



# Reviewing evidence on the ecological condition of Wales' woodlands

A study for the Woodland Trust



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## PAWS Restoration and Continuous Cover Forestry

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*A review for the Woodland Trust by Rob Marsh*

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October 2018

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Rob Marsh Woodland Services Ltd



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## Restoring Plantations on Ancient Woodland Sites in Wales: Impacts on Softwood Timber Production

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*A study for the Woodland Trust by Rob Marsh*

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July 2016

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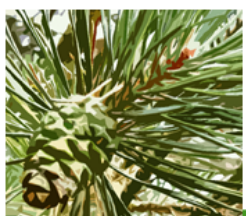


Rob Marsh Woodland Services Ltd



# Project background

- Woodland Trust UK review of woodlands and trees
  - Data sources for Wales
  - Feed into UK-level scoping project
- Inform discussions on policy and advocacy in Wales
- Contributing to NRW's 2020 State of Natural Resources Report (SoNaRR).
  - “evidence gaps”



# Woodland condition

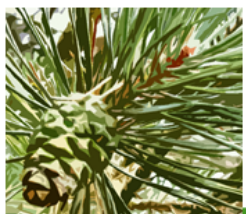
## The obvious...

- Woodland extent (out of scope)
- Woodland “type”
- Woodland composition:
  - Tree species composition
  - Shrubs, ground flora
  - Ferns, mosses, lichen
  - Soils, deadwood
  - Animals
- Structural attributes:
  - Age-class (trees)
  - Density (no. trees; basal area)
  - Understorey, shrub layer
  - Regeneration



Woodlands naturally change

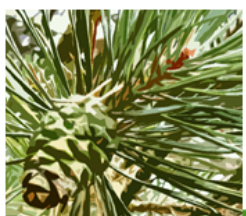
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# Woodland condition

## The less obvious (part 1)

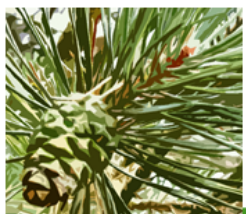
- Threats to woodlands:
  - Pests and diseases
  - Development
  - Invasive species
  - Climate change
  - Pollution
  - Grazing...



# Woodland condition

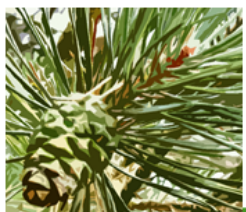
## The less obvious (part 2)

- Ecosystem services
  - Landscape
  - Recreation & tourism
  - Water quality / interception / flood prevention
  - Shelter
  - Air quality
  - Noise abatement
  - Timber



# Sources of information

- Scientific studies
  - Repeated / one-off
  - Original research and its interpretation
- Nationwide projects
  - Forest inventories, air / water quality monitoring
  - Particular species / taxon groups: Record Centres
- Remote sensing
- Management data
  - Site management plans
  - Grant schemes
  - Regulatory data
- Citizen science
  - E.g. Ancient Tree Inventory, Observatree, Tree Alert...
- Combined / interpretive studies
  - E.g. NRW's SoNaRR; State of Nature Partnership



# Bringing it all together

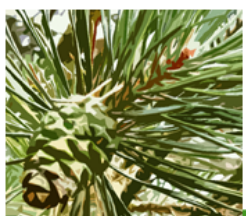
Source Ref	Data source	Scale	Owner	Published (date)	Time periods				Woodlands							Ecological attributes									
					Current	Last 10 yrs	Last 50 yrs	>50 yrs	Future (predictive)	Wood extent	Wood type	Ancient woods	Non-Ancient woods	Planning regs	Agricultural woodland	Soils	Water / riparian	Lichens / mosses	Ground flora	Understorey	Woodland canopy	Ind. Trees	Deadwood	Insects	Birds
1	Ancient Woodland Inventory	National / all land	NRW	2011	Y			Y		Y	Y	Y									Y				
2	National Forest Inventory	National / all land	Forest Research	2017	Y	Y				Y	Y	Y	Y								Y				
3	Phase 1	National / all land	NRW	1999	Y		Y			Y					Y										
4	Tree Cover in Wales Towns and Cities	National / all land	NRW	2016	Y	Y															Y				
5	SSSI management plans and monitoring	National / particular	NRW	TBC	Y	Y	Y				Y	Y	Y				Y	Y	Y	Y	Y	Y	Y		
6	I-tree	Specific areas	Forest Research / USD	Ongoing	Y	Y															Y				
7	Ecological Site Classification	National / all land	Forest Research	n/a	Y	Y			Y		Y					Y			Y		Y				
8	Google Earth aerial photography	National / all land	Google Earth		Y	Y				Y	Y					Y									
9	Recent aerial photography (various sources)	National / all land	Commercial AP suppliers	Various		Y	Y	Y		Y	Y					Y									
10	Historic OS maps (various dates)	National / all land	OS / online sources	Various	Y	Y	Y	Y		Y	Y					Y									
11	Historic (decades-old) aerial photography	National / particular	National Library; NRW	TBC			Y	Y		Y	Y														
12	OS Opendata	National / all land	OS / online sources		Y					Y	Y						Y								
13	OS Mastermap	National / all land	OS		Y					Y	Y						Y								

- ~90 sources so far
- Categorising / summarising for future users
- How can we improve data collection?



# Ammonia

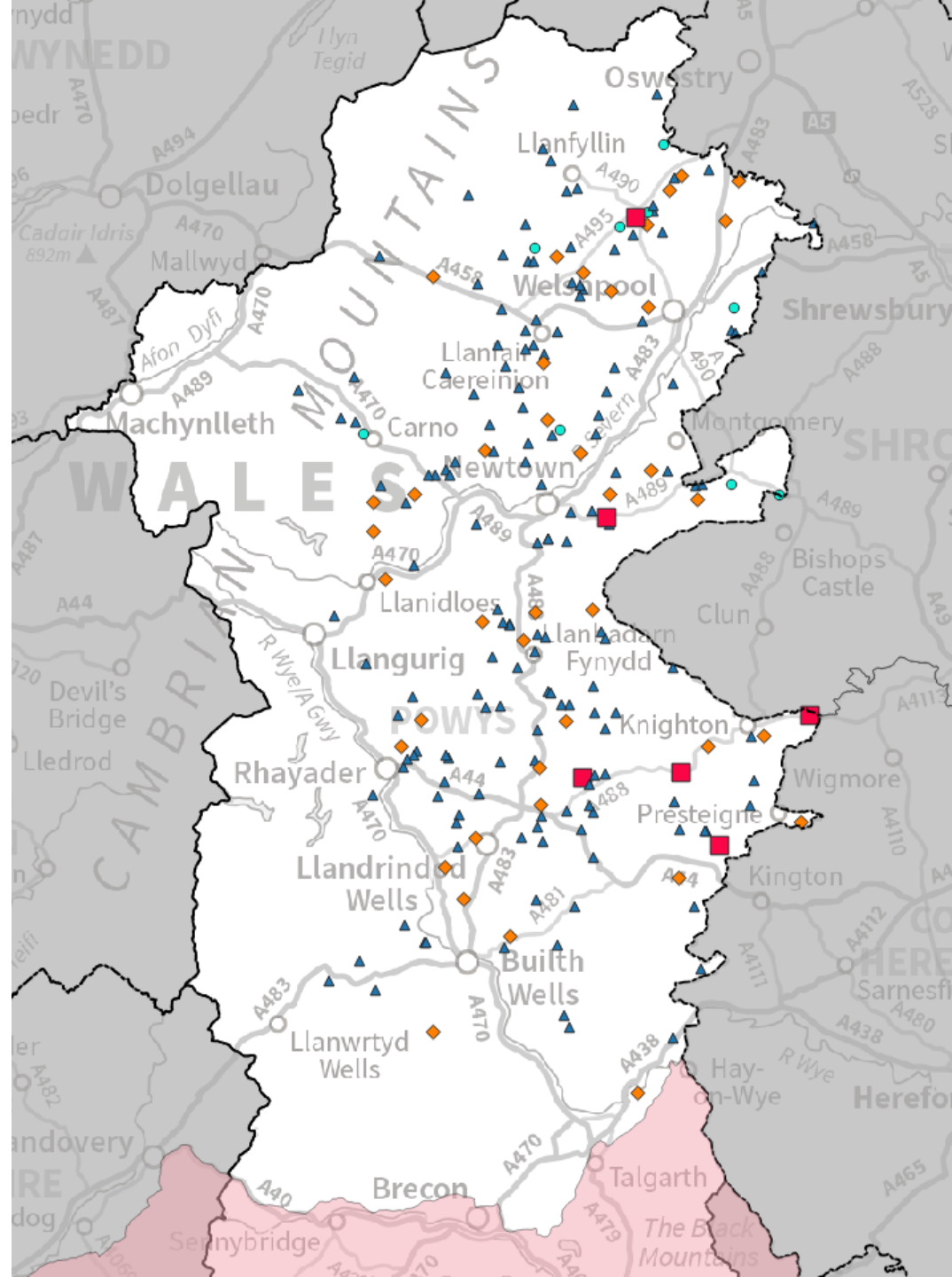
- Sources of pollution in rural areas:
  - Poultry units
  - Pig production
  - Cattle / dairy
- Short-range effects
- Impacts on woodlands
  - Increases available nitrogen
  - Direct impacts (especially fungi / lichen)
  - Indirect impacts on wider ecosystem
- Diffuse pollution
  - Multiple sources
  - Various levels of severity and mitigation
  - Difficult to regulate (processes need updating)



# Where are the poultry units?

Poultry units by no. birds:

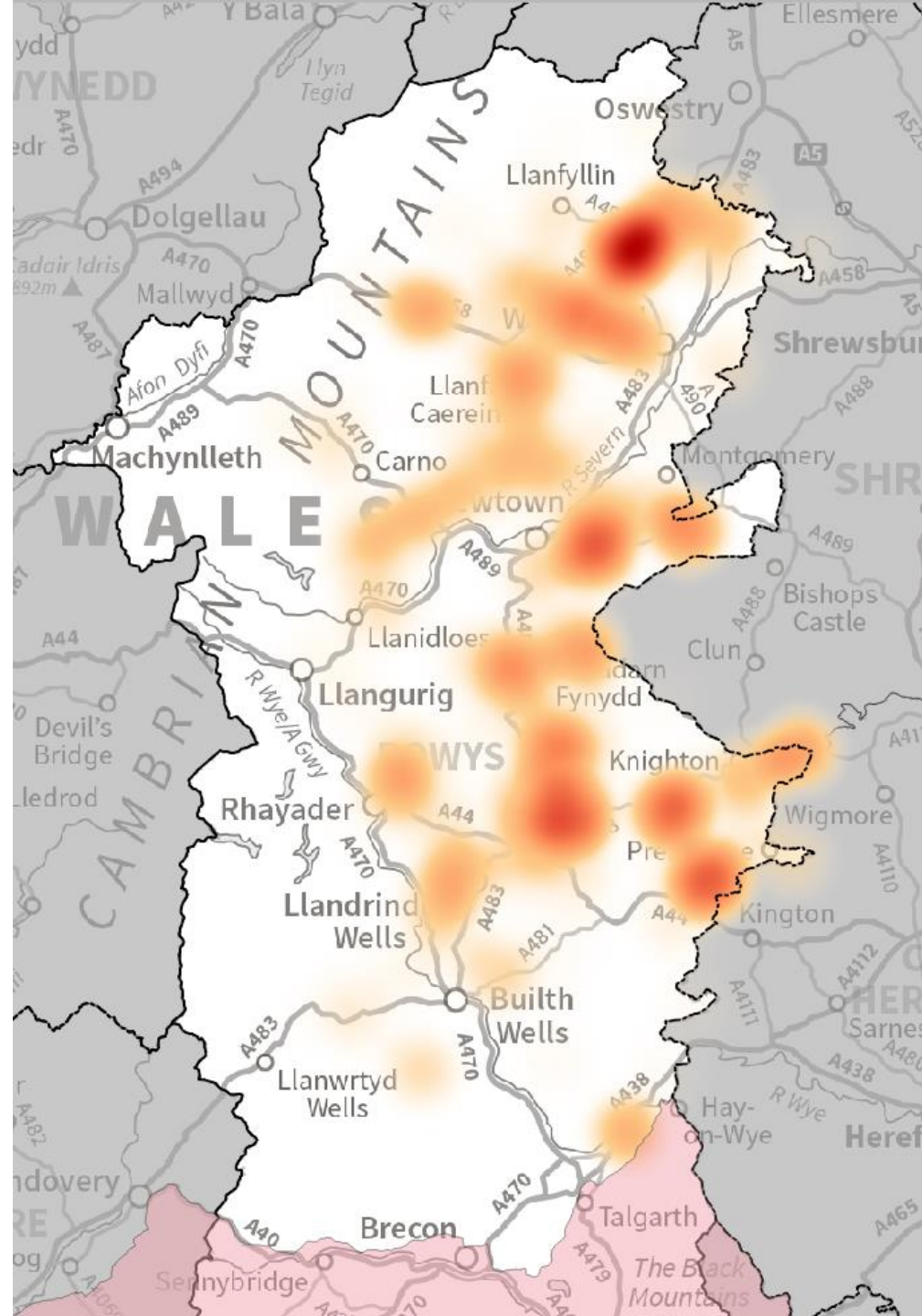
- ▲ <40,000
- ◆ 40,000-200,000
- >200,000
- Unknown



*Powys poultry unit data used courtesy of Brecon & Radnor Branch, CPRW. Contains OS data © Crown copyright and database right (2019)*

# Ammonia heatmap

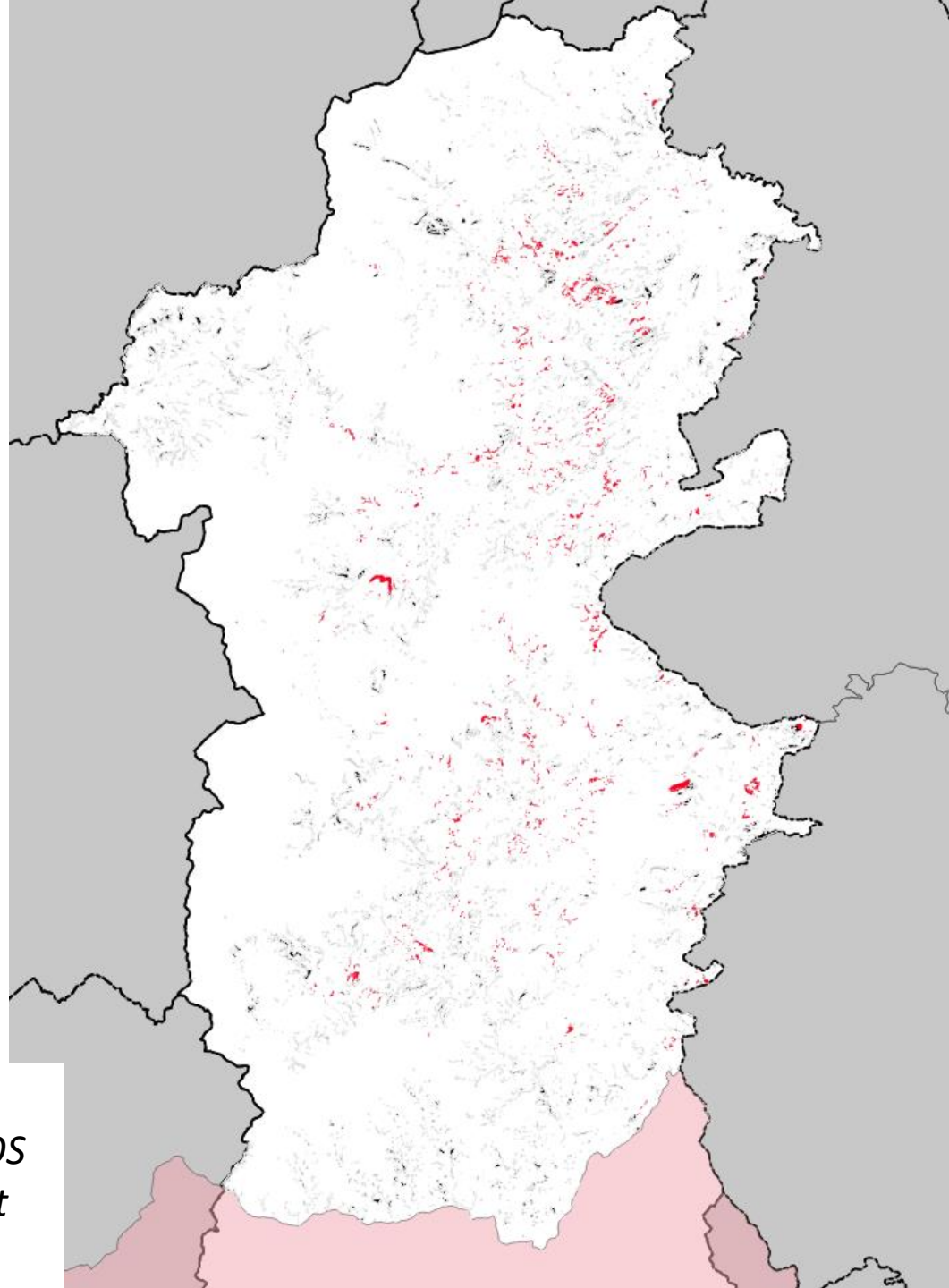
- Based on 5km radius
- Intensity from total no. birds / farm
- Only from known poultry units
- Approximate picture - emissions vary...
- Other sources?



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## Proximity to Ancient Woodland Sites

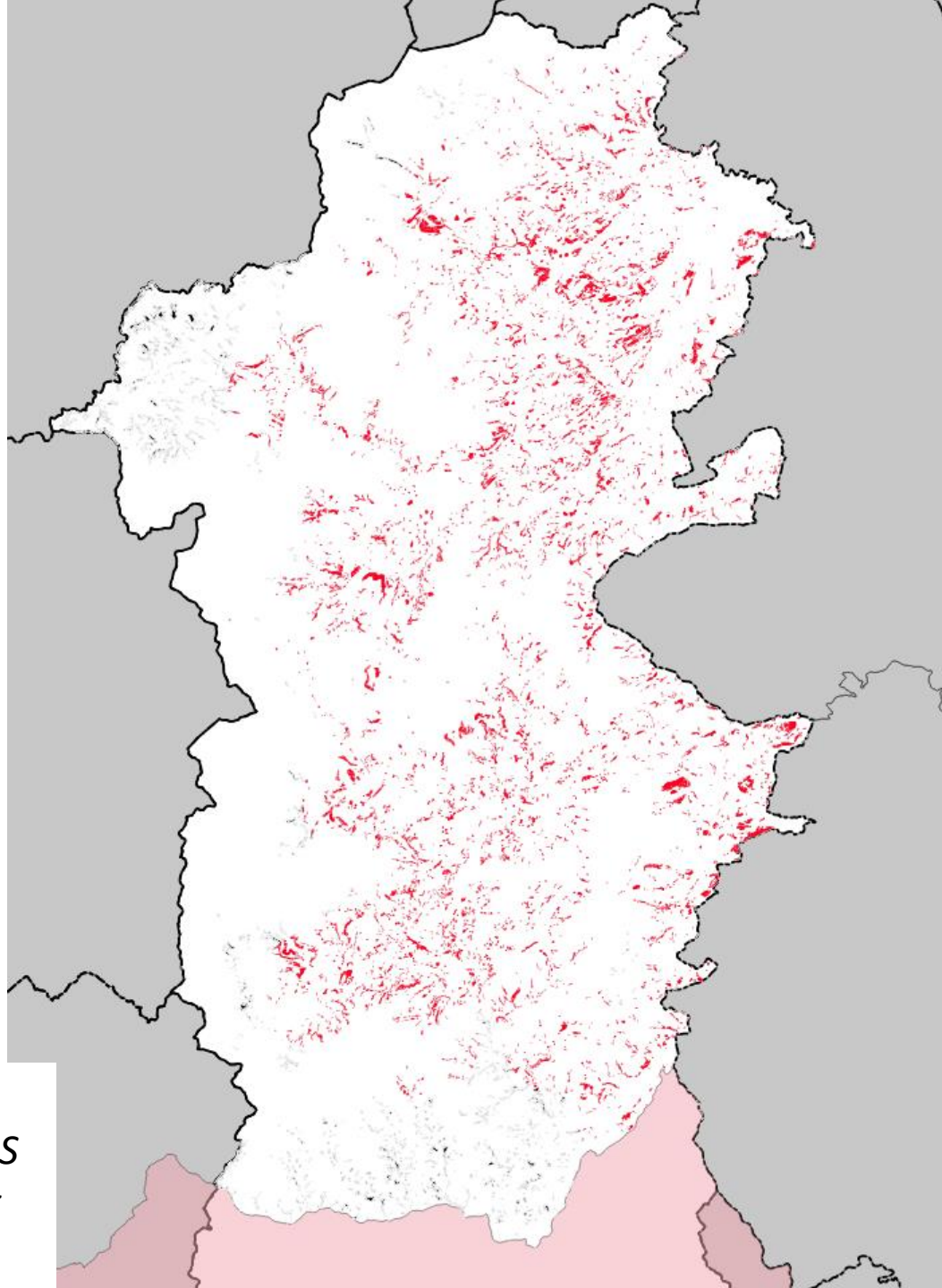
- RED – AW <1km from poultry unit
- Black – other AW
- 2,896 hectares (7,156 acres)
- 15% of AW area



*Powys poultry unit data used courtesy of Brecon & Radnor Branch, CPRW. Contains OS data © Crown copyright and database right (2019); Ancient Woodland Inventory (NRW)*

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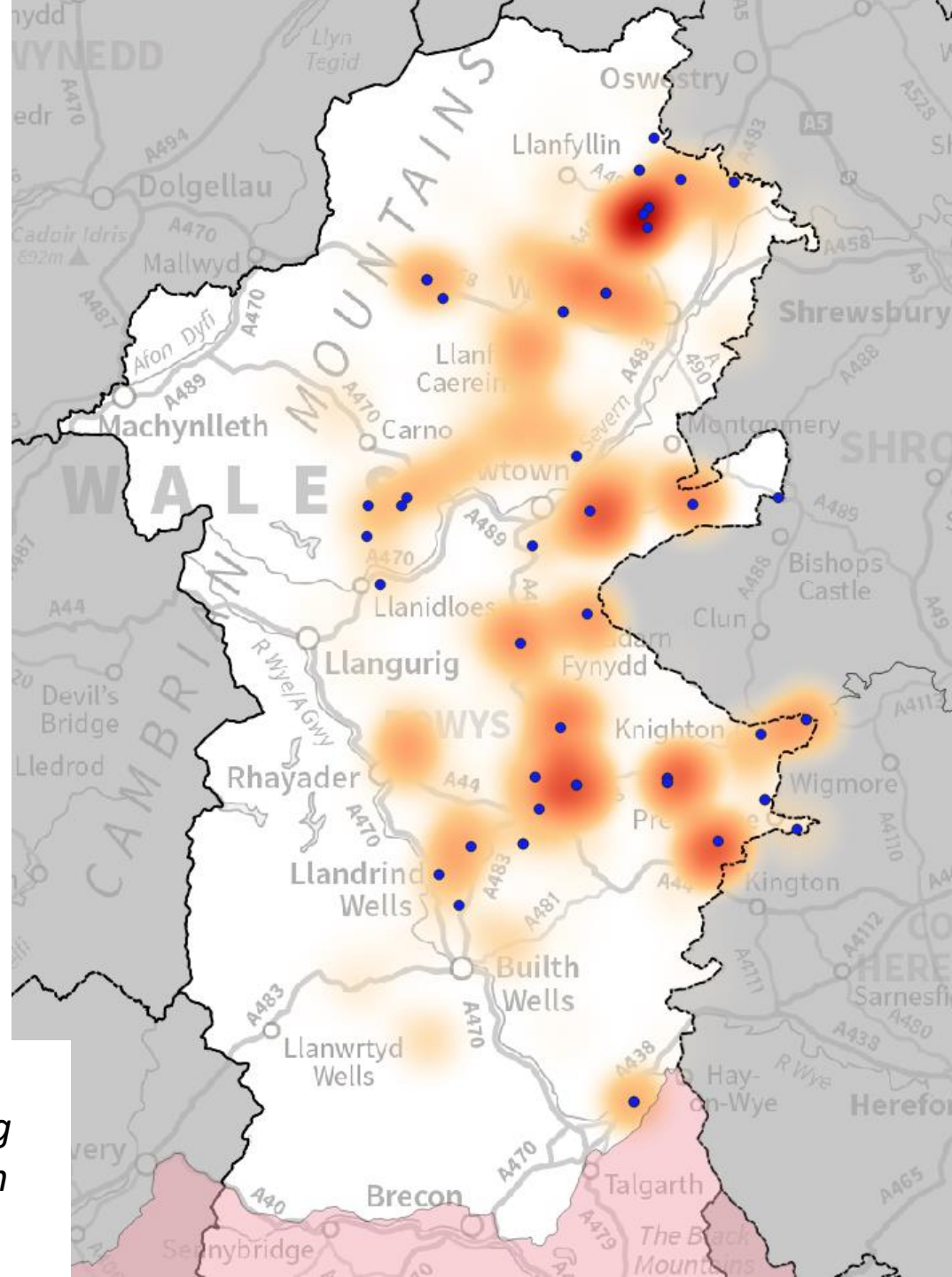
- RED – AW <5km from poultry unit
- Black – other AW
- 15,134 hectares (37,400 acres)
- 78% of AW area



*Powys poultry unit data used courtesy of Brecon & Radnor Branch, CPRW. Contains OS data © Crown copyright and database right (2019); Ancient Woodland Inventory (NRW)*

# Environmental Permitting Regulations (Industrial Sites)

- Blue dots show “poultry or pigs” permit categories



*Powys poultry unit data used courtesy of Brecon & Radnor Branch, CPRW. Permitting data NRW (Lle). Contains OS data © Crown copyright and database right (2019)*



Thank you