



Measuring the impact of Glastir on biodiversity

Outputs from GMEP from 2013, 2014 and a look to future work

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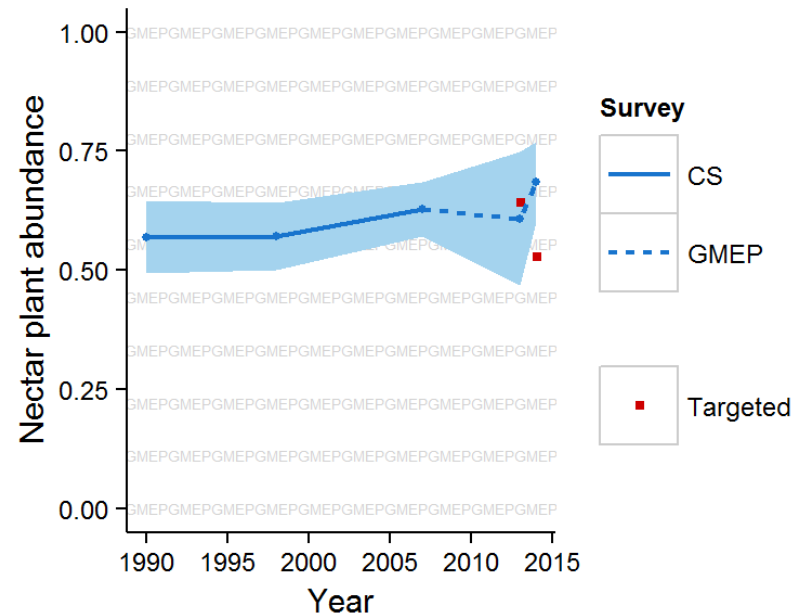
Contents:

- Biodiversity indicators
- Section 42 species
- Birds
- Legacy effects of previous schemes on GMEP
- Future work



Types of biodiversity indicator:

- Habitat extent & connectivity
 - broad habitats
 - section 42 habitats
 - Annex I habitats
- Habitat condition
 - Whole Farm code
 - CSM plant species
 - Nectar plants
 - % *Sphagnum* cover
 - Many others calculated and possible to derive
- Birds
- Pollinators
- Section 42 species



Section 42 habitat extent

- Coverage in GMEP 1km squares (years 2013 and 2014)

Habitat	%WW	%Targeted
Improved Grassland	21.7	15.77
Neutral Grassland	17.61	14.29
Coniferous Woodland	6.91	4.76
Acid Grassland	5.93	13.7
Broadleaved Mixed and Yew Woodland	3.47	3.38
Arable and Horticulture	2.83	3.37
(ph) Purple Moor-grass and Rush Pasture	2.74	2.13
(ph) Upland Heath	1.86	3.79
(ph) Blanket Bog	1.53	7.7
(ph) Lowland Mixed Deciduous	1.4	0.93
(ph) Wet Woodland	1.25	0.7
Bog	1.01	1.79
Bracken	0.81	2.47
(ph) Fen	0.61	0.58
(ph) Upland Oakwood	0.45	0.25
(ph) Upland flushes	0.3	0.81

**S42
habitats**

**S42
habitats**

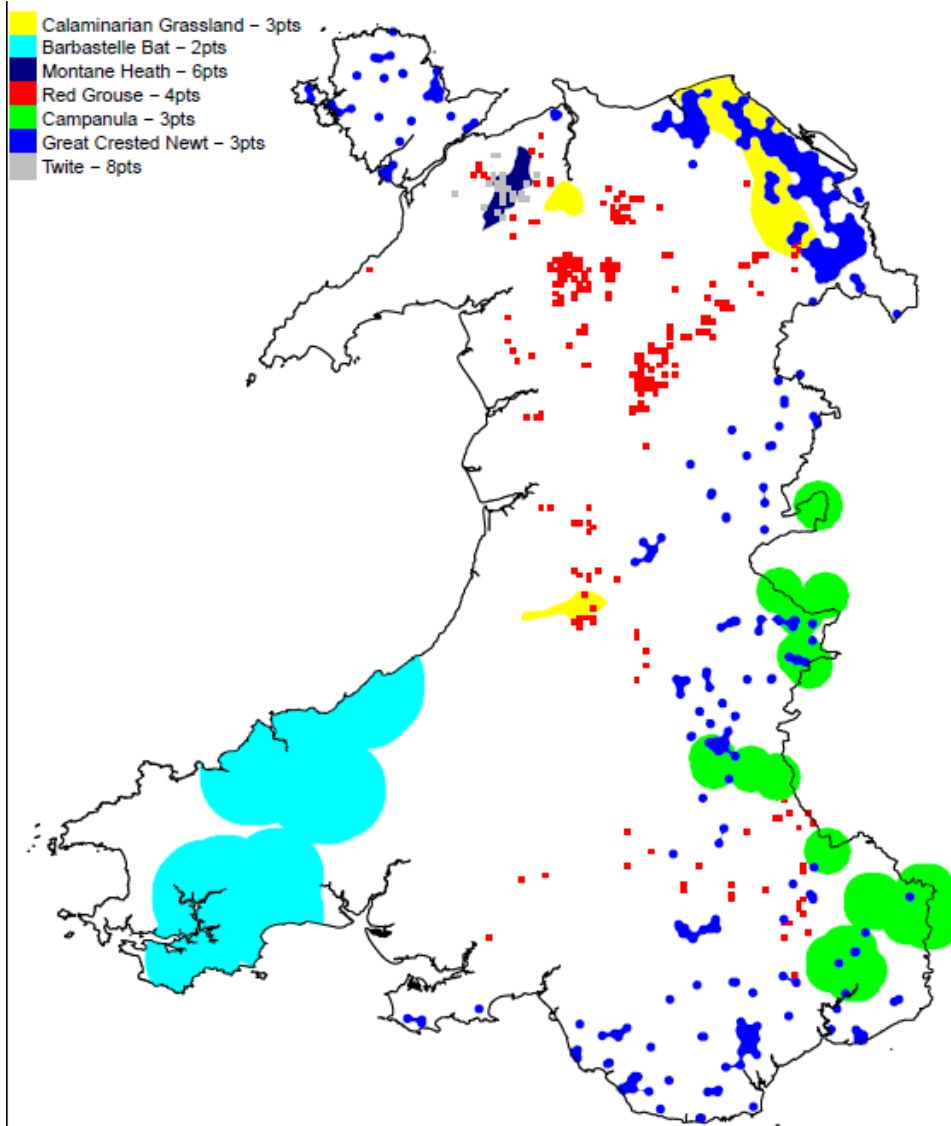
Representing targeted habitats and species in GMEP sample

Environmental layers have been scored by WG in order to target areas to go into the Glastir advanced scheme.

Example shown here for some layers.

There are approximately 100 layers in total

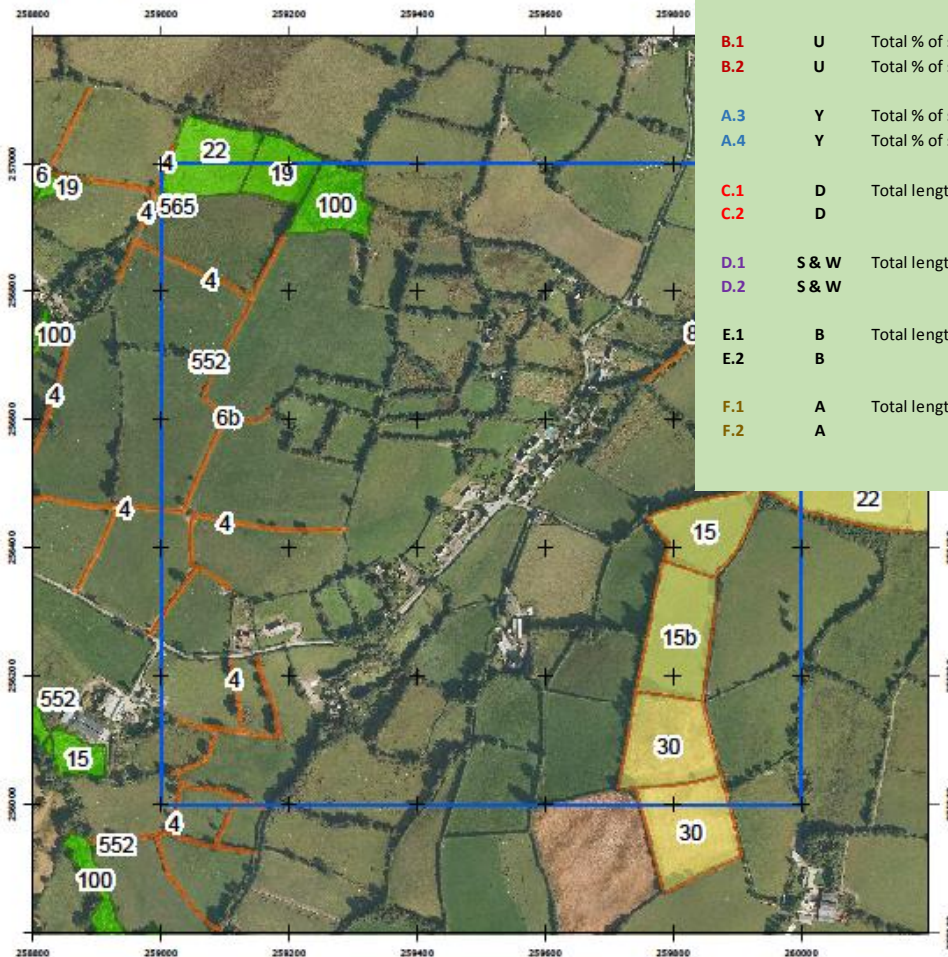
They are free to overlap.



Sampling land in and out of option



CEH SQUARE: 19434



FILL IN THE PINK BOXES TO GET NUMBERS OF REQUIRED PLOTS

Number of X plots falling in **enclosed** land?

A.1 X - in - option?
A.2 X - out-of-option?

B.1 U Total % of sqr that is unenclosed habitat?
B.2 U Total % of sqr; unenclosed **in-option**?

A.3 Y Total % of sqr that is enclosed habitat?
A.4 Y Total % of sqr; enclosed **in-option**?

C.1 D Total length of WLF in square (m)
C.2 D -in option (m)

D.1 S & W Total length of watercourse in square (m)
D.2 S & W -in option (m)

E.1 B Total length of all linear features in square (m)
E.2 B -in option (m)

F.1 A Total length of arable margin in square (m)
F.2 A -in option (m)

Total % of plot-able land in sqr
100

PLOTS TO BE ALLOCATED

OUT-OF-OPTION	0	U
IN-OPTION	0	U
OUT-OF-OPTION	0	Y
IN-OPTION	0	Y
OUT OPTION	10	D
IN-OPTION	0	D
OUT OPTION	5	S&W
IN-OPTION	0	S&W
OUT OPTION	5	B
IN-OPTION	0	B
OUT OPTION	5	A
IN-OPTION	0	A

Max plots per square
Total plots per square given plotable area

10 10
5+ 5
10 10
5 5
5 5
5 5

Field methods ensure we target land in Glastir options.

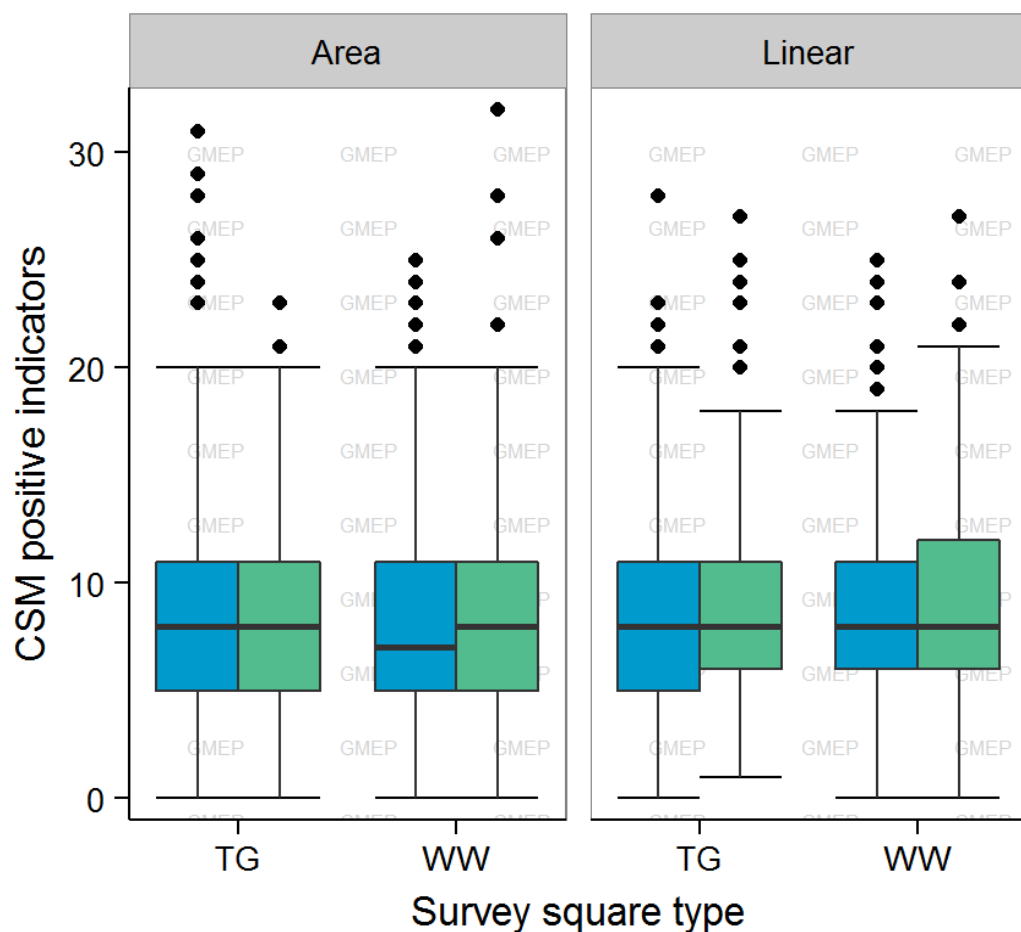
Statistical power depends on uptake in 1km squares.

More popular options have greater representation.



Baseline characterisation; 2013/'14

- On entry into Glastir do indicators vary between habitats and features IN versus OUT of option?



Gwlithlys



Creiglys



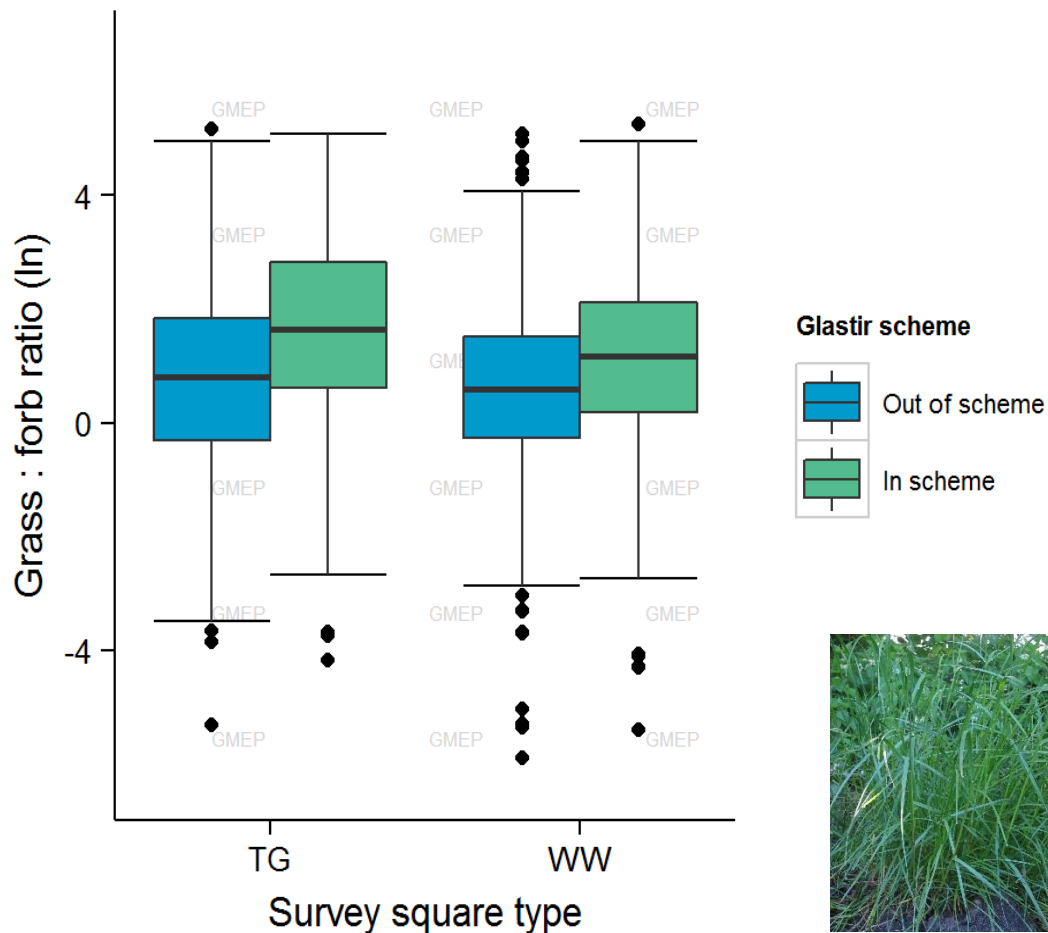
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Glastir
Monitoring and
Evaluation
Programme

Baseline characterisation; 2013/'14

- Grass:forb ratio is one of 5 indicators measuring the fertility of 'habitat' land in and out of agreement.



Under the Whole Farm Code fertiliser application is prohibited on 'habitat' land.

There was no significant difference in grass:forb ratio between in or out of agreement 'habitat' land in either targeted or wider-wales GMEP squares.



Section 42 species and Glastir

- A logical model for detecting impacts of options

Glastir **Glastir Advanced: Target Checker** Version 1

Select a target objective from the drop-down list below:

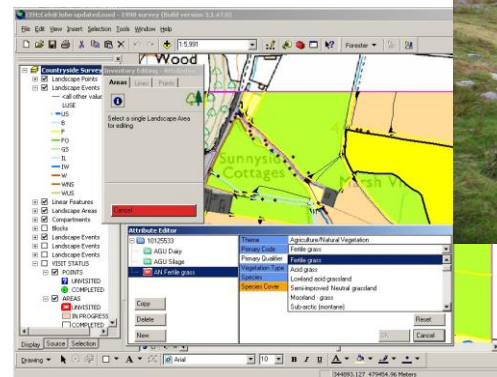
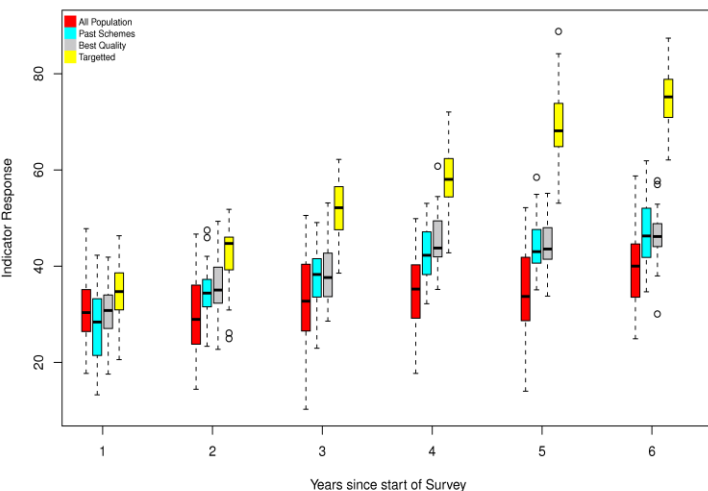
Lesser Horseshoe Bat

Your contract manager will be looking for options which focus on the provision of woodlands which act as flight paths and

The Options, Additional Management Payments and Capital Works listed below have the *potential* to deliver for the selected target objective in a wider range of situations, but may not always be applicable - your Contract Manager will provide you with site-specific information in Glastir Advanced, but may deliver for the Objective where they have been included in the Glastir Entry Contract (rates are not guaranteed).

Payment rates are either £ per unit or percent of actual cost (scheme rules and financial limits apply). In some cases a Glastir / Glastir Entry option. A reduction in that particular Glastir Advanced payment will apply in these instances. All options and capital

MANAGEMENT OPTIONS AND ADDITIONAL MANAGEMENT PAYMENTS	unit	rate
1 Create a 3 metre corridor to include tree and shrub planting on improved land	514 Ladder Stile	
1B Create a 2 metre corridor to include tree and shrub planting on improved land	517 Timber Kissing Gate and Posts	



Baseline characterisation; initial results

Target section 42 species	Number of GMEP 1km squares with recent species records / number with Glastir species options	Expected indicator variable status in-option versus out-of-option	Consistent with expectation? ³
Dormouse	0/27	Understorey cover-weighted canopy height higher (broadleaf wood)	NS (2)
		Bramble cover higher (broadleaf wood)	Yes (1), NS (1)
		Honeysuckle cover higher (broadleaf wood)	Too few data
		Total tree and shrub richness higher (hedgerows)	NS (2)
Rare Arable Plants	0/16	Annual forb richness higher	No (1) ¹
		Fertility score lower	NS (1)
		Cover of arable crop higher	NS (1) ¹
Curlew	2/29	Vegetation height heterogeneity higher	NS (4)
		Wetness score ²	NS (4)
		Rush (Juncus spp.) cover ²	NS (4)
		Vegetation height ²	Not tested
Lapwing	2/27	Vegetation height heterogeneity higher	NS (4)
		Wetness score ²	NS (4)
		Rush (Juncus spp.) cover ²	NS (4)
		Vegetation height ²	Not tested
Lesser Horseshoe Bat	5/81	Fertility score lower	Yes (1), NS (5)
		Plant species richness higher	NS (6)
		Wetness score higher	NS (6)

BTO bird surveys for GMEP

GMEP Survey 1km squares

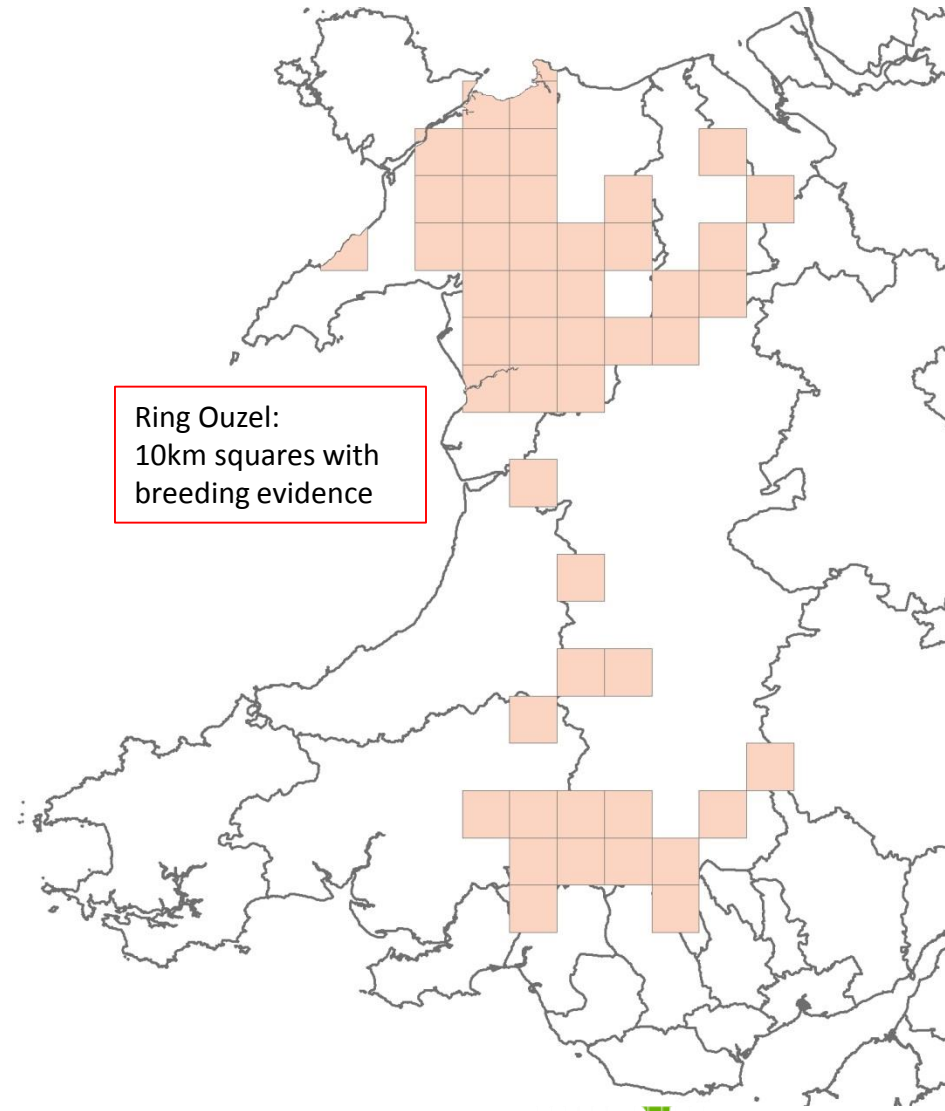
- Distributed across Wales

BTO Bird Atlas 2007-11

- Current distributions of all bird species at the 10km square scale across Wales
- Records with evidence of breeding

Simple overlap analysis

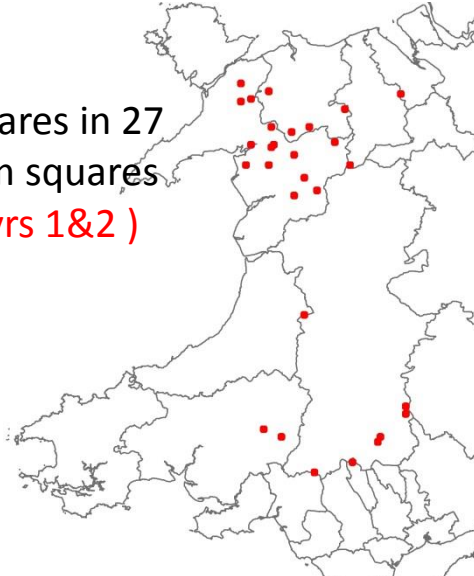
- Survey squares in 10km squares with each species
- Survey effort relevant if the right habitats for the species are in the 1km square



BTO bird surveys for GMEP

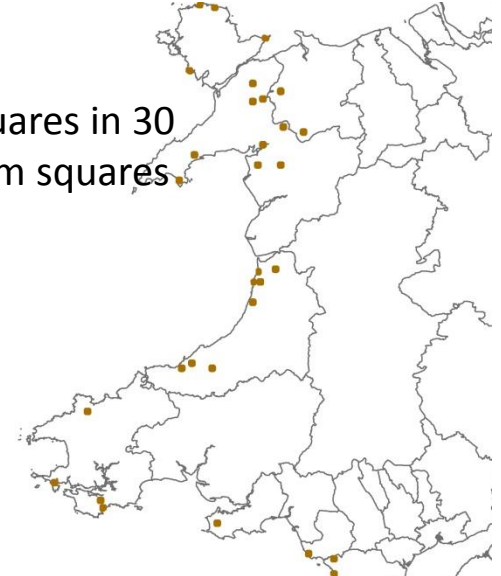
Ring Ouzel:

29 survey squares in 27
different 10km squares
(3 records in yrs 1&2)



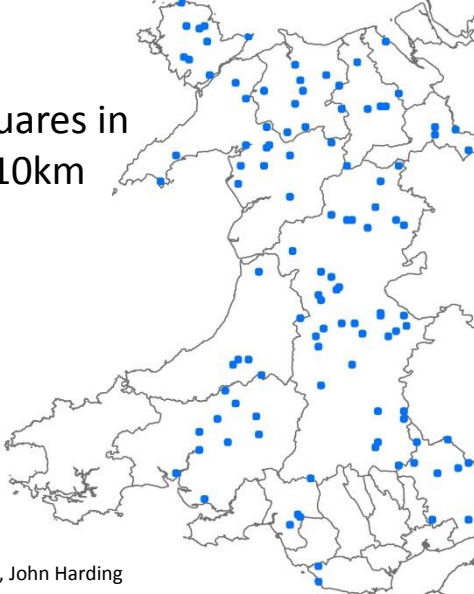
Chough:

31 survey squares in 30
different 10km squares
(8)



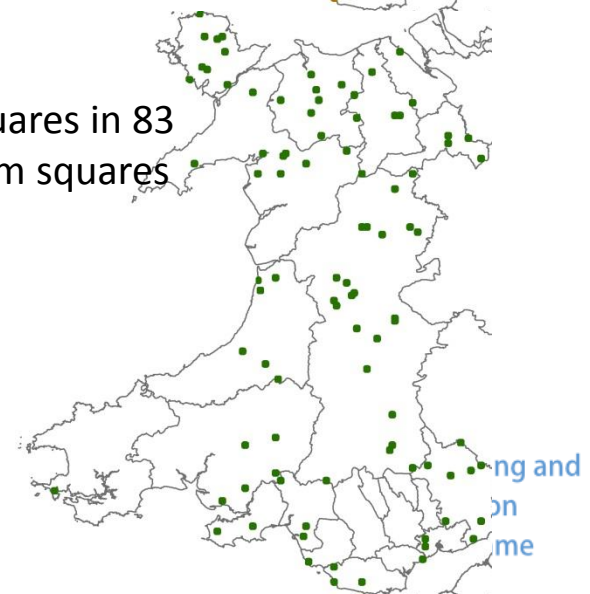
Curlew:

111 survey squares in
103 different 10km
squares (19)

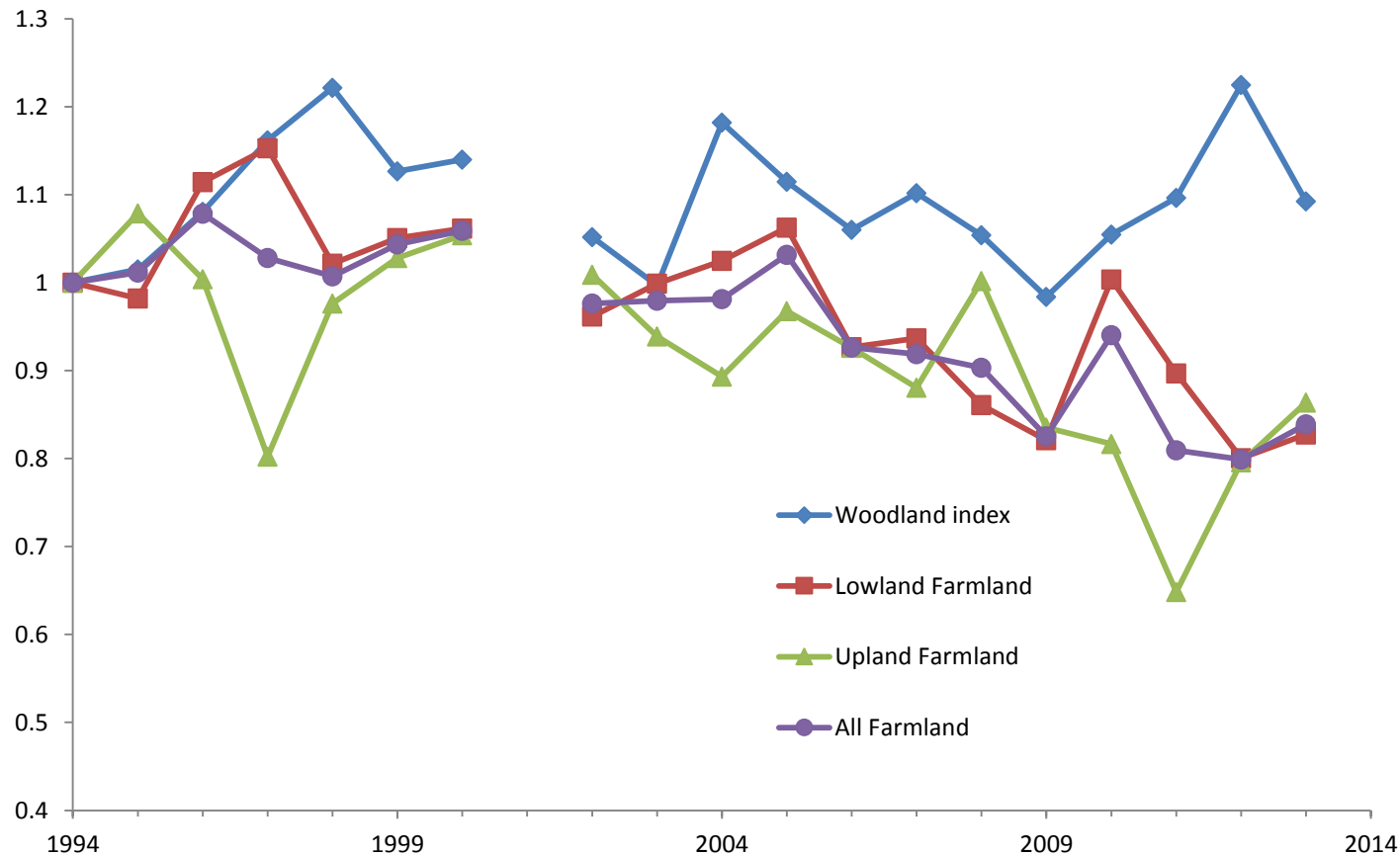


Lapwing:

92 survey squares in 83
different 10km squares
(11)



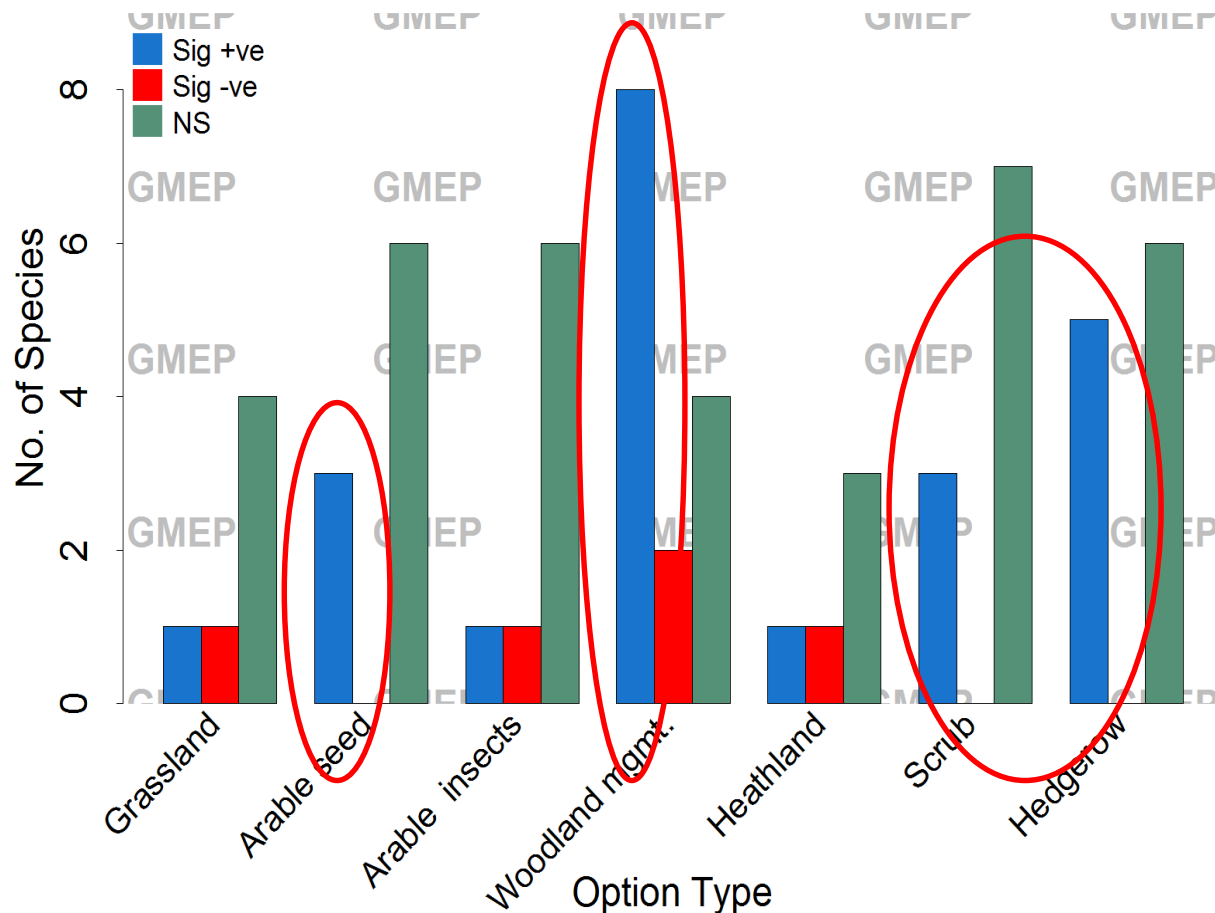
Contextual species trends; birds



Summary index trends for farmland (all species), lowland farmland, upland farmland and woodland in Wales (BBS data).

Legacy effects of previous schemes

- Effects of Tir Gofal on bird population growth rates.
- Generally positive effects of hedgerow and woodland management.



Section 42 species are rare in GMEP squares

- Out of 15 section 42 butterfly species, 7 have so far been recorded in GMEP squares.
- Of the 3 linked to Glastir options, 1 has been recorded.

BUTTERFLY SPECIES	Number of GMEP 1km survey squares 2013-14	% GMEP 1km survey squares 2013-14
Brown Hairstreak	1	1
White-letter Hairstreak	2	1
Small Pearl-bordered Fritillary	6	4
High Brown Fritillary	1	1
Wall Brown	24	16
Grayling	3	2
Large Heath	2	1



Section 42 species in GMEP squares

Section 42 species associated with Glastir options	Number of post-1970 records in yr 1 & 2 GMEP squares
Lesser Horseshoe Bat	14
Greater Horseshoe Bat	2
Barbastelle Bat	1
Dormouse	0
Water Vole	2
Red squirrel	1
Great Crested Newt	2
Arable plants	0
Arctic-Alpine plants	0
Grassland plants	0
Heath plants	1
Lichens of wayside and parkland trees	5
Metal-mine lichens	0
Grassland fungi	1
Brown-Banded Carder Bee	0
Shrill Carder Bee	0
High Brown Fritillary	1

Further work on biodiversity

- Updates to indicators in light of 2015 field survey and consultation with NRW species and habitat experts.
- Further development and automation of the section 42 species Glastir impact indicators.
- Citizen Science summaries based on up-to-date and comprehensive species records in collaboration with Wales LERC *we hope*.
- Analysis of GMEP survey data coincident with SSSI (birds, pollinators, soils and vegetation).
- Development of High Nature Value farmland map.

Thank you for listening



We thank Plantlife, Bat Conservation Trust and the many other recording societies who allowed access to their species distribution data. Colleagues at NRW including , Jean Matthews, Claire Burrows, David Allen and Jim Latham are thanked for input, information and advice.