High Nature Value Farmland in Scotland GIS methodology

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Scotland RDP:

..notes that the indicator "High nature value farmland" is under-developed across Europe. It can therefore not be reported against in the SRDP. An alternative indicator will therefore be used to capture high nature value farmland: hectares of land under farmland, woodland, urban, and other. Annual progress reports will report against this alternative indicator. Over....



Relationship between the 'Types'



Logical process according to us



Utilisable Agricultural Area UAA

-IACS field boundaries - other 10% from Mastermap

-Mask applied at end of analysis







Likely to be an over-estimate, since no real control over ACTUAL use

 Perhaps use area used for 2009 LFA claims within LFA area?



Fields from MasterMap

- "THEME" = 'Land' AND "MAKE" = 'Natural' AND
 (("DESCGROUP" = 'General Surface' AND "DESCTERM" IS
 NULL) OR ("DESCGROUP" = 'Natural Environment' AND
 "DESCTERM" IN('Coniferous Trees (Scattered)', 'Orchard', 'Nonconiferous Trees (Scattered)')))
- Various shape and size filters e.g. 0.25*perimeter/sqrt(area)
- But still polygons in urban areas....





© 2010 Infoterra Ltd & Bluesky Image © 2010 The GeoInformation Group 57°07'04.32" N 2°12'06.58" W elev 292 ft ©2

Par

Hatfield Broad Oak 2 l Heath ____GOOg © 2010 Tele Atlas © 2010 Infoterra Ltd & Bluesky 51°49'16.40" N 0°14'19.42" E elev 242 ft Eye alt 17639

Peri-urban parcels

- Are these actually farmland?
- Or horse paddocks for leisure use?
- Or are they used informally by farmers? (Lawful not to declare them on IACS if not under applicant's control on 15th May, and easier since can avoid cross-compliance responsibility for whole year)
- Maybe they are interesting for nature......
- But not 'accessible' to the CAP

Can mislead in picture of HNV farming (and how 'HNV' farming is in particular zones)

Type 1: Farmland with a high proportion of semi-natural vegetation

-LCM 2000 classification -Combined with UAA





What's wrong with this map??

- Seems to be a good starting point
- At least on NUTS IV level gives indication of % of semi-natural vegetation in overall area
- Since have IACS map, can get % IACS area
- 'Does' the main Type 1 identification!
- Points you in direction of parishes with significant but lower % of SNV, where might look for Type 2 mosaics





Type 3: Farmland supporting rare species or a high proportion of European or world population.

-SAC, SPA, biological SSSI -Combined with UAA raster





Perceived difficulties with Type 3 approach

- It should be for 'mopping up' areas not included in Type 1 and Type 2.....
- But in any case, in Scotland, Natura 2000 sites are probably NOT a good indicator



Type 2: Farmland dominated by low-intensity agriculture or a mosaic of semi-natural and cultivated land and small scale features.

Several possible approaches

Landscape structure from Mastermap
Species data from National Biodiversity Network database etc. (as attempted in England)

Farming systems data from Scottish Government



Type 2: Landscape structure

("DESCGROUP" = 'General Feature' AND "PHYSPRES" = 'Obstructing') OR ("DESCGROUP" = 'Inland Water') OR("MAKE" = 'Natural' AND "PHYSPRES" = 'Edge / Limit')

Any lines in enclosed urban areas are erased.
Within each 1km square calculate the area covered by the UAA.
Calculate the length of boundaries within the UAA for each square.
Calculate the ratio of length of line to area of UAA for each square.





Landscape diversity

- If wanting a measure of parcel density per km², could just use LPIS mapping for first estimate as parcel identifiers are themselves grid references of parcel centres (would need to be combined with data on UAA within the grid square)
- LOW-INTENSITY mosaics?
- Are small fields the same as a mosaic landscape anyway?

Type 2: Species diversity - overview-A priori lists of farmland species developed

-Birds, butterflies, mammals, vascular plants and lower plants

-These species records selected from NBN databases + BTO + mycological database + confidential records

-Spatial resolution problem – 100m, 1km, 2km, 10km Weighted at 1km resolution



Scottish Natural Heritage



Farmland species

- A map of farmland (in the case of species groups)
- But depending on the species chosen..... (Strange that uplands have NO species groups – birds?? Higher plants?? Mammals??)
- A map of experts (in the case of species)?









Marsh marigold







False oat-grass

Meadowsweet





Corn buttercup



Type 2: Farming systems data -List of IACS fields with fallow land

-Parish stocking densities

-Threshold issue – low intensity numbers determined by grazing potential - never completed



Scottish Natural Heritage







Type 2: Creating a combined map

-Rules clearly defined

-E.g. >2 species groups -Upper quartile of structural grids -stocking density <0.1 LU/ha





Livestock density data

- Could use IACS!! E.g. show stocking density declared on 1st March on all parcels claimed by a holding (common grazings pose small problem)
- Or show average stocking density by parish of main holdings (perhaps with cutoffs)
- Why do it by parish when farm available!?



Livestock density data

- Could work out realistic thresholds, since Rough Grazings is declared separately, allow different minimum stockings - one for RG and one for rest of forage,
- e.g. 0.1 LU/ha for RG, 0.8 LU/ha for the rest
- and work out composite farm-level max. and min. stocking density threshold
- Max =(area RG*0.3 + area other forage*1.0)/total area
- [and perhaps Min =(area RG*0.05 + area other forage*0.5)/total area]

And show actual parcels meeting this/these threshold(s)

Final, final HNVF map

-25m raster combination of 3 types
-Many ways of combining and/or weighting are possible







Conclusions?

- Main bulk of HNV farmland in Scotland is dominated by semi-natural vegetation – maps seem to capture it well
- IACS is weak because of Perm. Grass. class
 - Age is rather meaningless for biodiversity
 - Occasional reseeds not commonly seen as Temp Grass!
- No need for abstract mapping of Type 3 map actual species of interest
- Need to focus on Type 2, but with constant reference to reality in reference areas. Likely that the areas will be small since semi-natural vegetation seems to be the dominant feature in most HNV areas



Effort needs to be linked to RDP monitoring & evaluation more clearly