Henfaes Research Station

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Davey Jones
Professor of Soil & Environmental Science

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Canolfan Ymchwil Henfaes
Henfaes Research Centre

Canolfan Rheolaeth Bryndir ac Ucheldir
Centre for Hill & Upland Management

Summary of Henfaes

- From the lowland to the upland
- 49 ha experimental farm
  - crops, agroforestry, sheep
- 209 ha upland sheep farm
  - Centre for Hill & Upland Management (CHUM)
  - 1600 sheep, managed commercially
- Grazing rights for 1850 ewes on the Carneddau
  - 1000 grazed due to *Rhaglen Tir Eryri*

Agri-environment schemes

- Henfaes is highly designated
  - Was in *Tir Gofal*
  - Was in *Rhaglen Tir Eryri*
  - Now in *Glastir Advanced*

  - Reduced (or no) fertiliser inputs
  - Re-seed programme

CS 1978 Surveyor Training

See http://www.countrysidesurvey.org.uk/

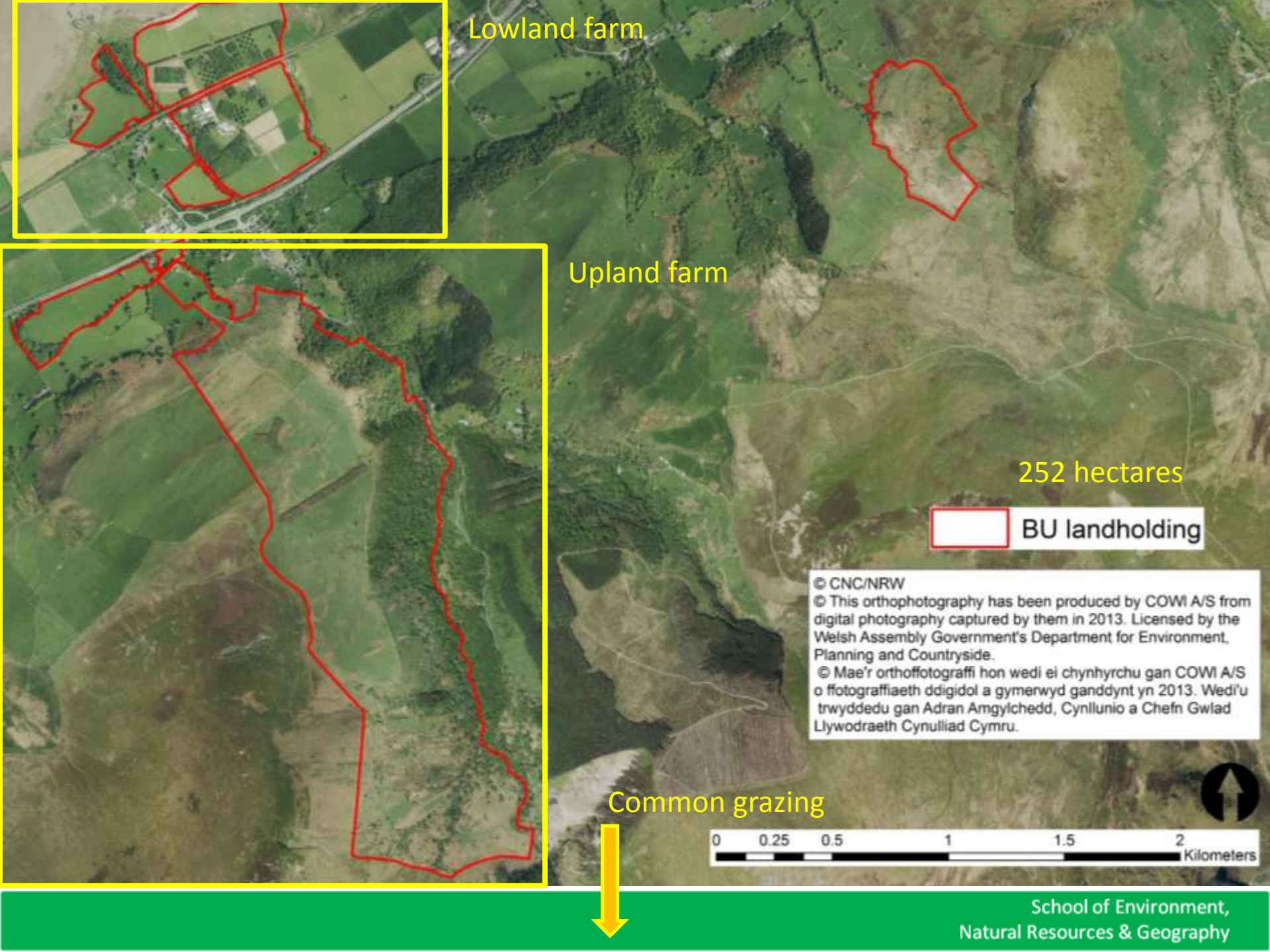
Glastir MEP

2013-14 Surveyor Training

Industry events

Henfaes sheep system: summary

- Welsh Mountain sheep
  - CAMDA breed improvement programme
- Feed blocks and silage
- Singles lambed outdoors on lowland; twins housed
- Sheep moved to Aber valley April; mountain in May


Lowland farm
Upland farm
252 hectares
BU landholding
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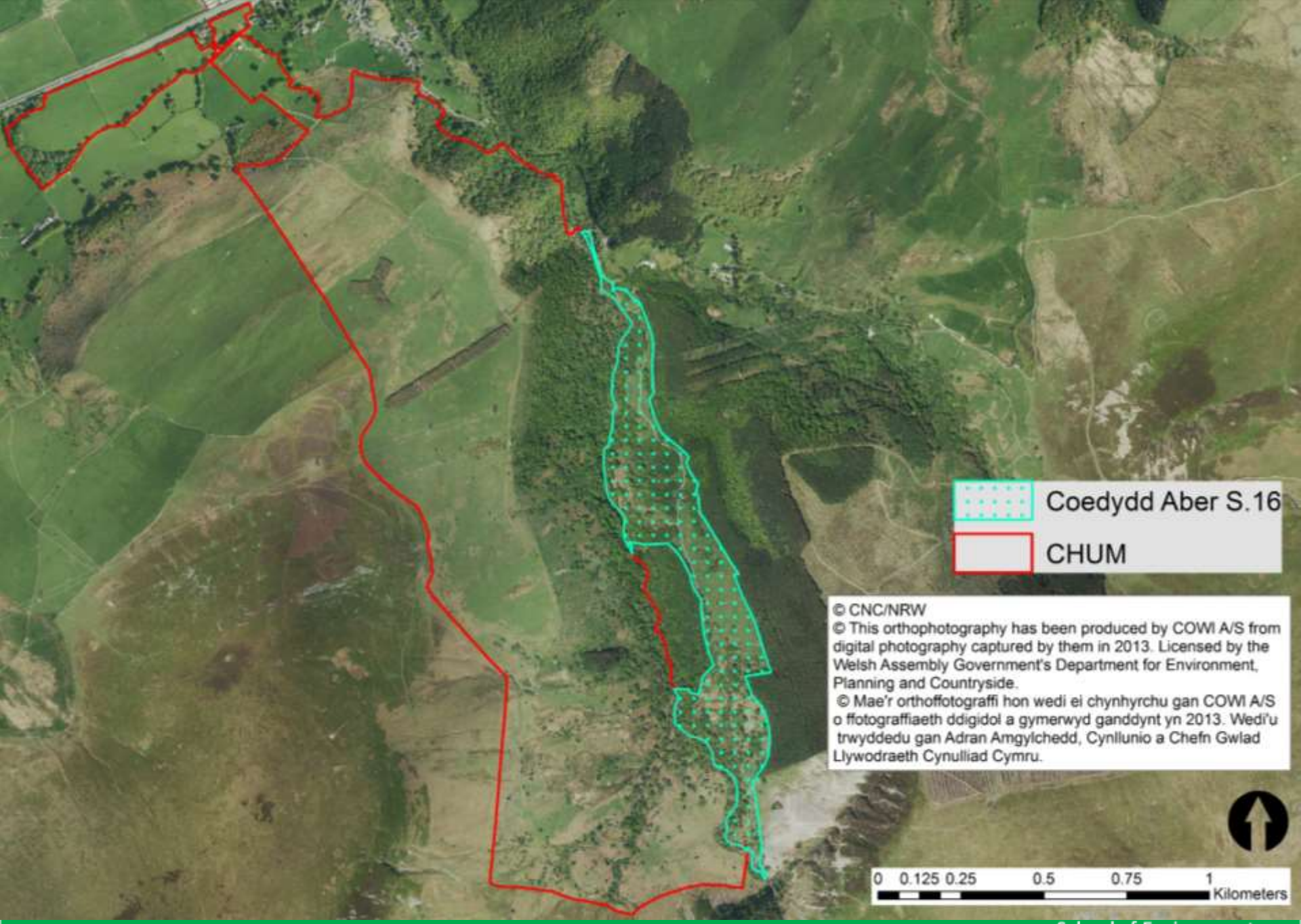
Common grazing
0 0.25 0.5 1 1.5 2 Kilometers

Legend
Henfaes land boundary
N
0 100 200 400 Meters
This layer contains the Bing Maps aerial imagery web mapping service, which provides worldwide orthographic aerial and satellite imagery
(c) 2010 Microsoft Corporation and its data suppliers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CHUM
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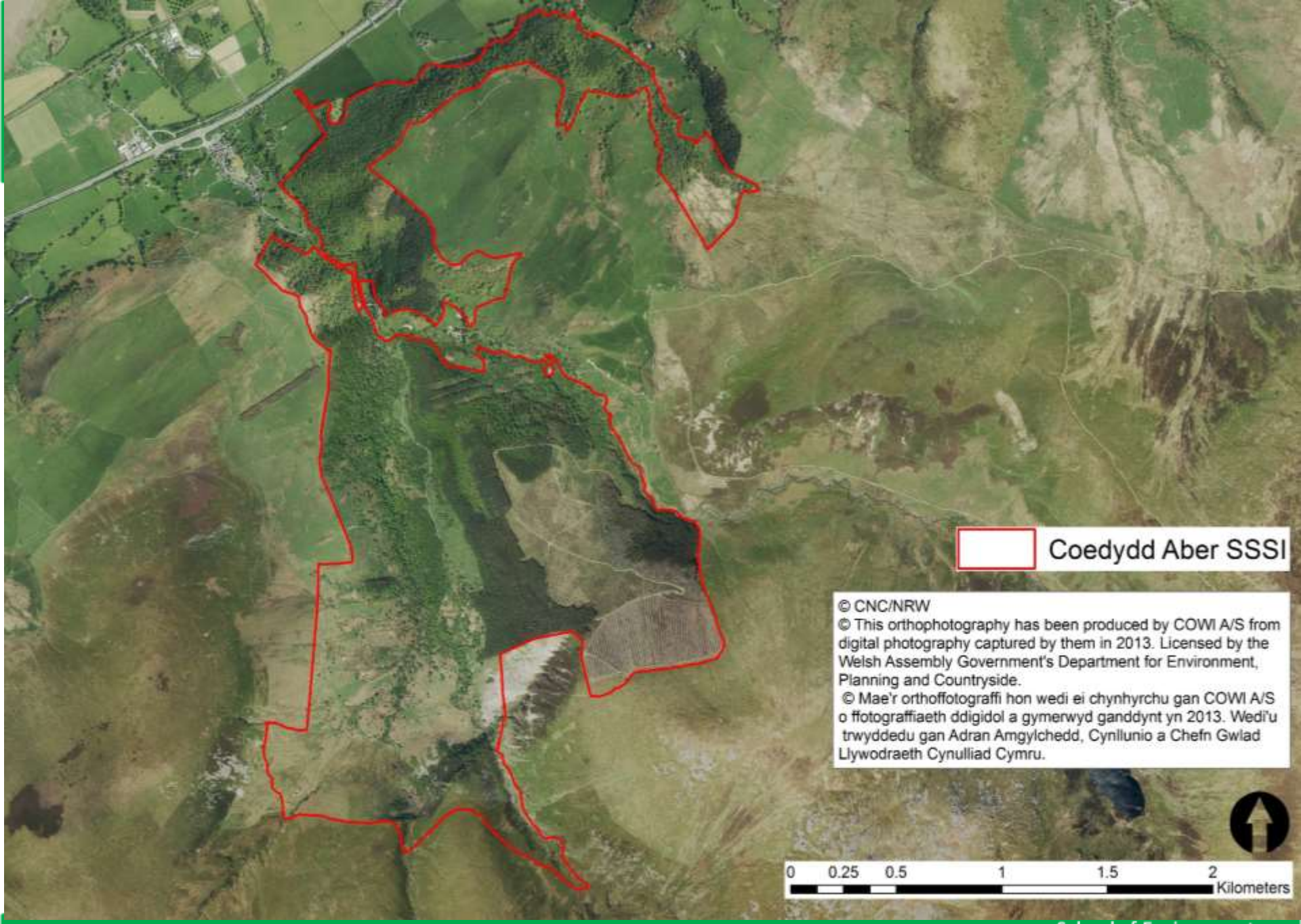
0 0.125 0.25 0.5 0.75 1
Kilometers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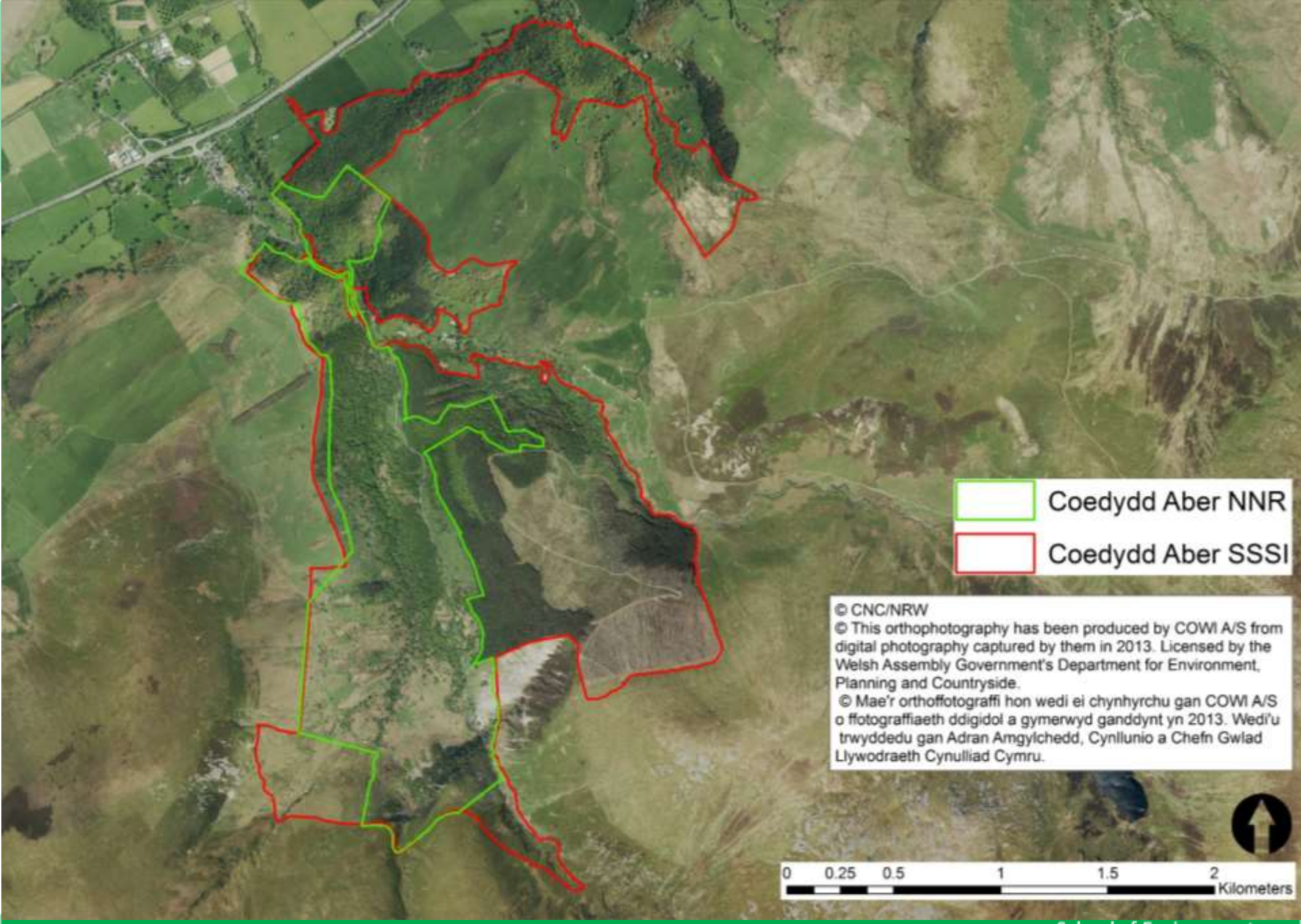
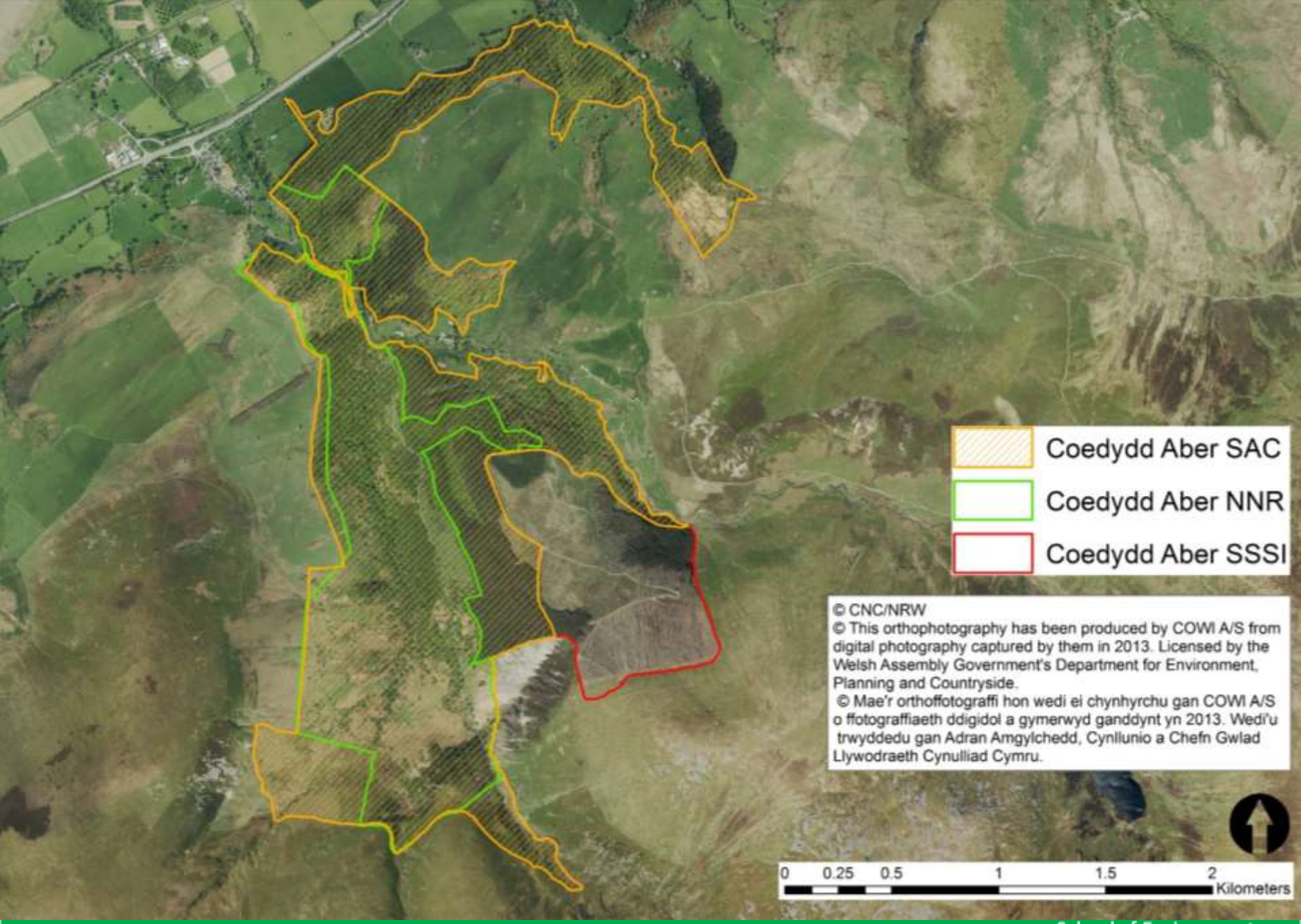
0 0.25 0.5 1 1.5 2
Kilometers



School of Environment,
Natural Resources & Geography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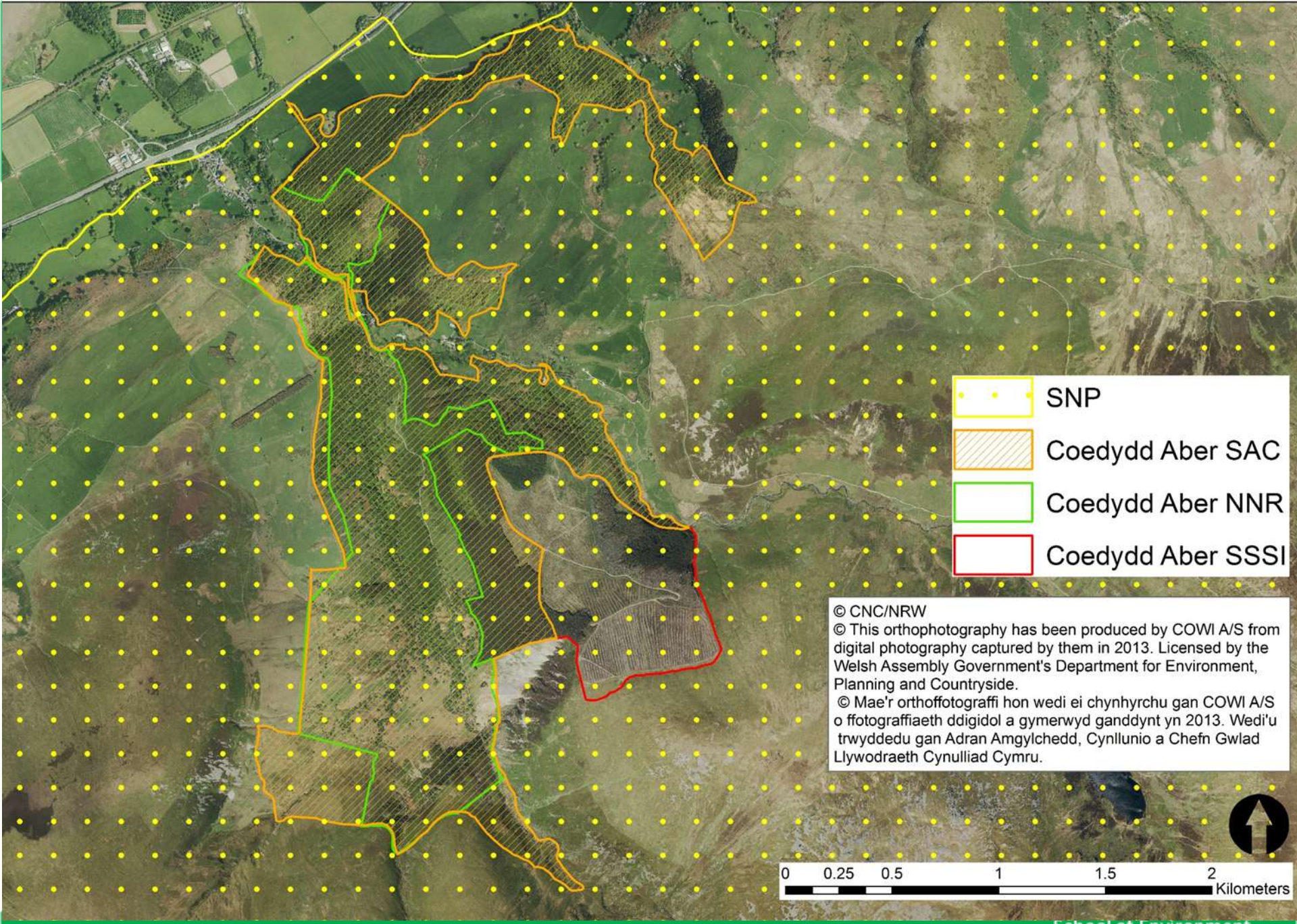
0 0.25 0.5 1 1.5 2
Kilometers


SNP
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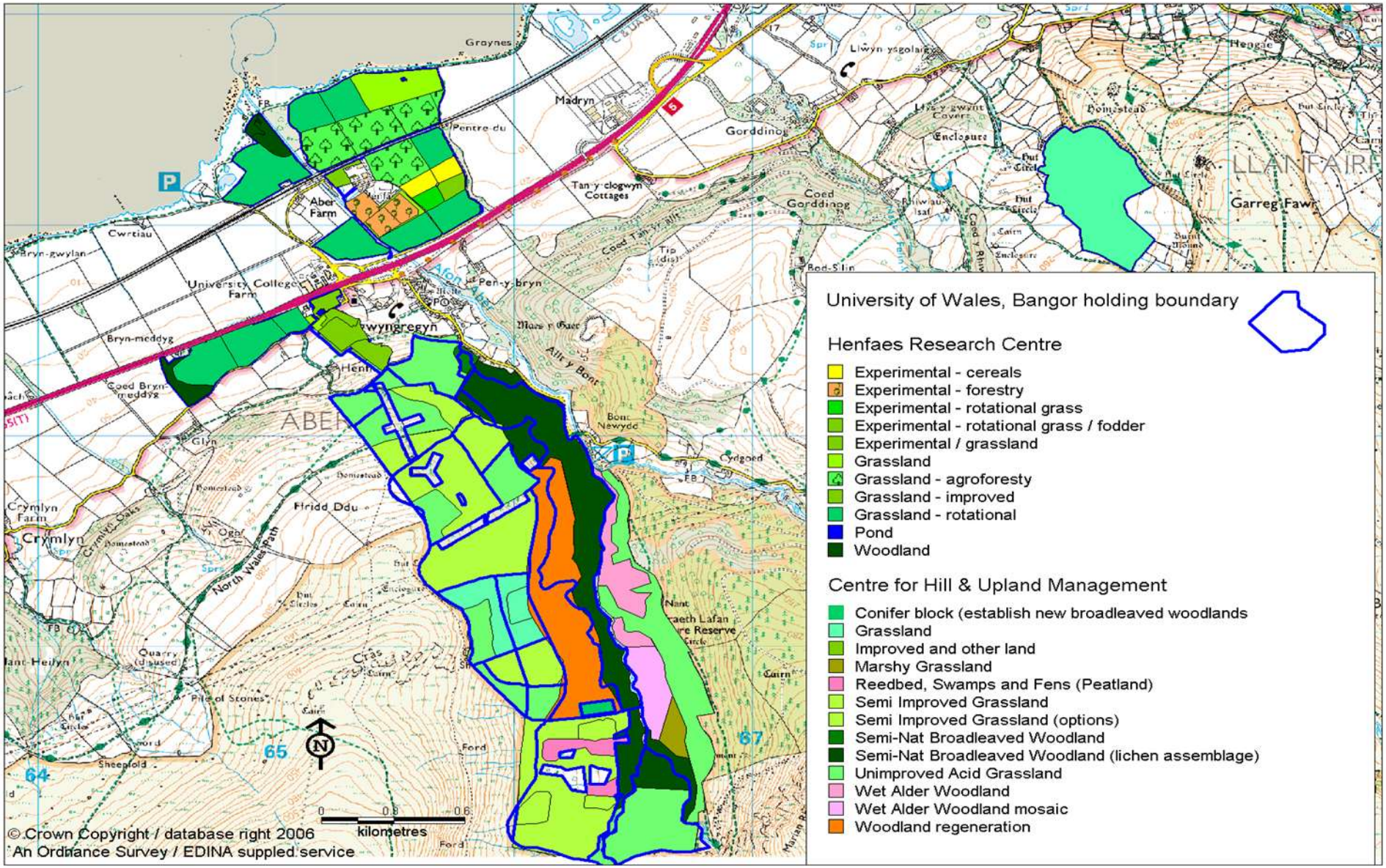
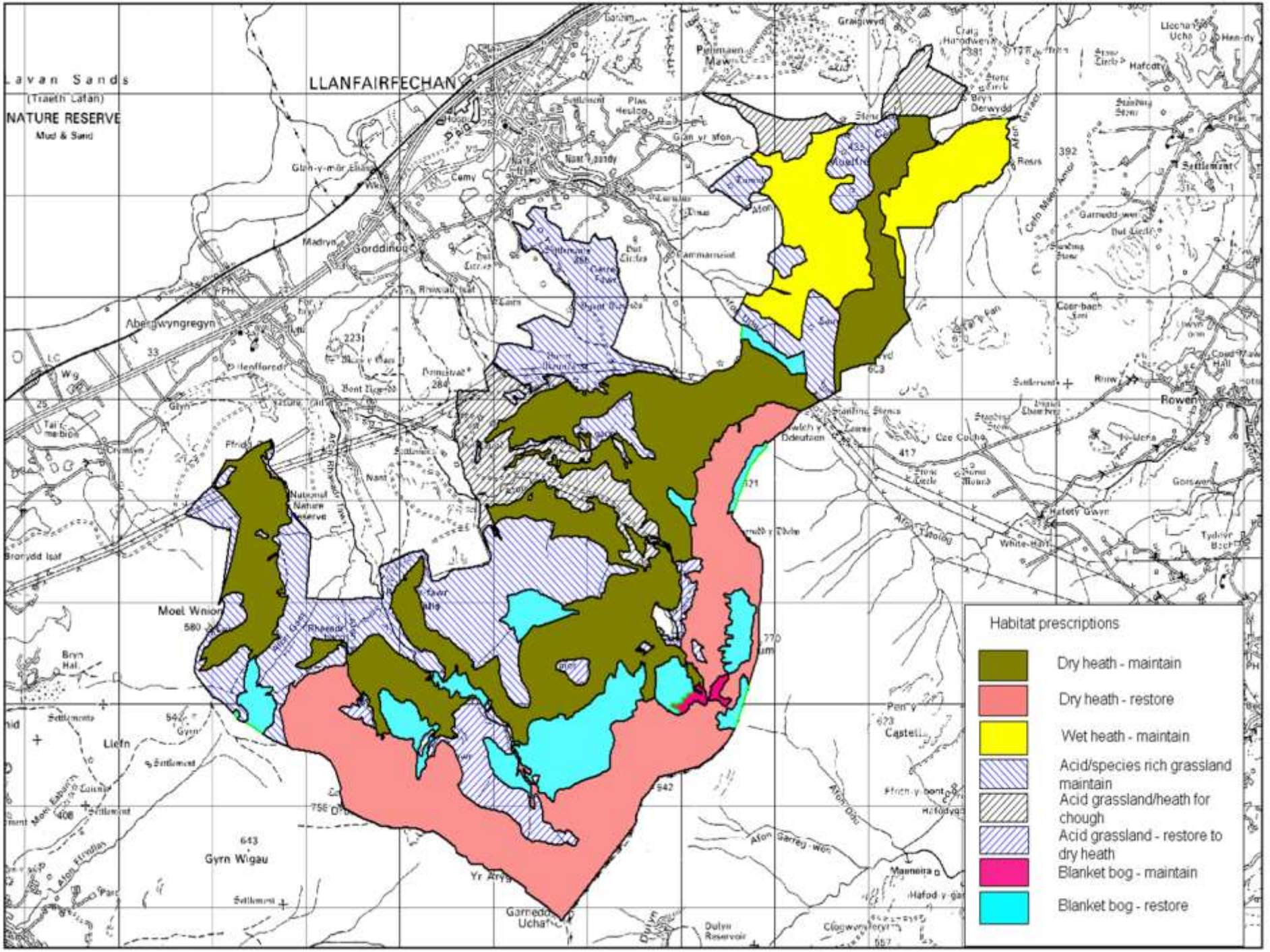
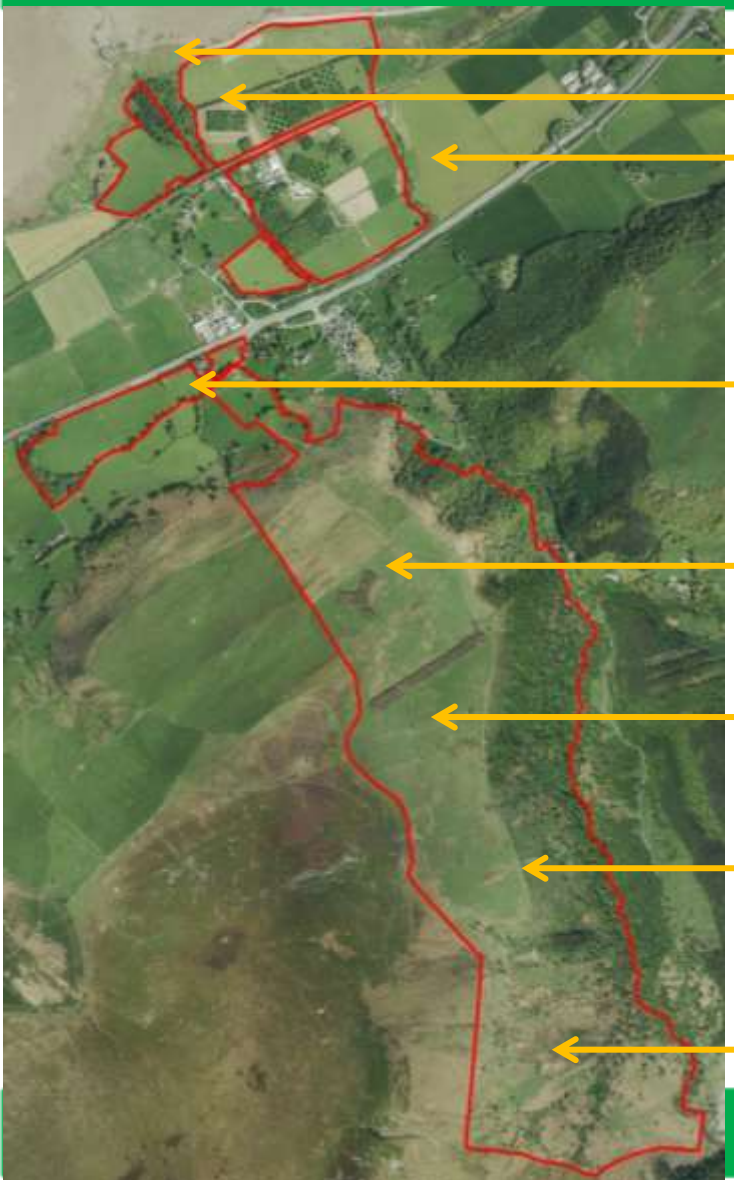
0 0.25 0.5 1 1.5 2
Kilometers

Diversity of habitats




LLANFAIRFECHAN
Lavan Sands
(Traeth Lafan)
NATURE RESERVE
Mud & Sand
Habitat prescriptions
Dry heath - maintain
Dry heath - restore
Wet heath - maintain
Acid/species rich grassland maintain
Acid grassland/heath for chough
Acid grassland - restore to dry heath
Blanket bog - maintain
Blanket bog - restore

Diversity of soils



Saltmarsh

Coastal brown earths

Neutral Brown earths

Gleys

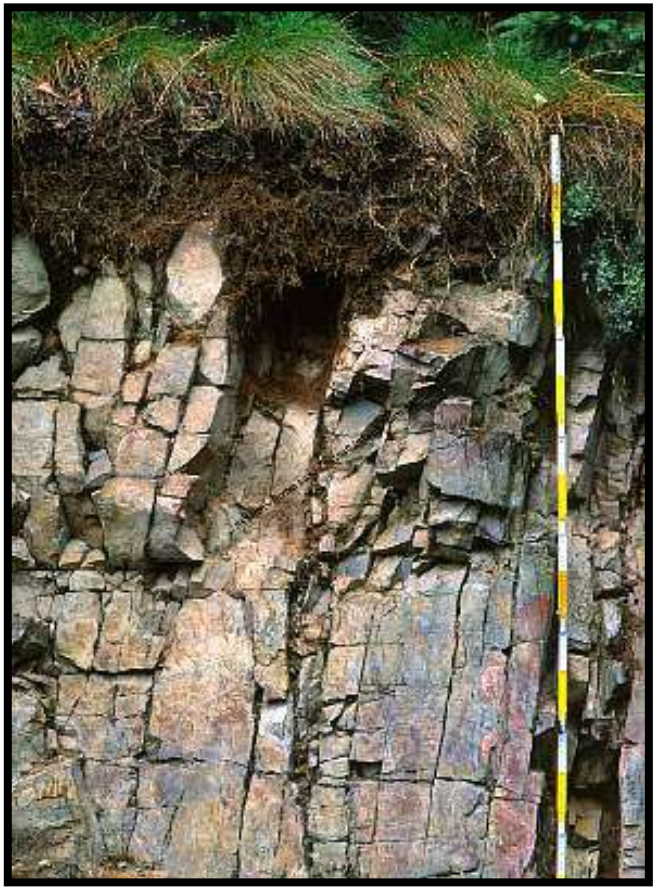
Acid Brown earths

Brown podzolics

Podzols

Peaty rankers

Welsh soils are very diverse



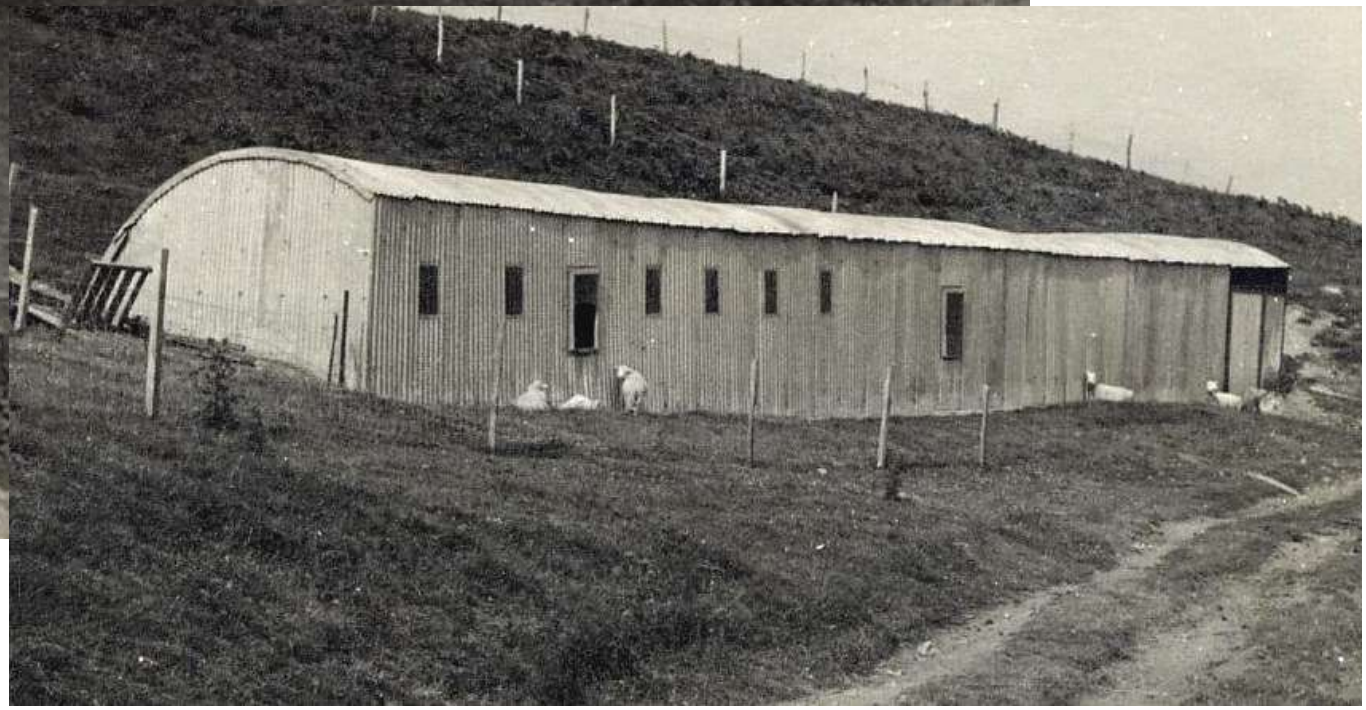
Land use research

Lowlands

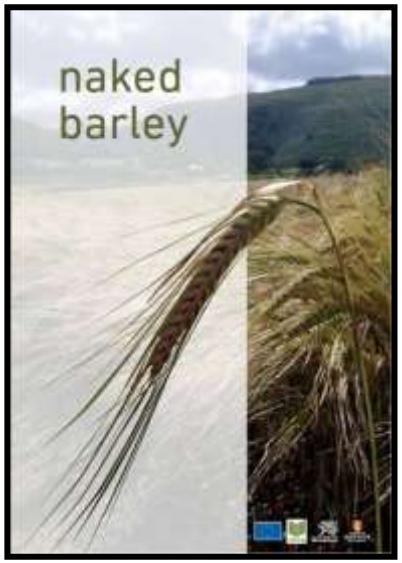
Fundamental science → Applied Science → Practice

Uplands

Shelterbelt experiment establishment

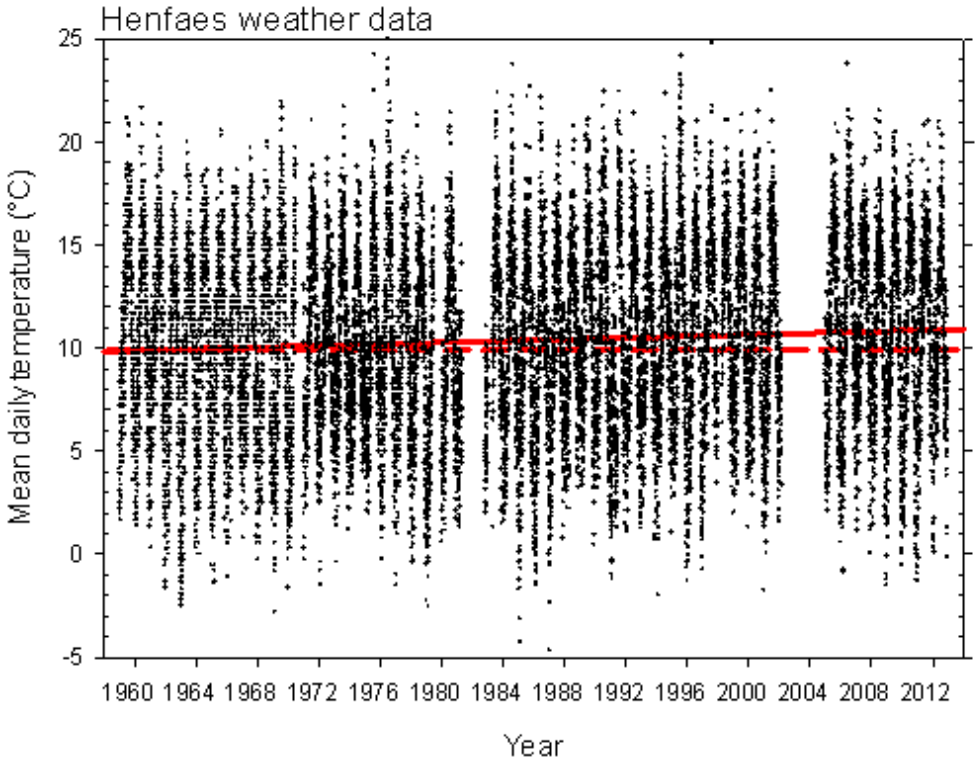


MENTERRA 2003-2007+



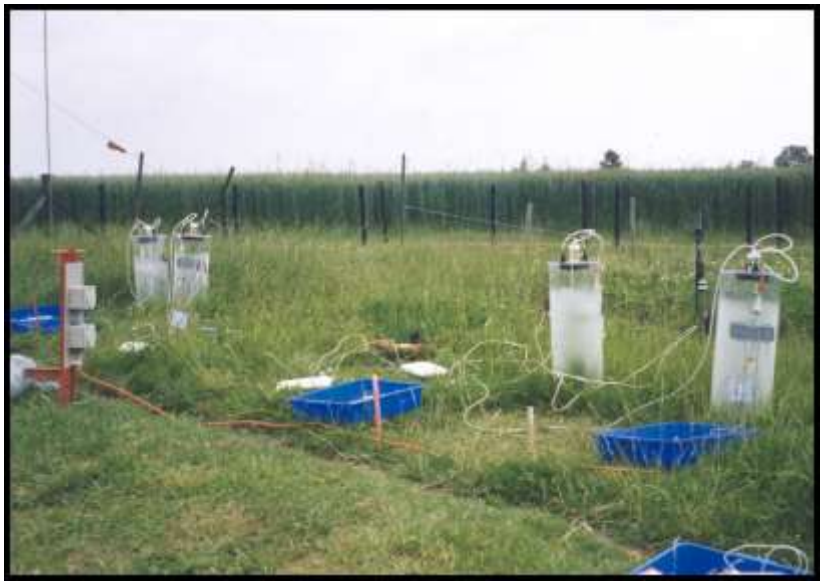
Climate change effects on soil

- How will soils respond to a changing climate in terms of nutrient cycling



Climate change responses

How will Welsh landscapes respond to climate change?



Soil responses to flooding

Can biochar improve soil quality?

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- Can we lock up carbon in the soil and improve soil quality (e.g. nutrient retention, soil structure)?

Silvopastoral agroforestry: 1992-present

BangorDIVERSE

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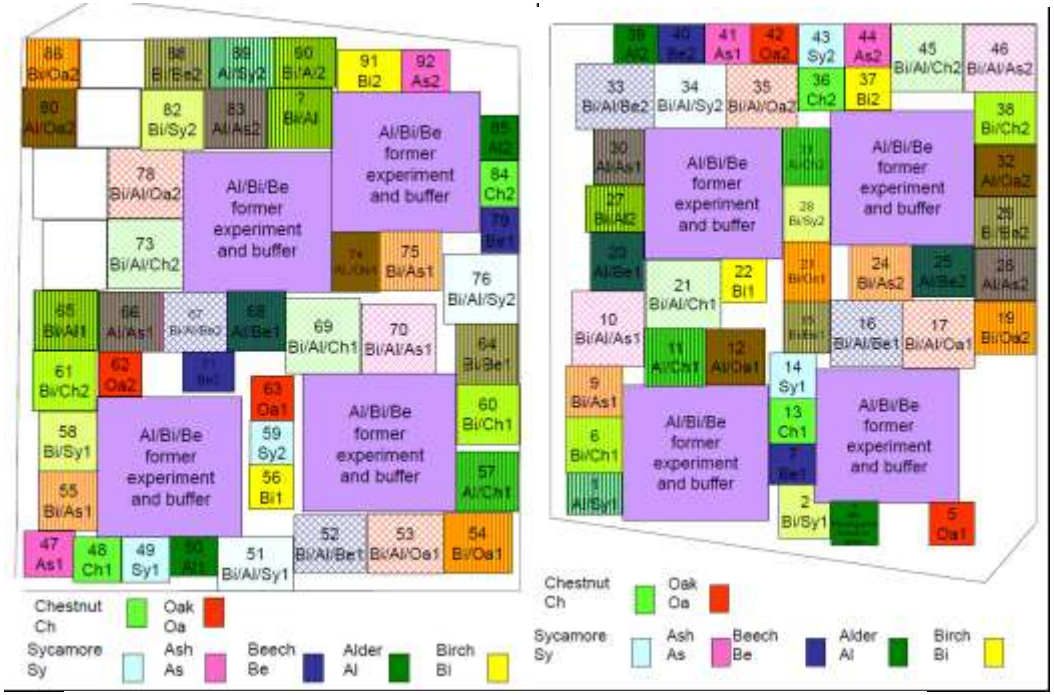

Birds or soil: which is more important?

Ecosystem services approach

Outwintering livestock

Pros and cons of forage grazing

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Pros

- Good for birds
- Easy to manage
- Better animal health

Cons

- Bad for soil quality
- Risk of soil erosion
- Higher greenhouse gas emissions
- Run-back areas need to well planned
- Poor animal health

Risk of human pathogens

E. coli O157

Farmer immunity

1 cow sheds 500,000,000 cells d^{-1} / human infective dose = 10

Bioreduction of fallen stock

Improving phosphorus use efficiency

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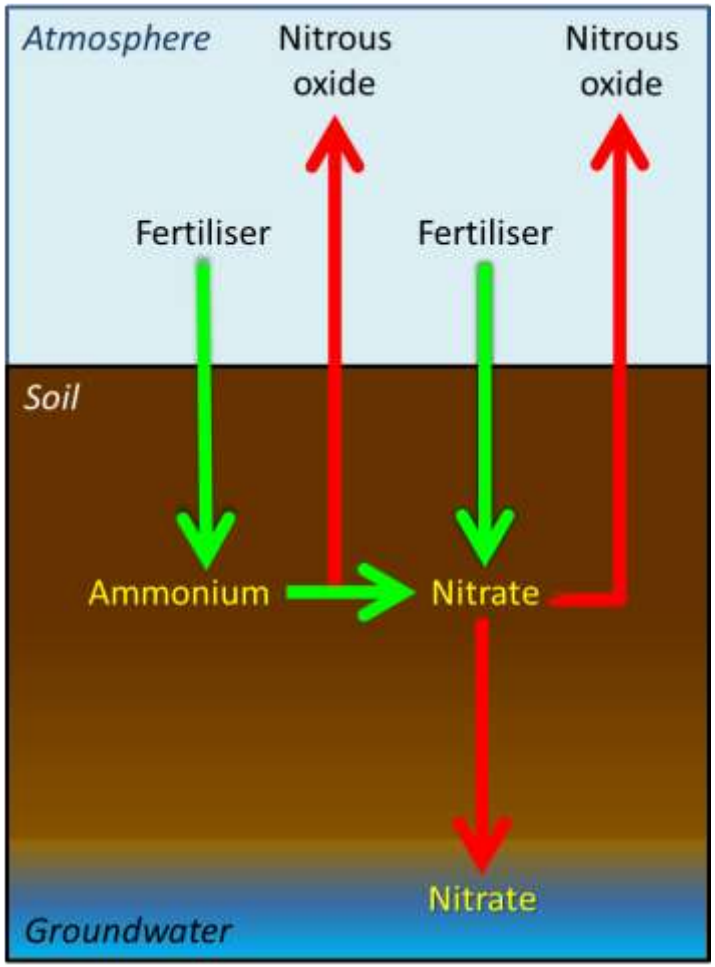
Can deep rooting varieties improve the uptake of P from soil?

Improving nitrogen use efficiency



1. In situ nitrogen sensors
2. Nitrification inhibitors
3. Use of clover
4. Diet vs GHG emissions

Assessing below-ground (soil) biodiversity in Wales

Llywodraeth Cymru
Welsh Government

Canolfan yr Amgylchedd Cymru
Environment Centre Wales

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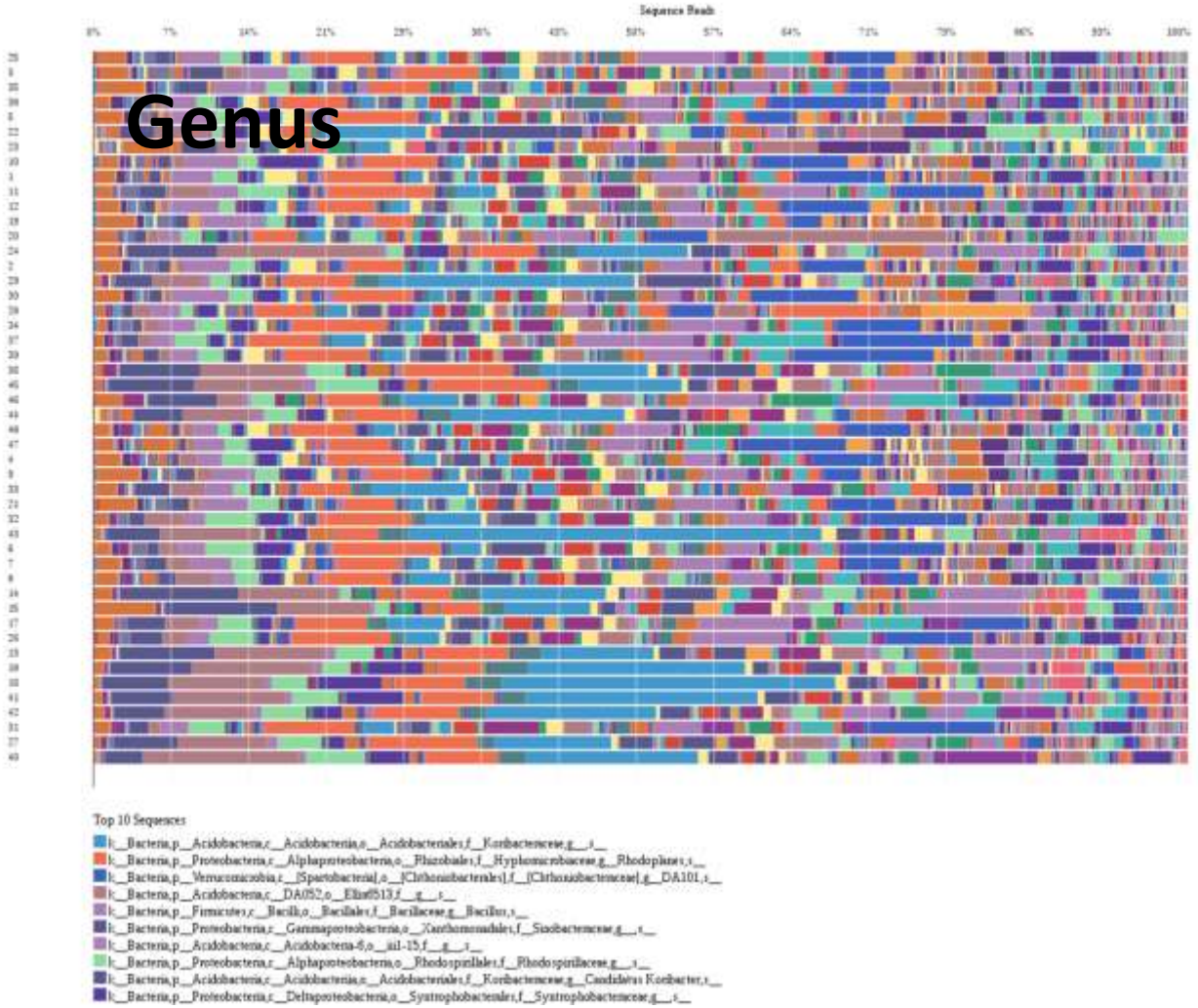
CEH
Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

What do we mean by soil biodiversity?

Bacterial taxa across the samples

- Domain
- Kingdom
- Phylum
- Class
- Order
- Family
- **Genus**
- Species



Conclusions

- Lowland → upland platform
- Long history of research
- Diversity of land use (soils and vegetation)
- Diverse research
- Fundamental science through to application
- Interdisciplinary
- Good infrastructure
- Good industry liaison