblebees found widespread declines from 1900
- Over a third of the social bumblebees (7 of 20 species) declined by more than **70%** 1900-1980
- **2 species extinct**
- **8 Priority Species for Conservation**

Extinct:

1. Culluman's Bumblebee, *B. cullumanus* (1941)
2. Short-haired Bumblebee, *B. subterraneus* (1988)

Declining/rare:

1. Moss carder, *B. muscorum*
2. Brown-banded carder, *B. humilis*
3. Great Yellow bumblebee, *B. distinguendus*
4. Red-shanked carder, *B. ruderarius*
5. Large Garden bumblebee, *B. ruderatus*
6. Shrill carder, *B. sylvarum*
7. Short-haired bumblebee, *B. subterraneus* (reintroduced population)
8. Bilberry bumblebee *B. monticola* (Scotland, research)



Why are they declining?

1. Diseases

Deformed Wing Virus (DWV)

Black Queen Cell Virus

Acute Bee Paralysis Virus

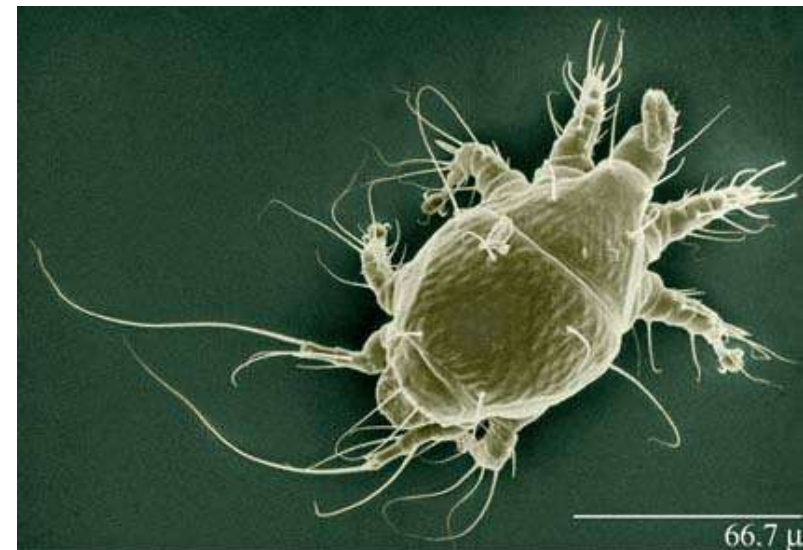
Slow Bee Paralysis Virus

Sacbrood Virus

Nosema ceranae – fungal pathogen

Etc...

- spreading between bumblebees and honeybees
- background rate higher in honeybees
- Likely spread from honeybees to wild bees



Why are they declining

2. Pesticides

Sublethal effects

Co-formulants

Synergism with other chemicals

But...

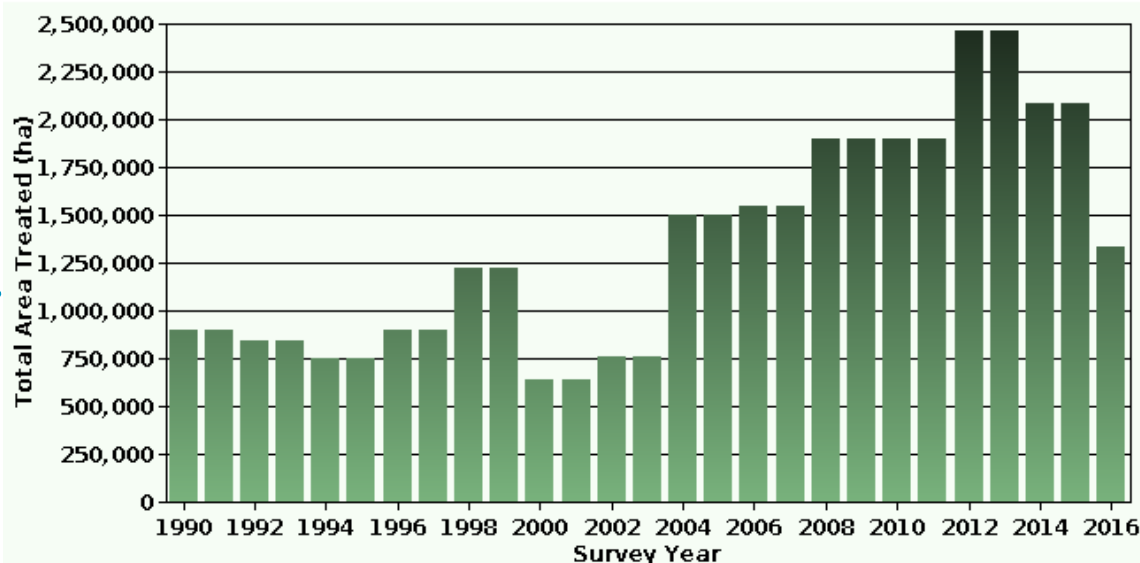
Pesticide usage increasingly
controlled

Several bans

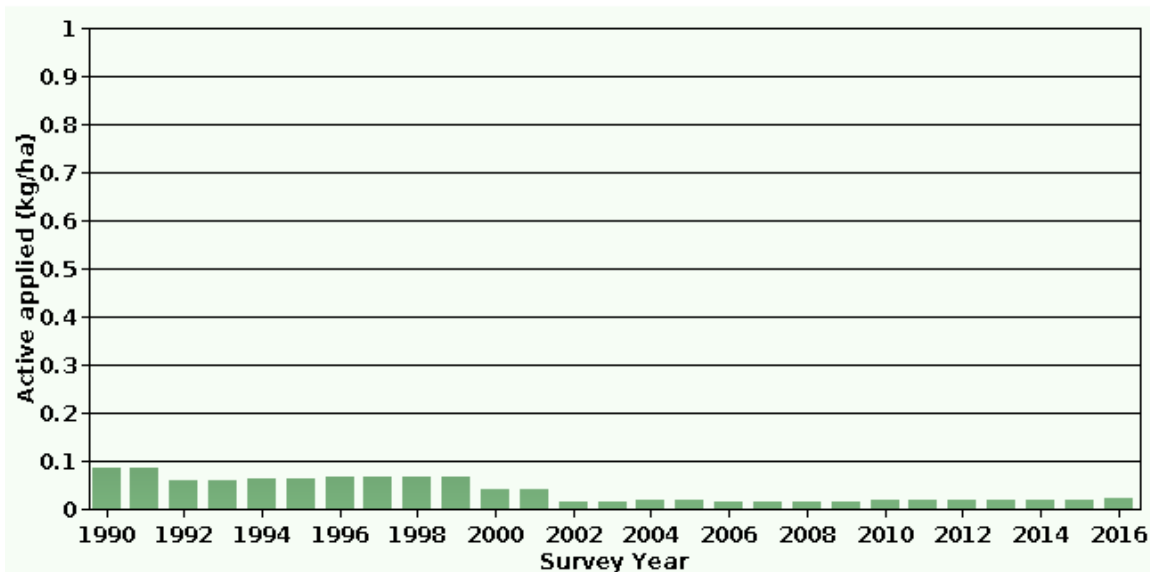
Increased awareness –
although Neonic derogation is
dangerous

Data: FERA PUS Stats

Total area treated with insecticides (oilseeds only)



Total weight of active ingredient applied
(insecticides & oilseeds only)



Why are they declining?

3. Habitat lost – the biggest issue for *Sylvvarum*

Great loss of bumblebee habitat

- 97% flower-rich grassland lost 1934-84
- 1984-present?

Agricultural changes to more intensive methods

- Cutting grass many times a year and heavy grazing
- Removal of hedgerows and areas without crops
- Grassland fertilisation (legumes)



Should we be worried?

Huge commercial importance as pollinators

- Insect pollination in the UK worth £500 million+ for 75% crop species
- €14.2 billion in EU, €265 billion worldwide
- Replacement cost £1.8 billion (2012)

90% of 9000 wild/garden flowering plants depend on insects for pollination

- Bumblebees help to support networks of semi-natural flower-rich grassland
- No bumblebees = sweeping changes to the countryside



bumblebee at commercial raspberry flower



Natur am Byth: *Wales' flagship conservation project*

- A **partnership** of nine charities and Natural Resources Wales
- Funded by the National Lottery and the Welsh Government
- **Protecting endangered species and reconnecting people** and with nature



- *Currently in our 18 month project development phase*
- *Culminating in submission of funding bid to the National Lottery Heritage Fund*
- *Our four year delivery period will commence in September 2023*

Supported by the National Lottery Heritage Fund and Welsh Government
Wedi'i gefnogi gan Gronfa Dreftadaeth y Loteri Genedlaethol a Llywodraeth Cymru



Our focus in NaB: Shrill Carder Bee

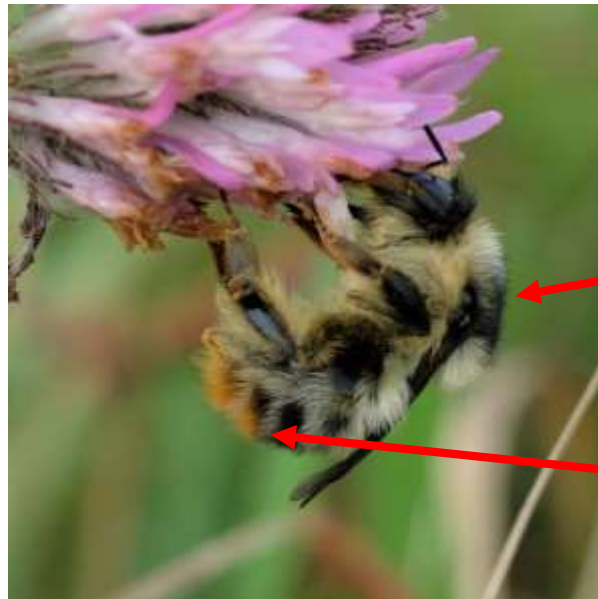


Red Clover - a favourite!



- One of the UK's most **endangered** bumblebees
- Found in just **three key locations in Wales**
- Was once widespread across Southern England and Wales
- Has suffered **severe decline** in recent years due to habitat loss, poor land management and pesticide use
- Small isolated populations are now **threatened by loss of genetic diversity** and inbreeding
- Needs extensive areas of **flower rich habitat**

Bombus Sylvarum - ID



**Queens 17mm long –
males and workers
much smaller**

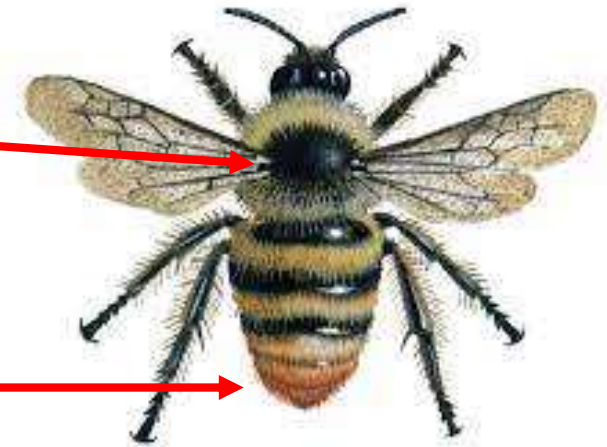
Straw-yellow

**Broad black band
between wing bases**

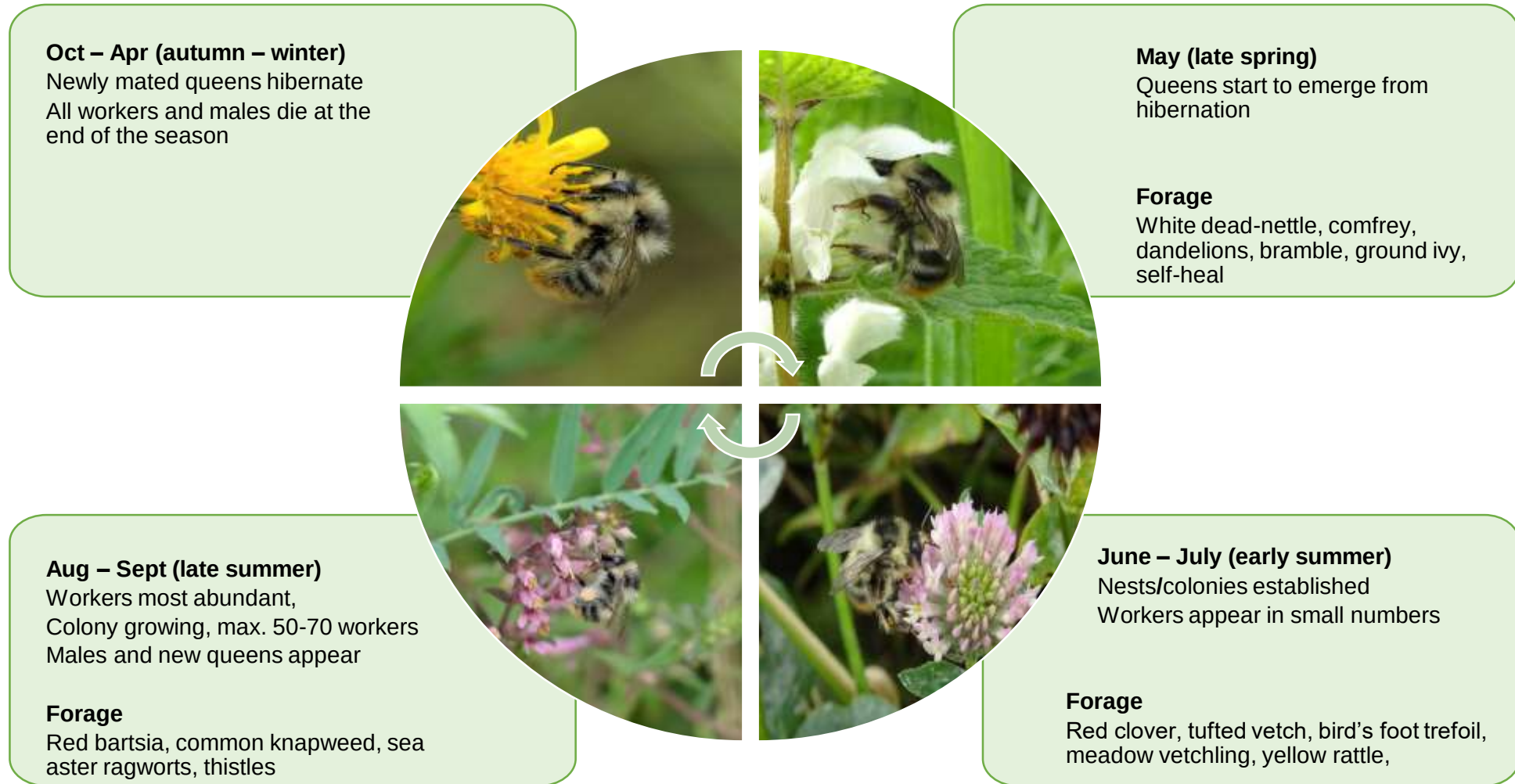
Banded appearance

Orange-red tail

High-pitched buzz



Life cycle



Shrill carder bee nesting

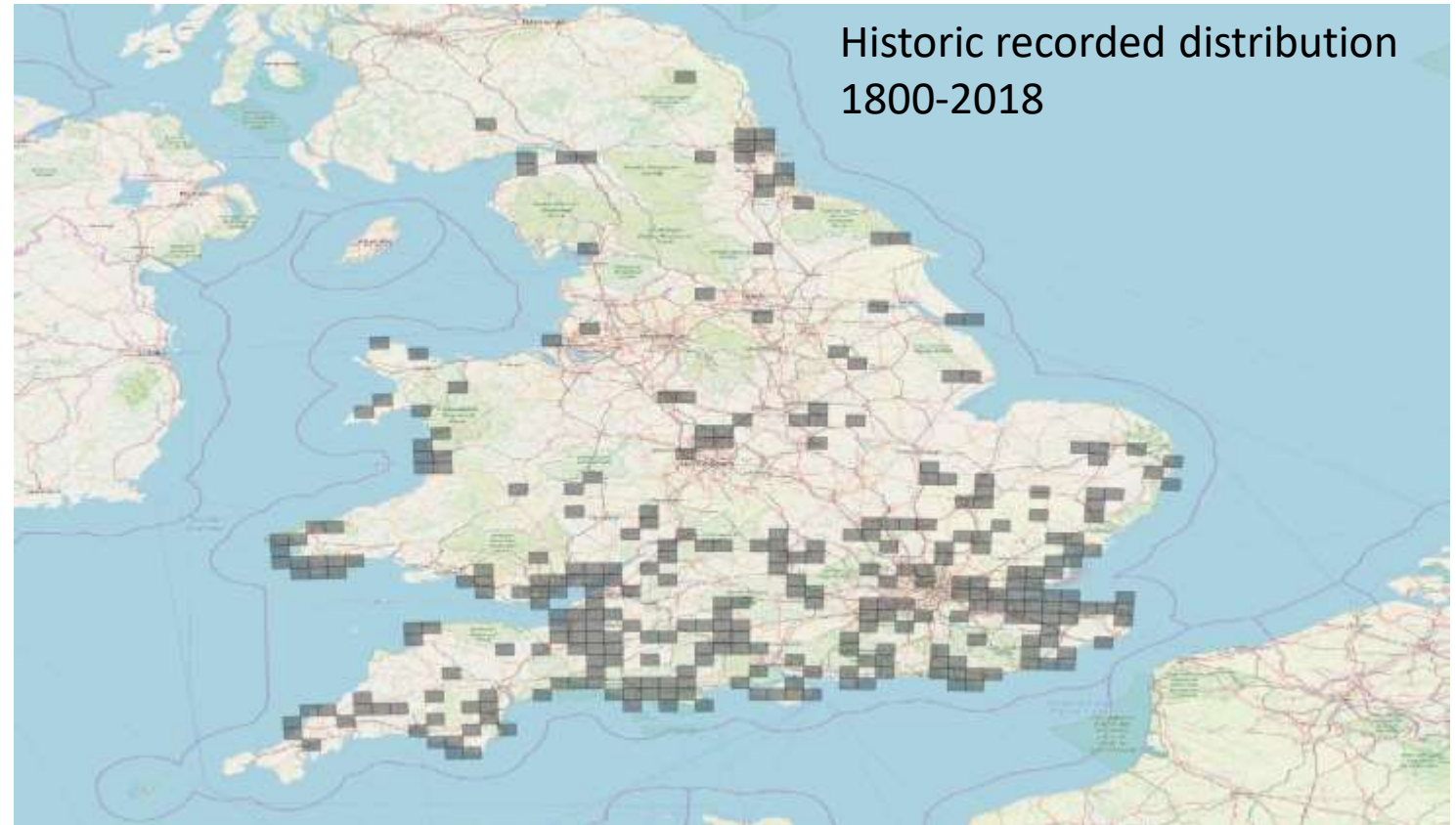
- Nest on surface or just below ground
- Tall grassland, tussock-forming grasses
- 'Doorstep' foragers



< 200m



Shrill carder bee distribution and decline



Shrill carder bee distribution and decline



Distribution Mapping

- Using statistical modelling we can identify key factors explaining Shrill Carder distributions, then predict these over a wider area.

Shrill Carder
records

+

Well-recorded
areas without
Shrill Carders

+

Environmental
data

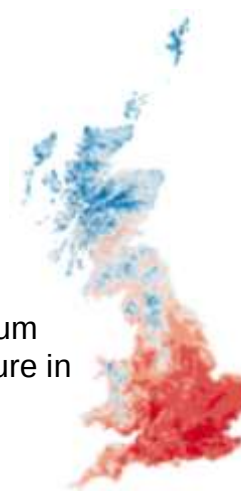


1,058 *B. sylvarum* records
from 1980 → 233 unique 1km
grid squares



134,402 *Bombus* records
from 1980 → 2,000 unique
1km grid squares

Maximum
temperature in
July



Land-use



Key preferences

Climate

↑ temperature in May

↑ wind speed in May

Topography

Lower altitude

Flatter ground

Land-use

Supra-littoral sediment

Neutral grassland

Arable & horticulture

Saltmarsh

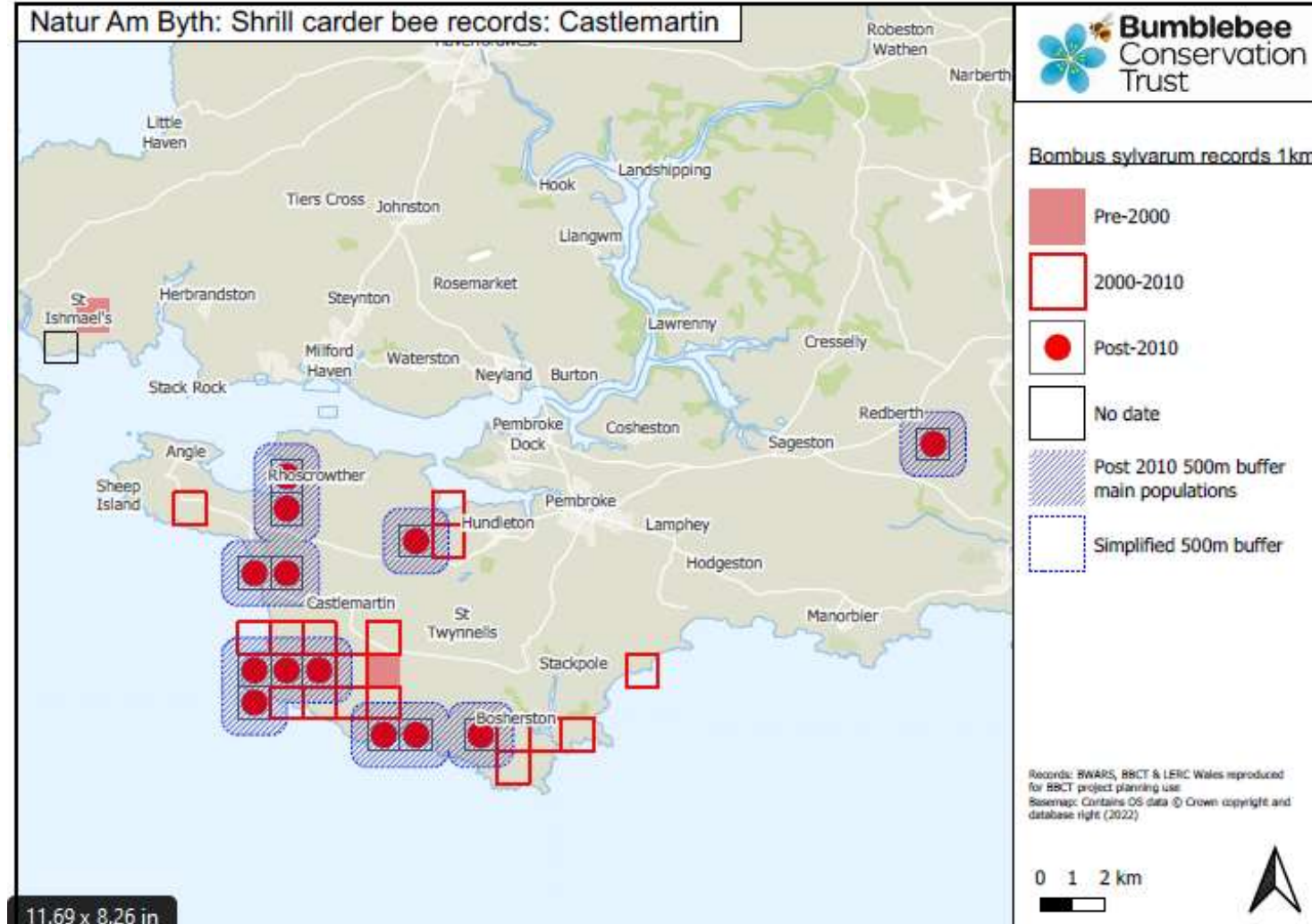
Natur am Byth: Our focal areas



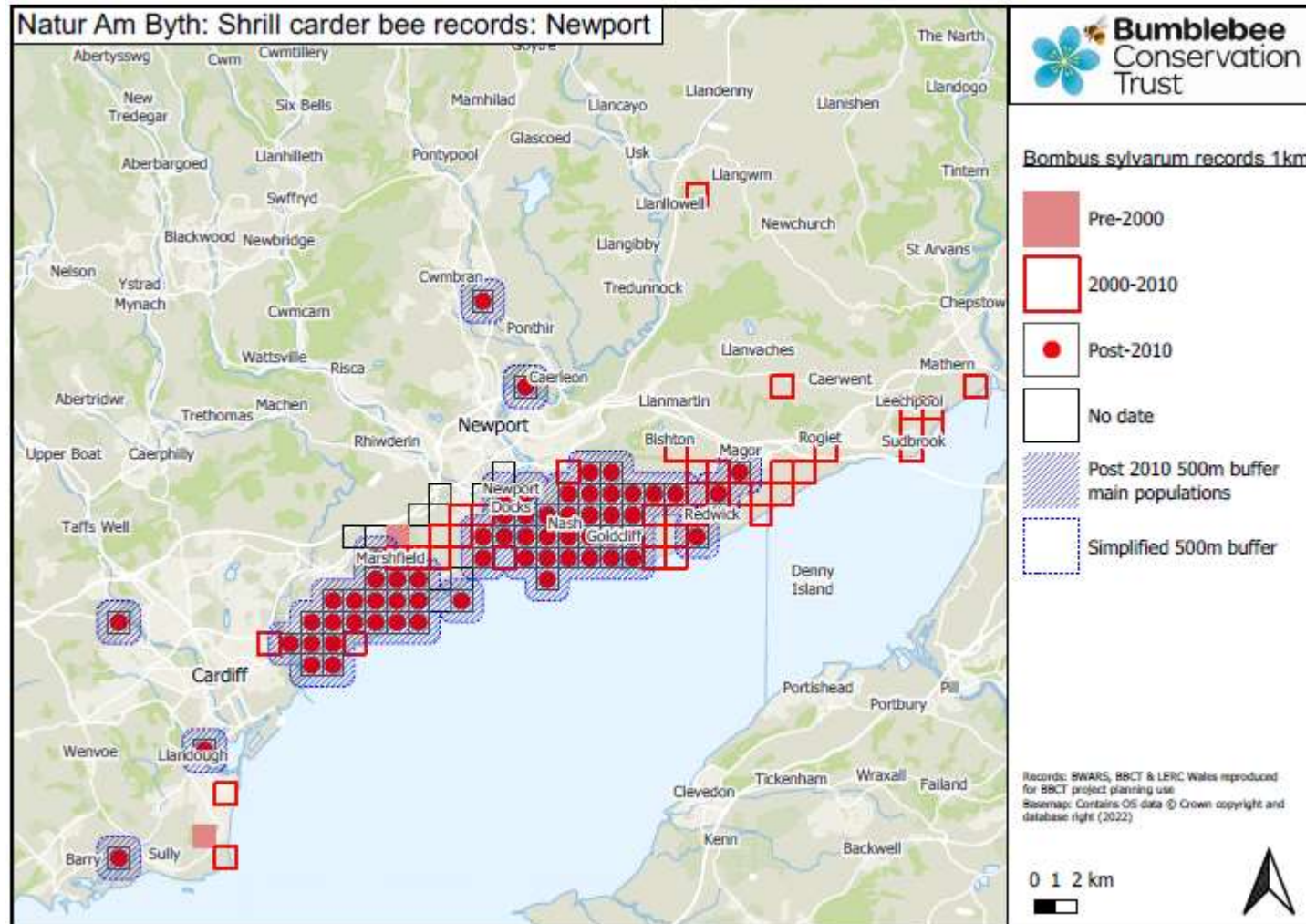
Shriill Carder Bee areas

- South Pembrokeshire
- Port Talbot / Kenfig
- Gwent Levels

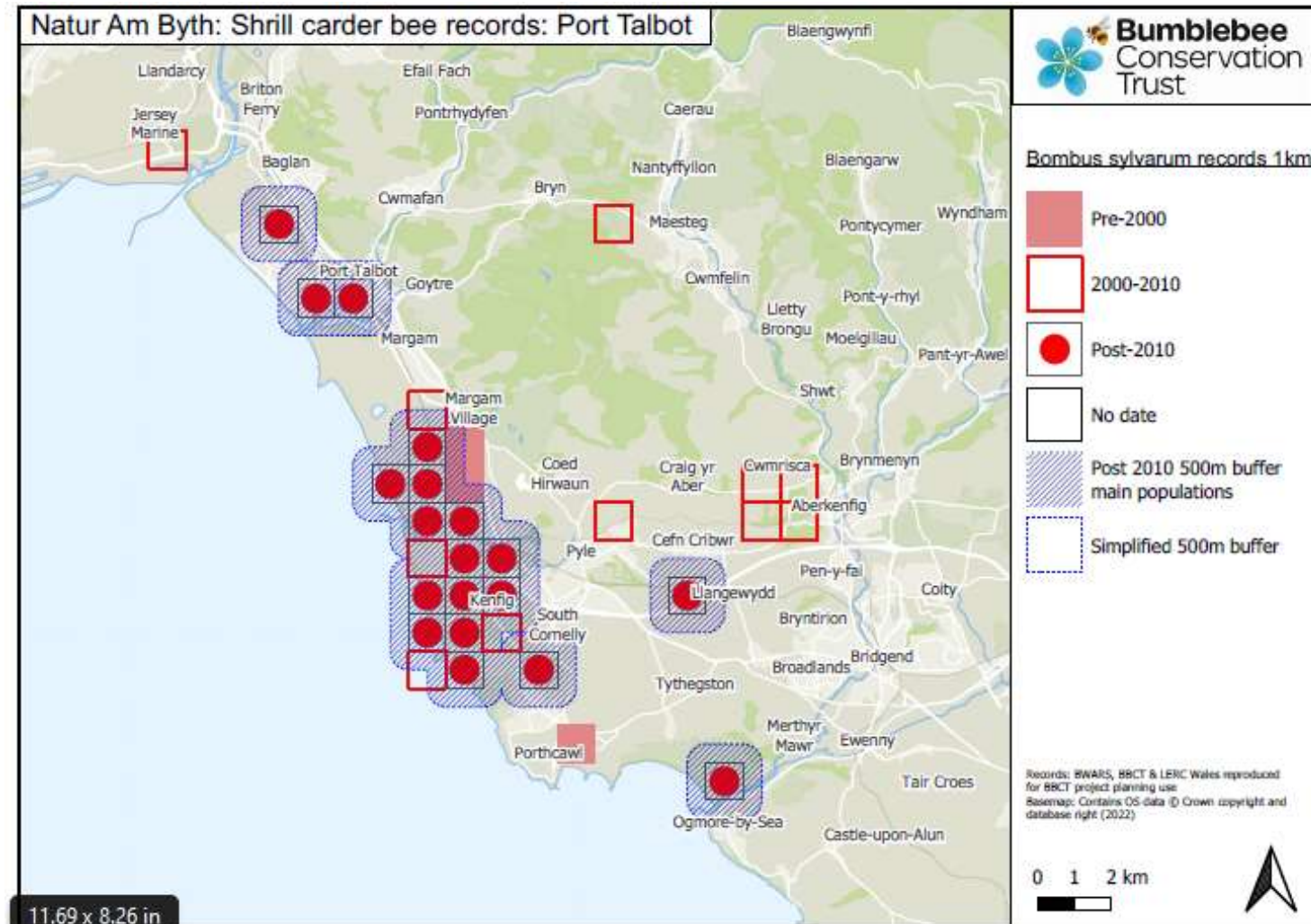
Shrill Carder Bee records: Pembrokeshire



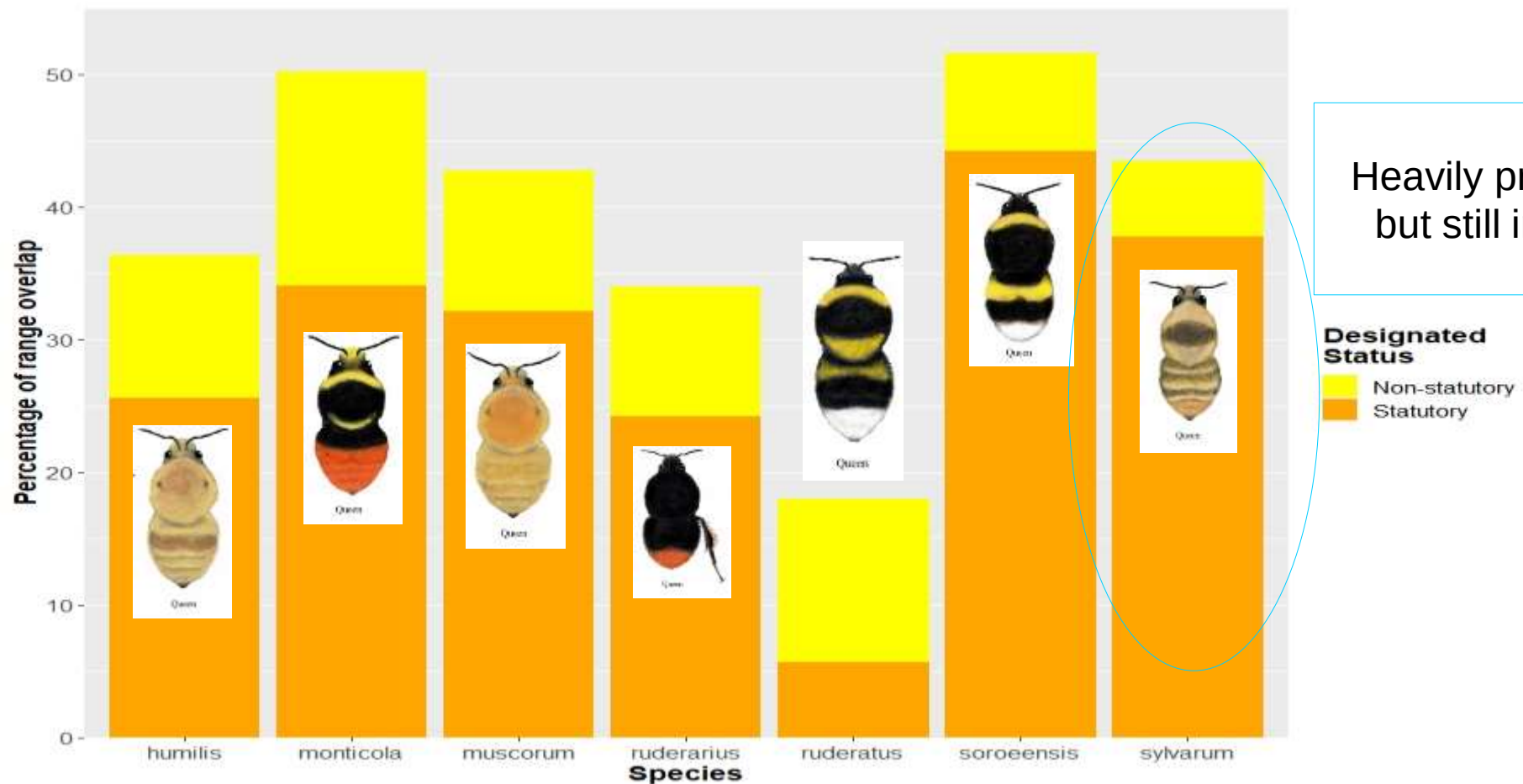
Shrill Carder Bee records: Port Talbot/Kenfig



Shrill Carder Bee records: Gwent Levels

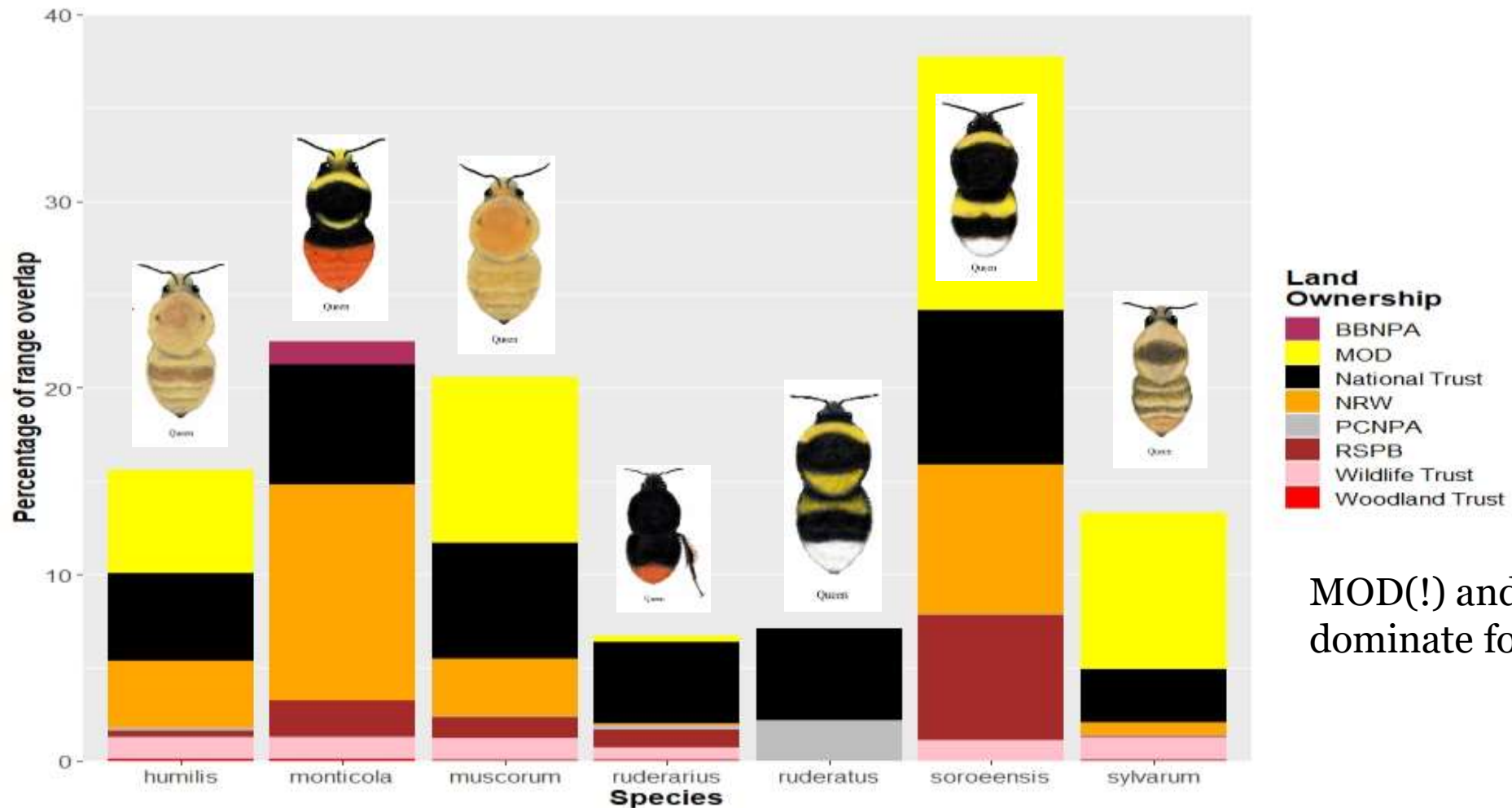


Do species live on protected sites in Wales?



Heavily protected –
but still in decline

Who owns bumblebee habitat in Wales?



MOD(!) and NT
dominate for Sylvarum

Summary of the main pressures

- Diseases
- Availability of forage habitat
- Availability of undisturbed nesting habitat
- Late emerging – need forage in a challenging period
- Pesticides and herbicides
- Connectivity of populations



People mention reintroductions – **not** a silver bullet

Too late – a Hail Mary

Conservation plus complications, from the lowest possible base

Time, effort, knowledge, skill, money, luck

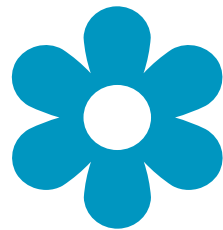
Have a place – but as a last resort, not a standard approach. We need to save it before it goes extinct.



Shrill carder bee forage



Pea family



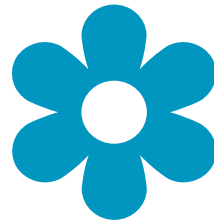
Fabaceae



Shrill carder bee forage



Dead-nettle family



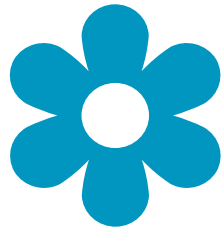
Lamiaceae



Shrill carder bee forage



Daisy family



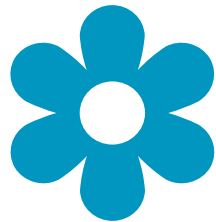
Asteraceae



Shrill carder bee forage



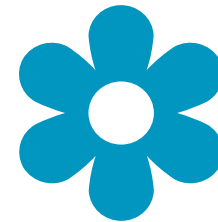
Broomrape family



Orobanchaceae



Borage family



Boraginaceae



Example habitat:
Wraik Hill nature
reserve



Example habitat:
Ellenden Farm
Kent

Grazed pasture
Arable
Hedgerows
Woodland edge



Example habitat:

Sea wall habitats

Grassland

Adj. Grazing marsh

Saltmarsh

Ditch networks



Key interventions 1/2

- Ensure flower-rich forage habitat is available April until late September.
- Cut traditionally managed hay meadows after mid-July; if possible rotate a late cut to provide forage into September.
- Leave wide uncut margins to provide late forage (rotate strips each year)
- Avoid summer grazing, or, adopt light rotational grazing throughout the year

Key interventions 2/2

- Rotate cutting of hedges, ditch edges and banks— ensures some areas are cut late
- Enhance existing swards and/or establish new wildflower grasslands or pollen and nectar margins
- Leave tussocky grass and scrubby areas for nesting, undisturbed between March and October
- Protect and manage open mosaic/brownfield habitats by rotational clearance of vegetation to maintain mosaic with open flowery areas

How you can help!

- Monitoring Shrill Carder Bees:
 - Habitat surveys
 - Beewalks
 - Ad-hoc surveys throughout the Summer
- Join us for events, walks and talks
- Supporting in educating colleagues, classmates and community in bumblebee conservation
- Share the message of NaB and our events with community groups, schools, clubs and organisations – we are happy to talk to anyone interested.
- Become ambassadors for nature in Wales