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# The dynamics of species-rich meadows on UK floodplains

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# Structure

- Hydrological niches
- Dynamism of the plant community
- Implications for restoration techniques
- Maintenance of  $\alpha$ -diversity



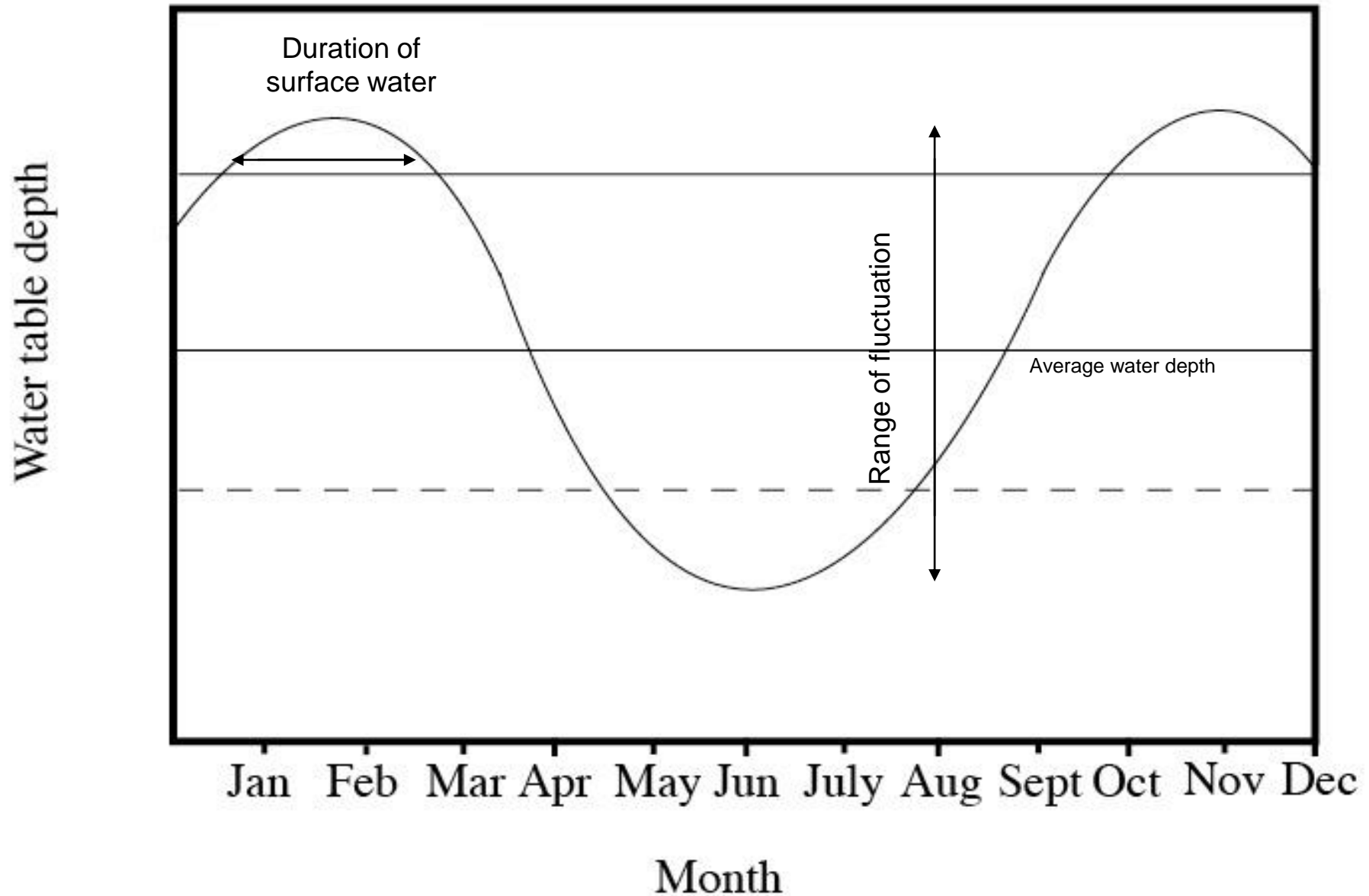
# Floodplain hydrology in UK

- Highly managed and regulated

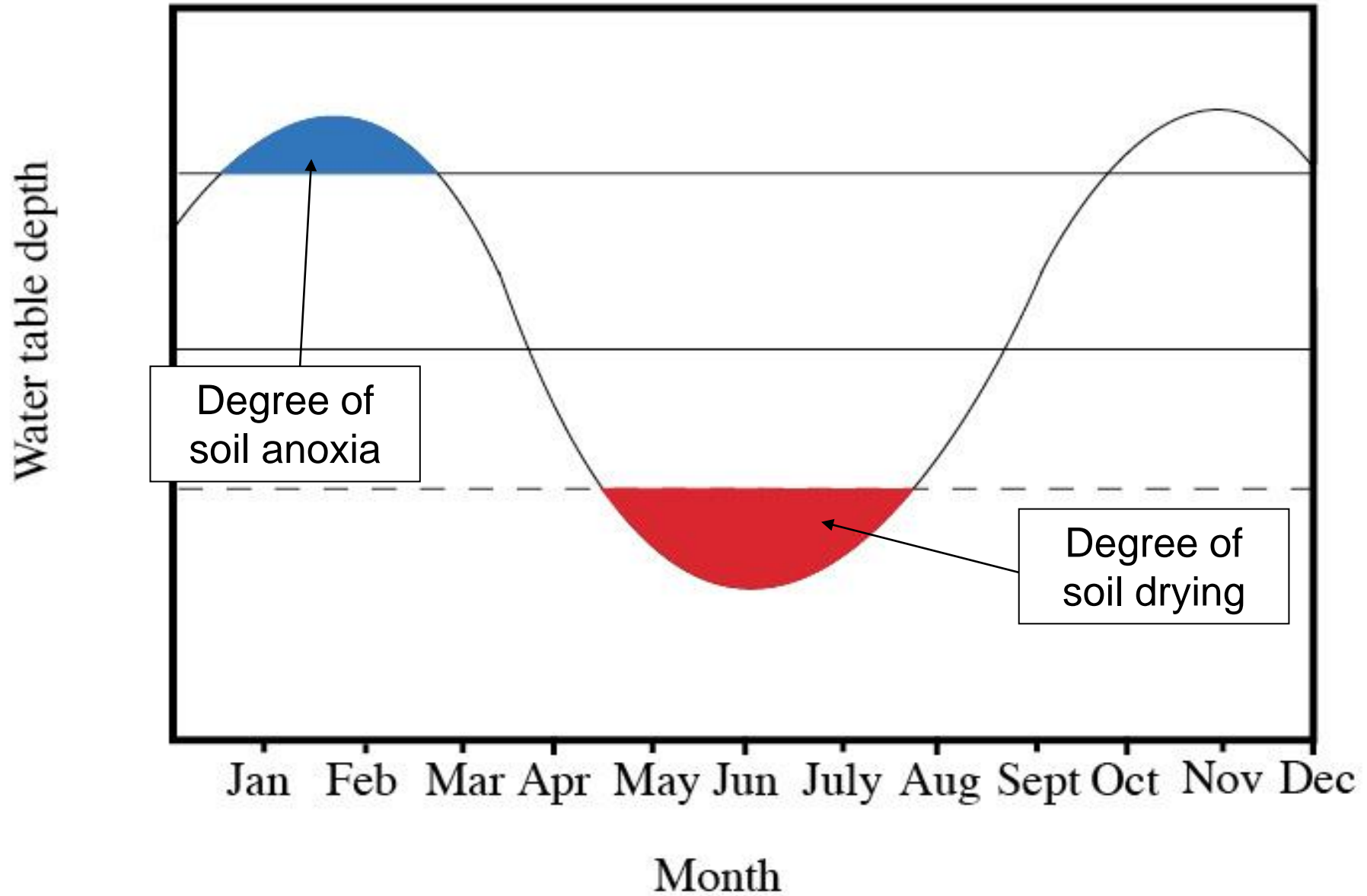


- Plant communities have assembled in response

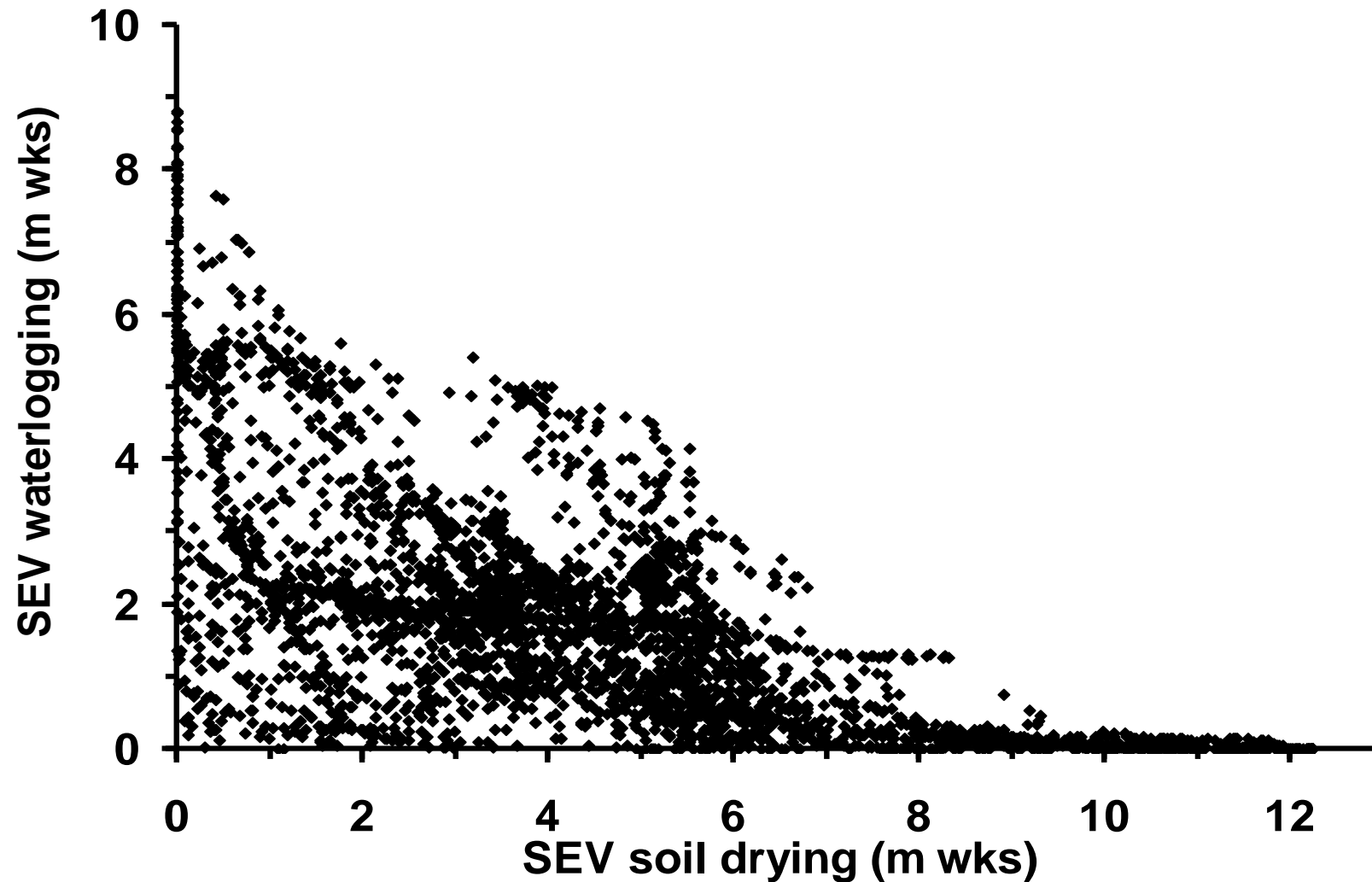
# Interpretation of a hydrograph



# Sum exceedence method



# Distribution of modelled water regimes

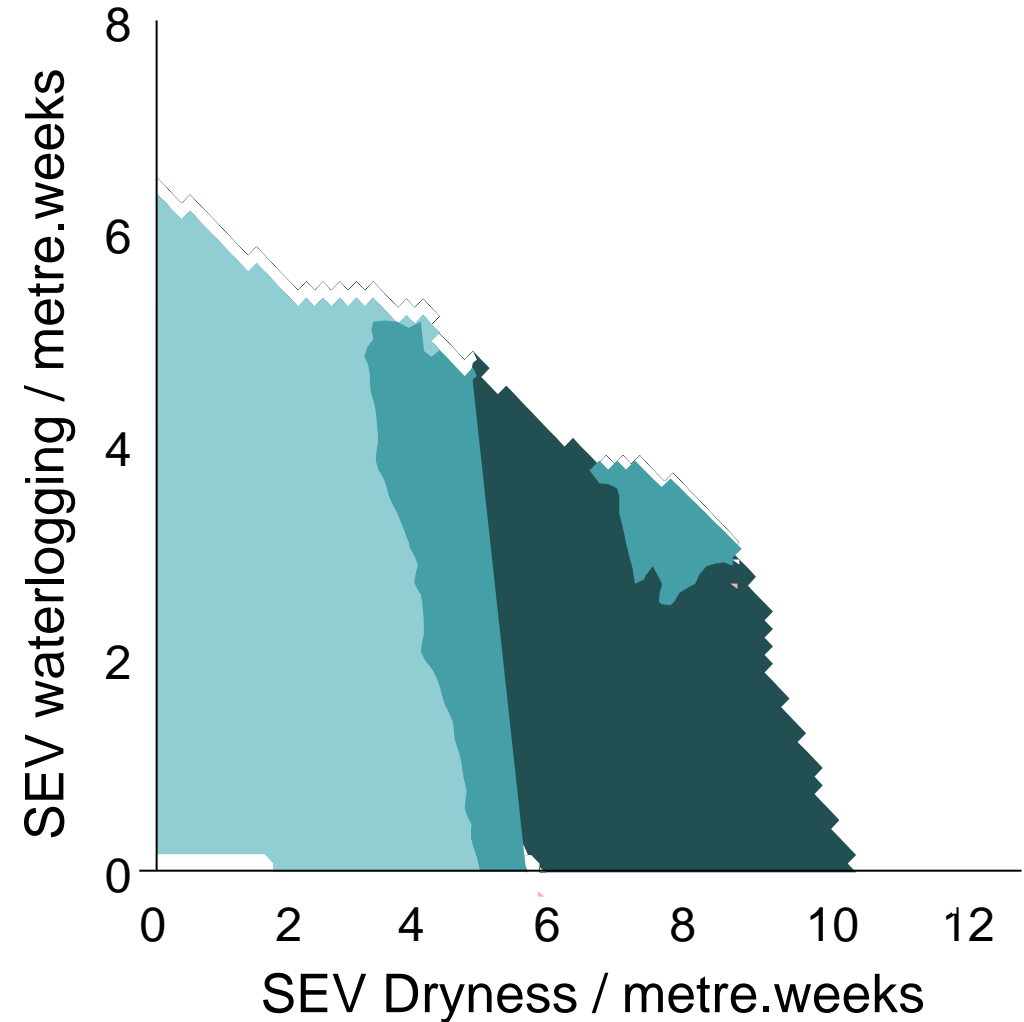


# Species SEV tolerances

- Meadow vetchling (*Lathyrus pratensis*) frequency relative to SEVs



- Data compiled from >3000 sample positions from 7 sites across England with contrasting soils

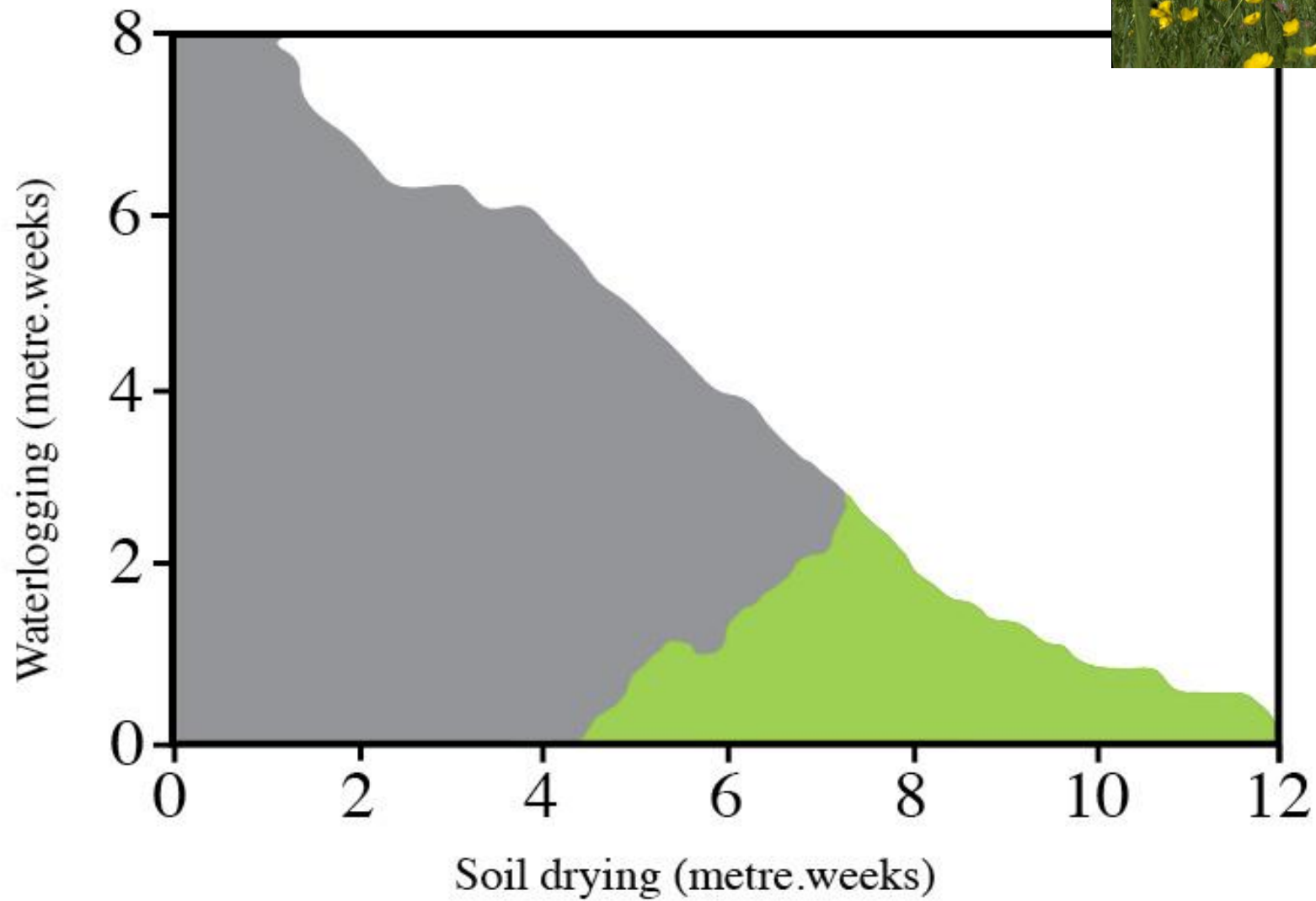


Less frequent than by chance

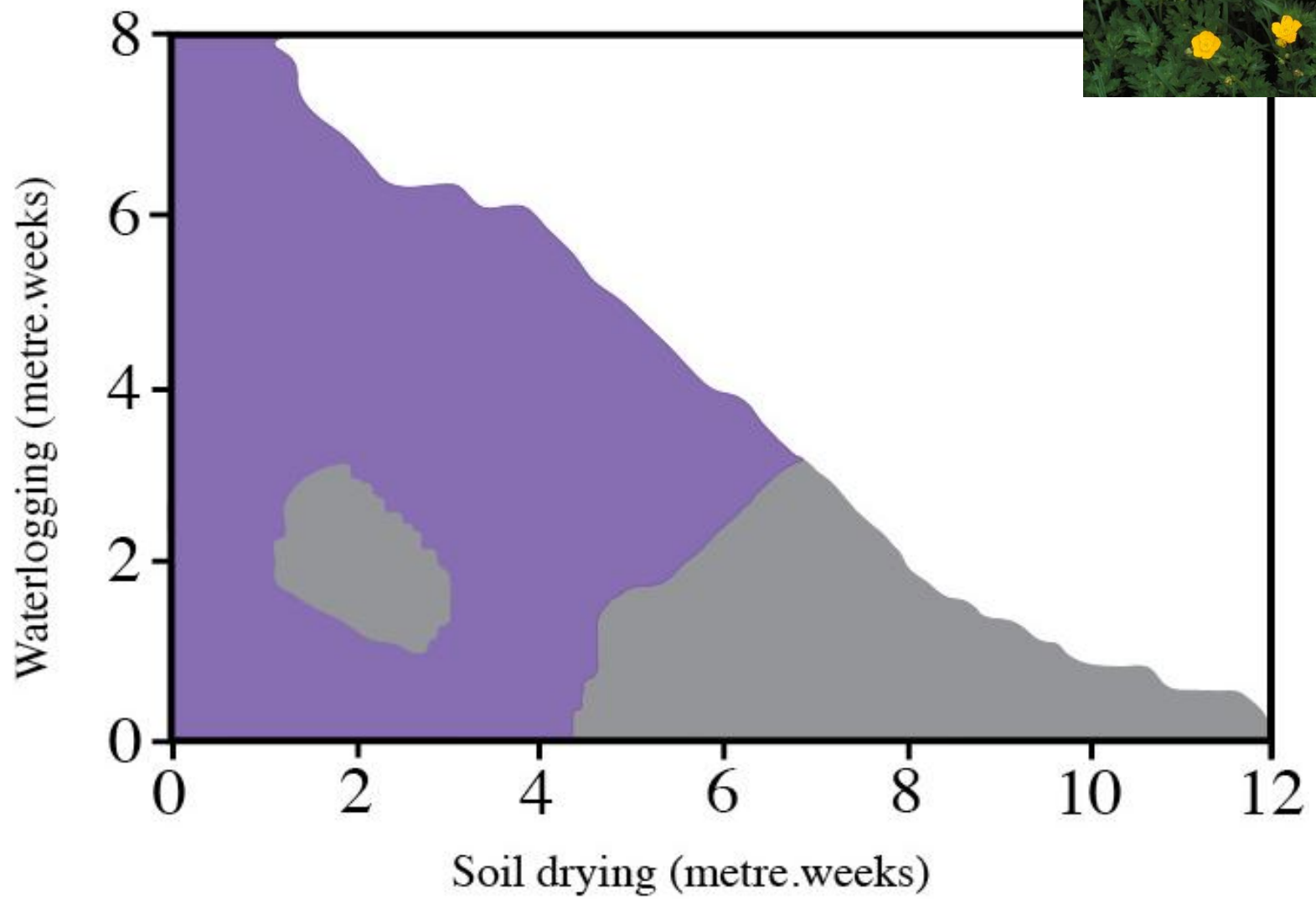
Expected frequency by chance

More frequent than by chance

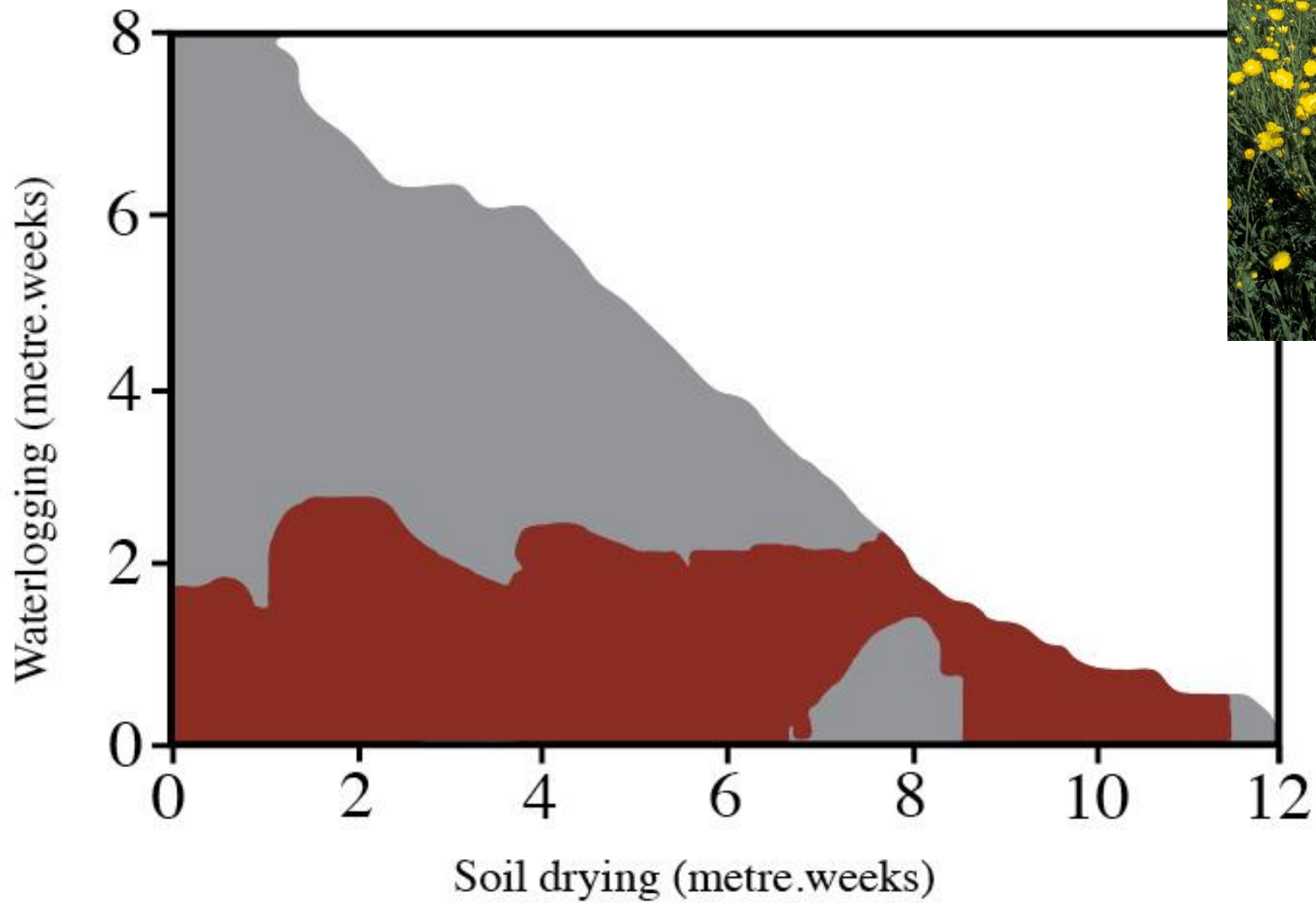




Bulbous buttercup (*Ranunculus bulbosus*)

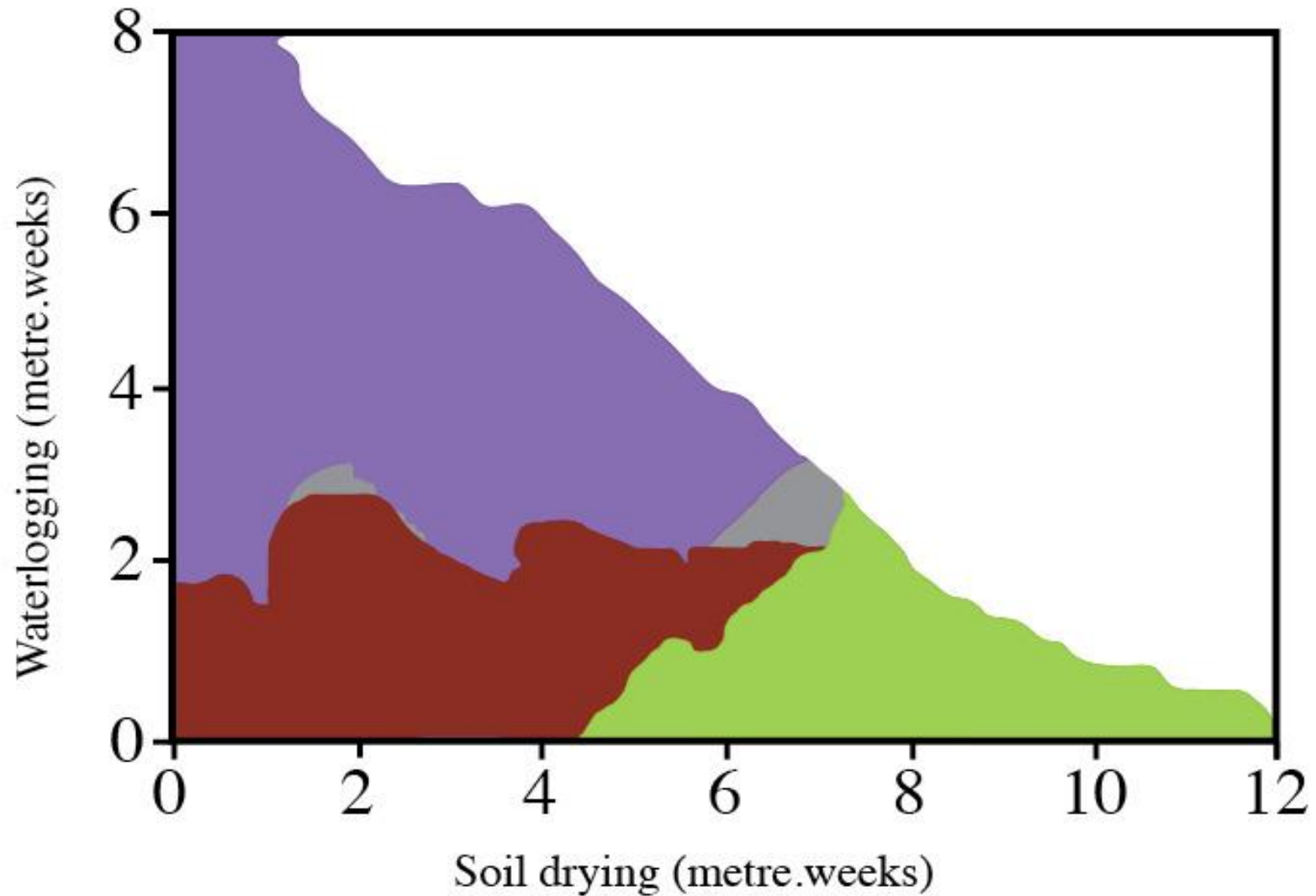


Creeping buttercup (*Ranunculus repens*)

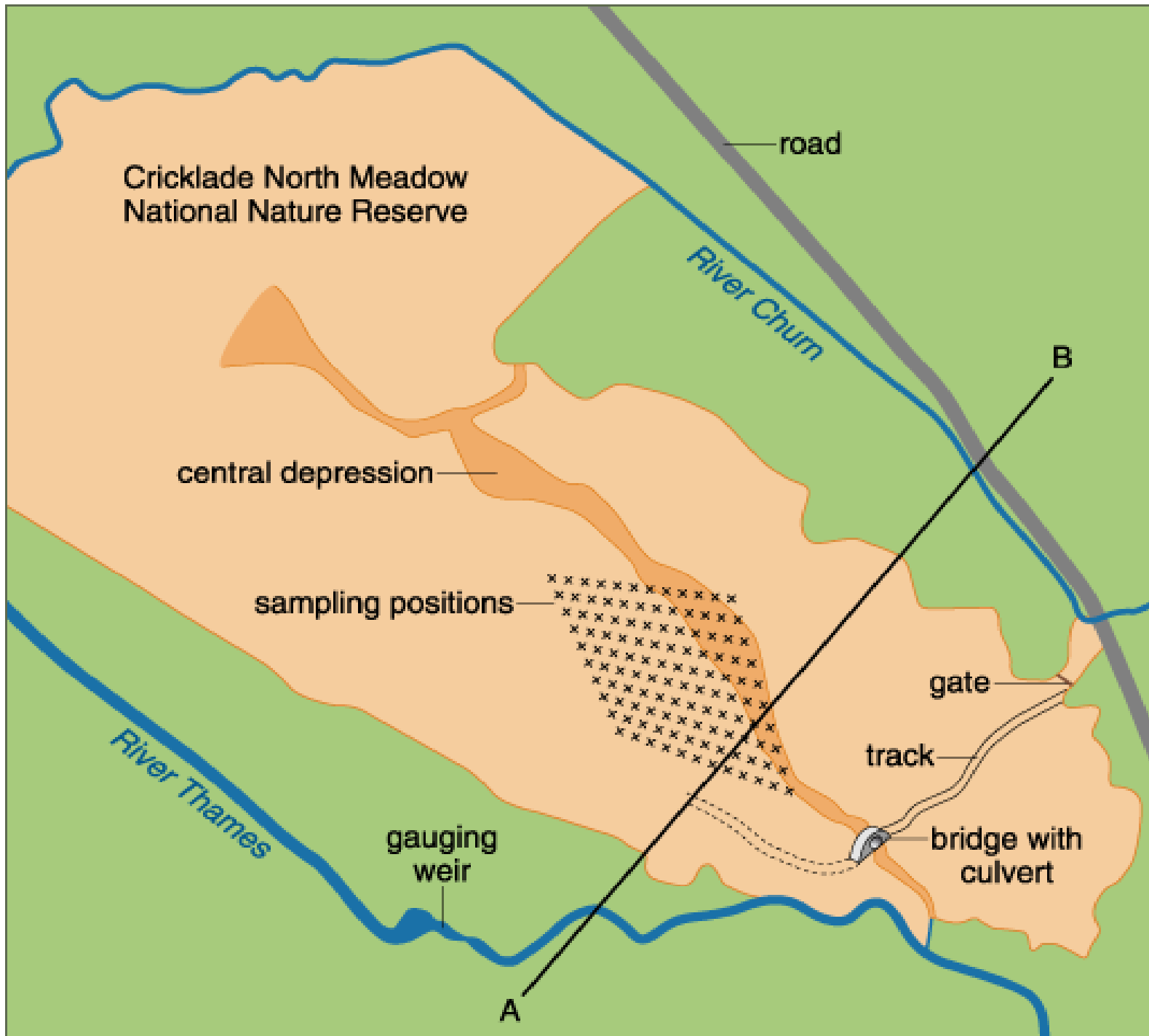


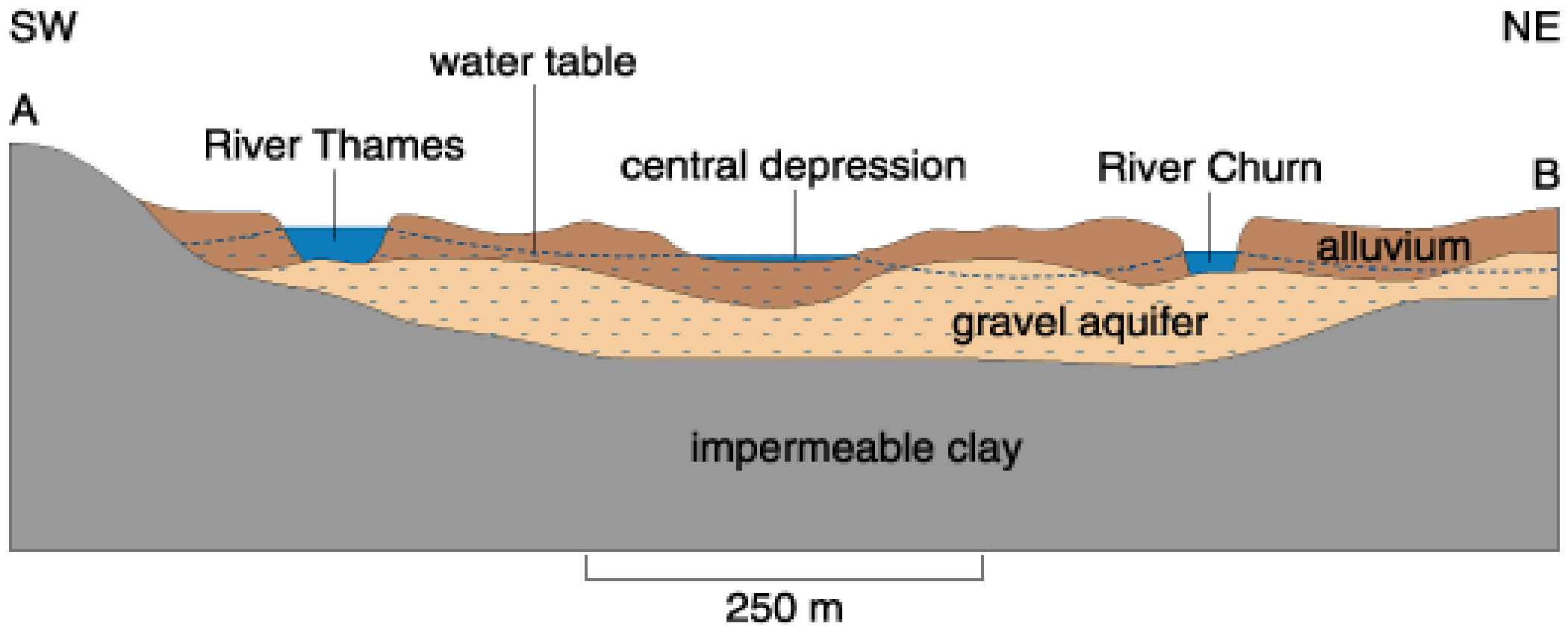
Meadow buttercup (*Ranunculus acris*)

# Sharing the hydrological niche



All buttercups

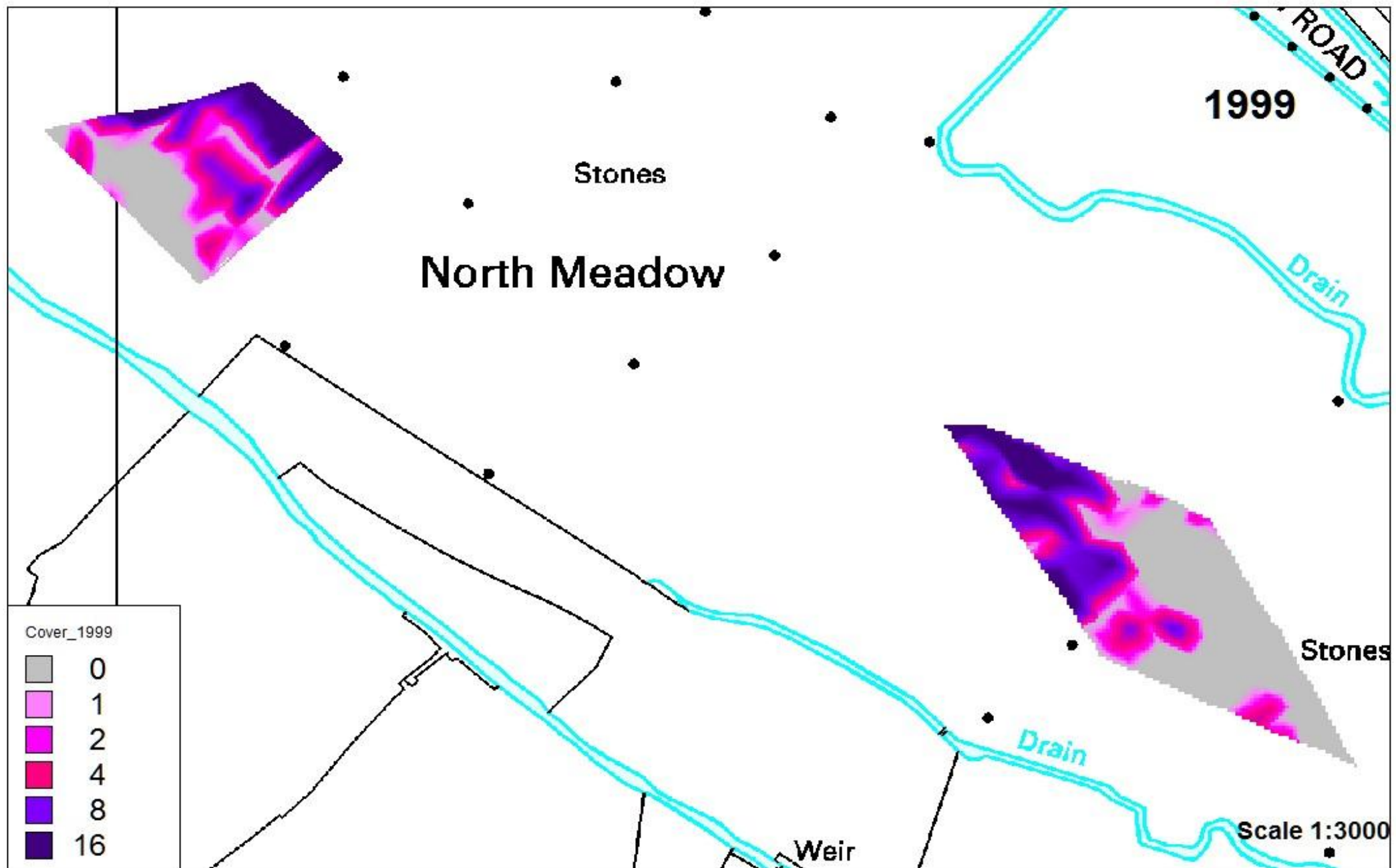




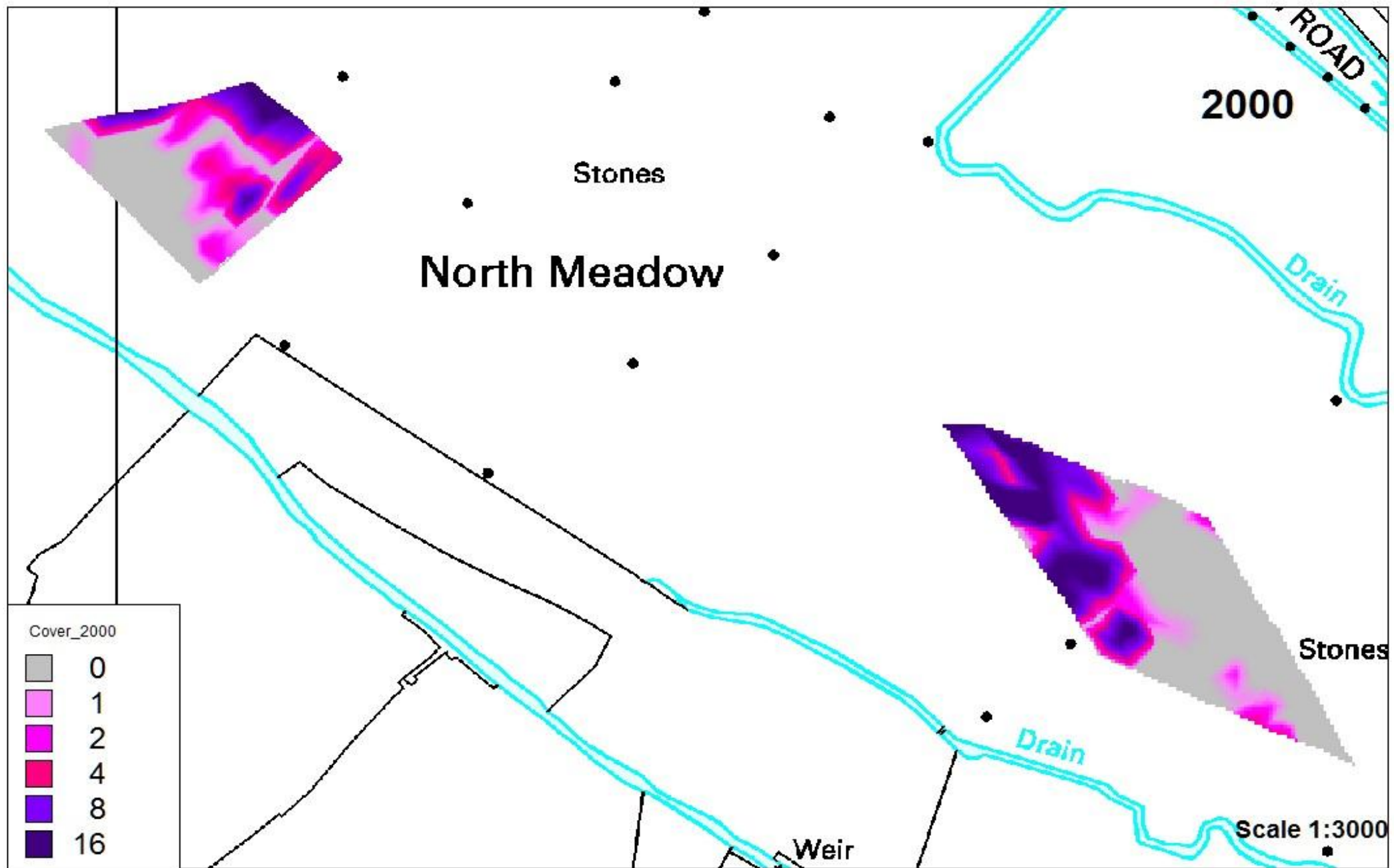
*Sanguisorba officinalis*  
(*Rosaceae*)

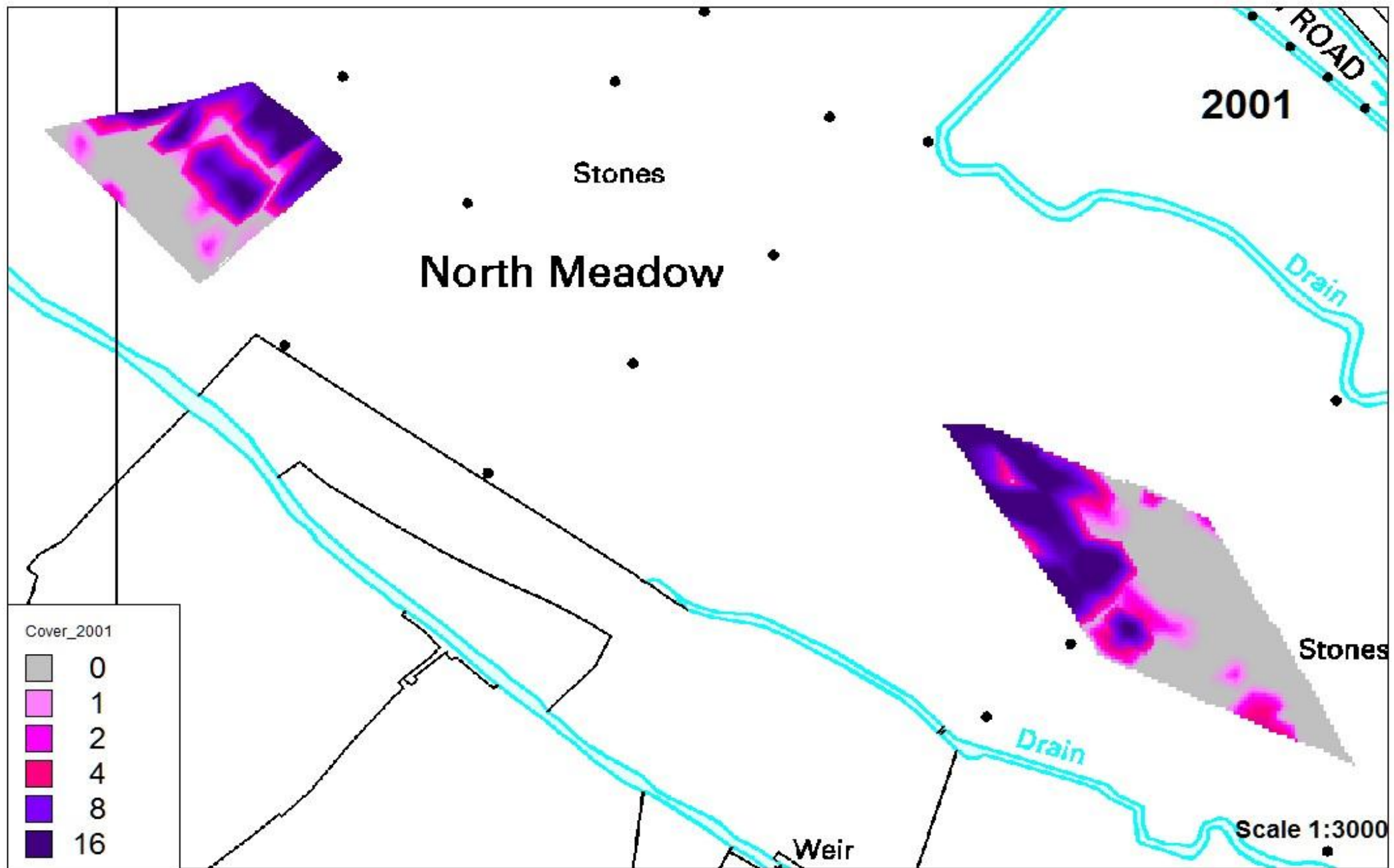
- Keystone species of floodplain meadows
- Long-lived, rhizomatous perennial

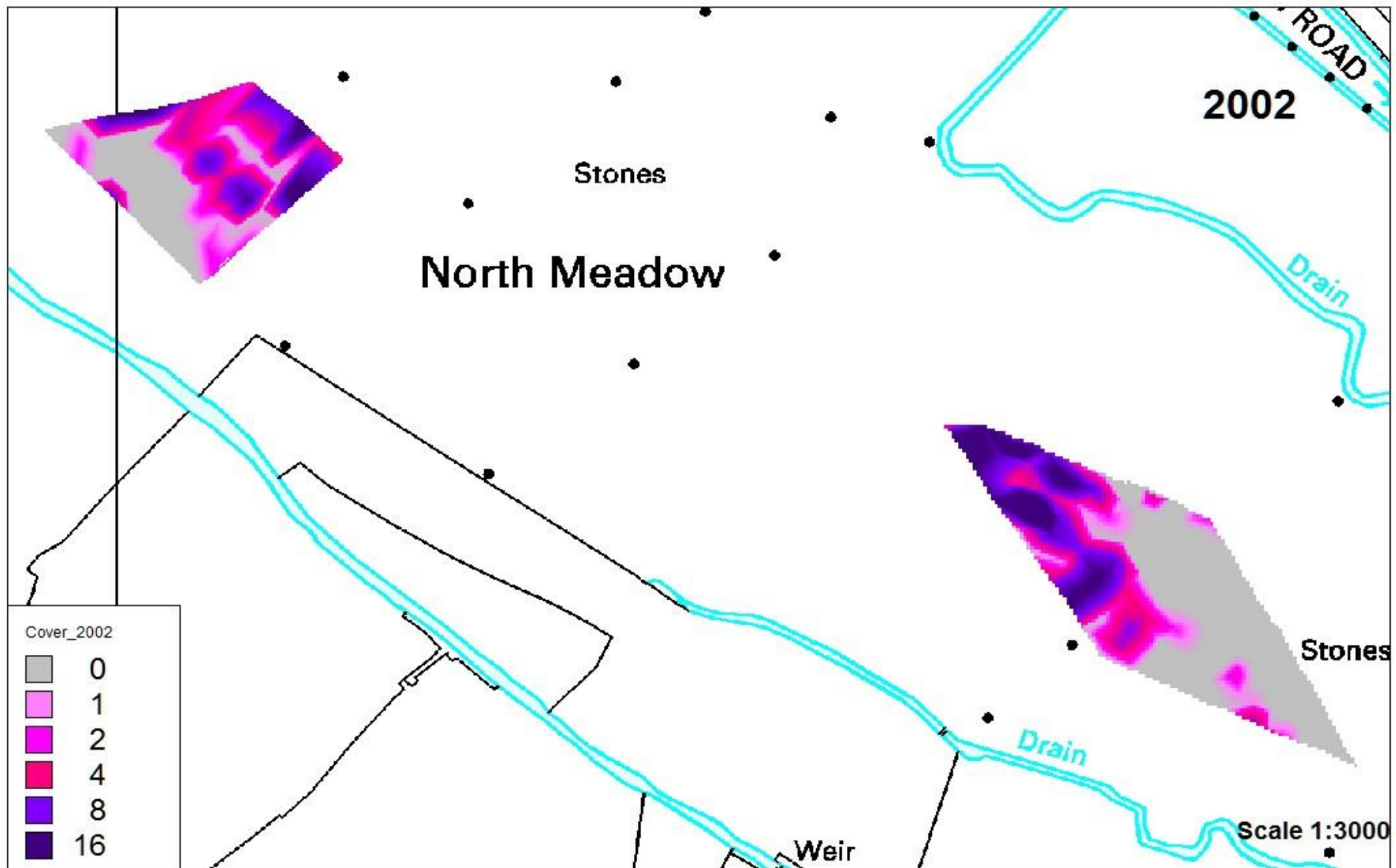


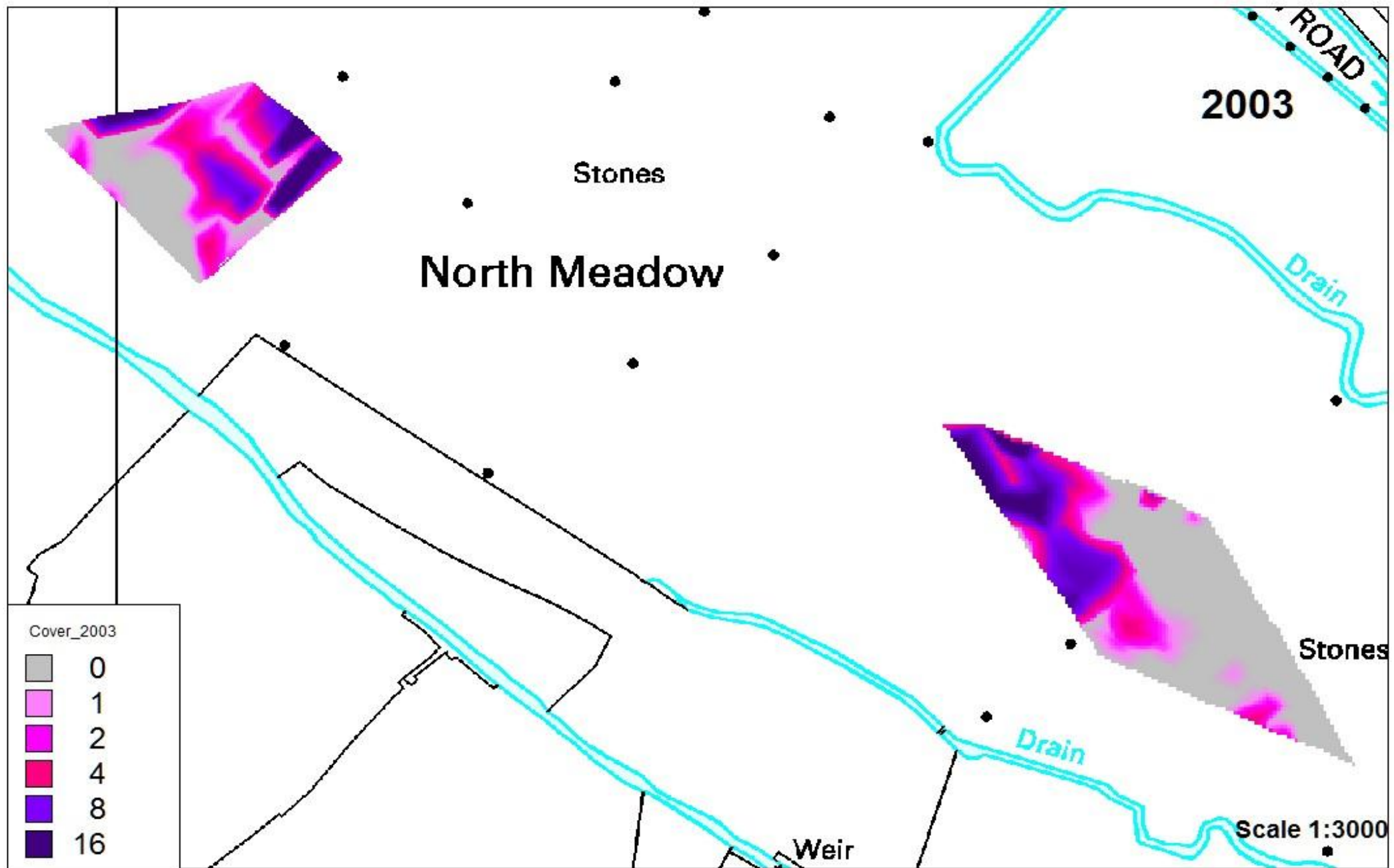


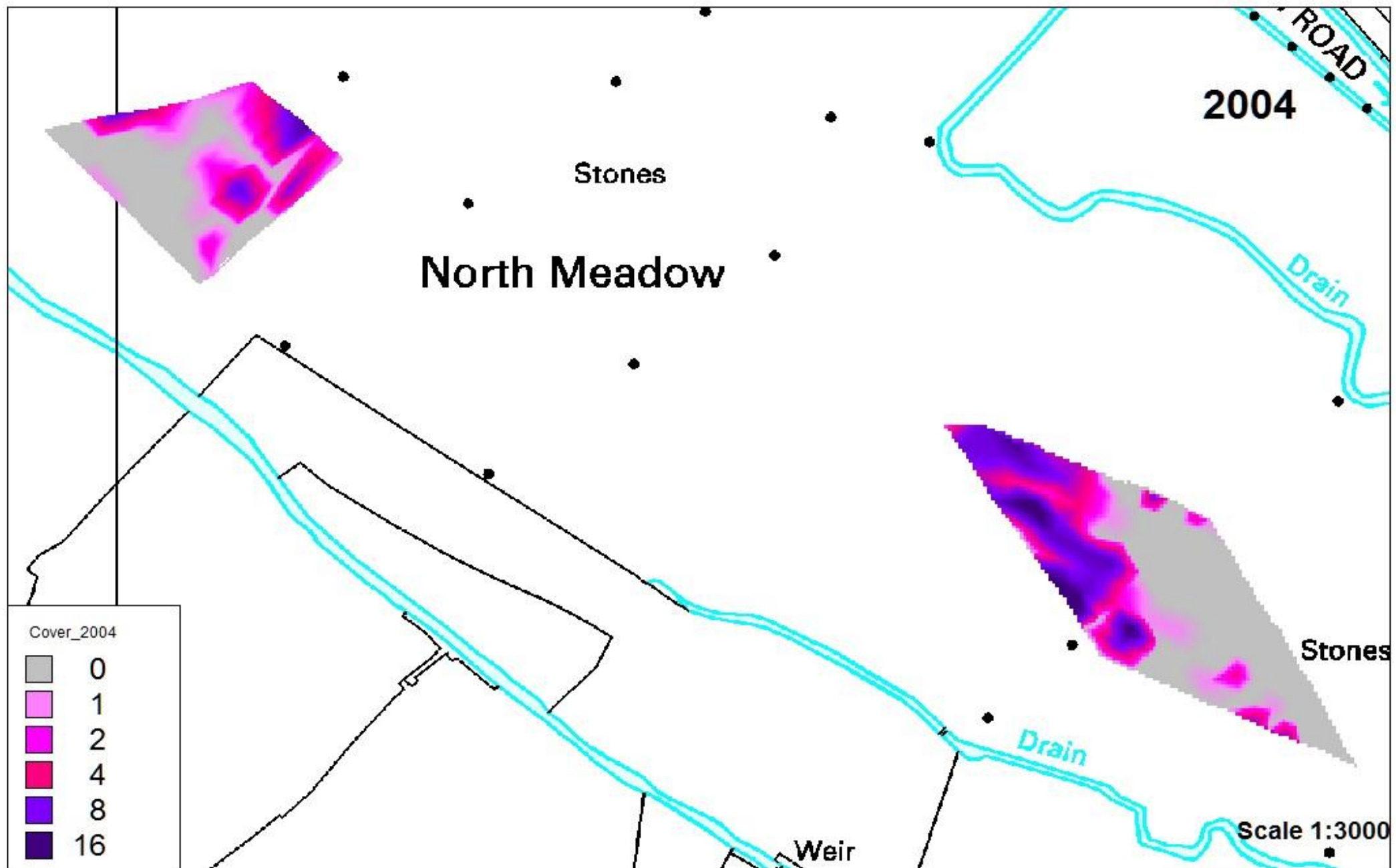


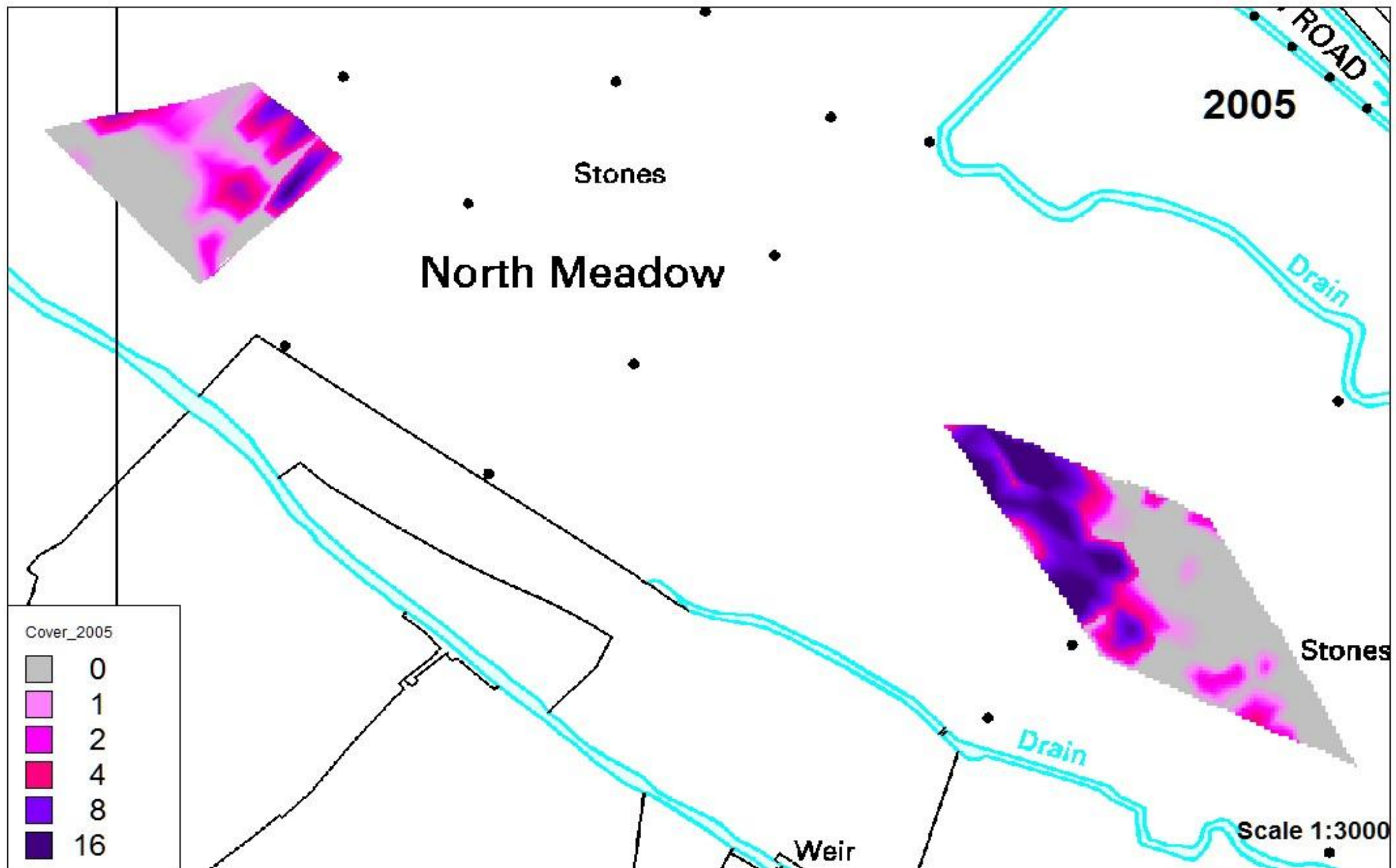


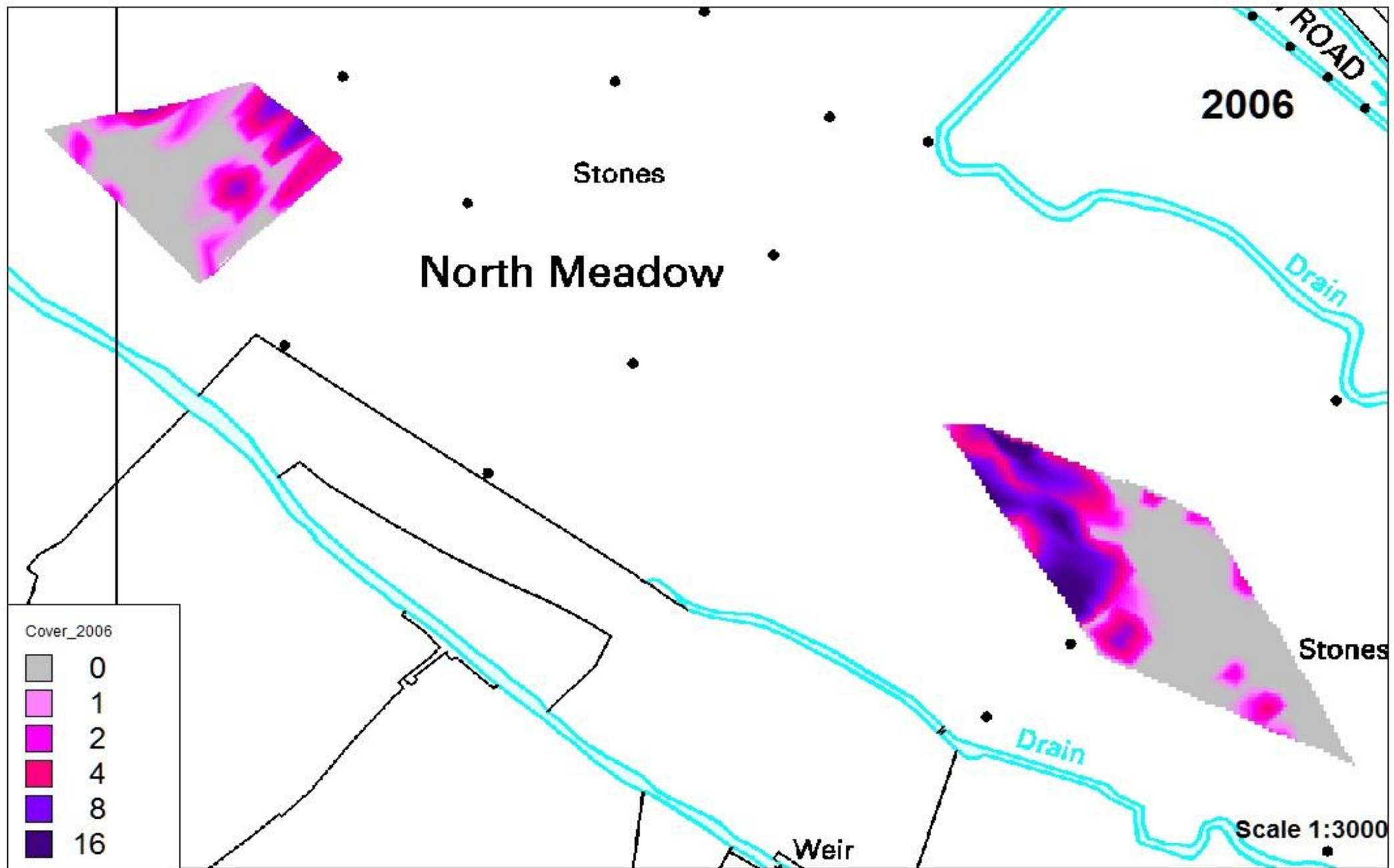


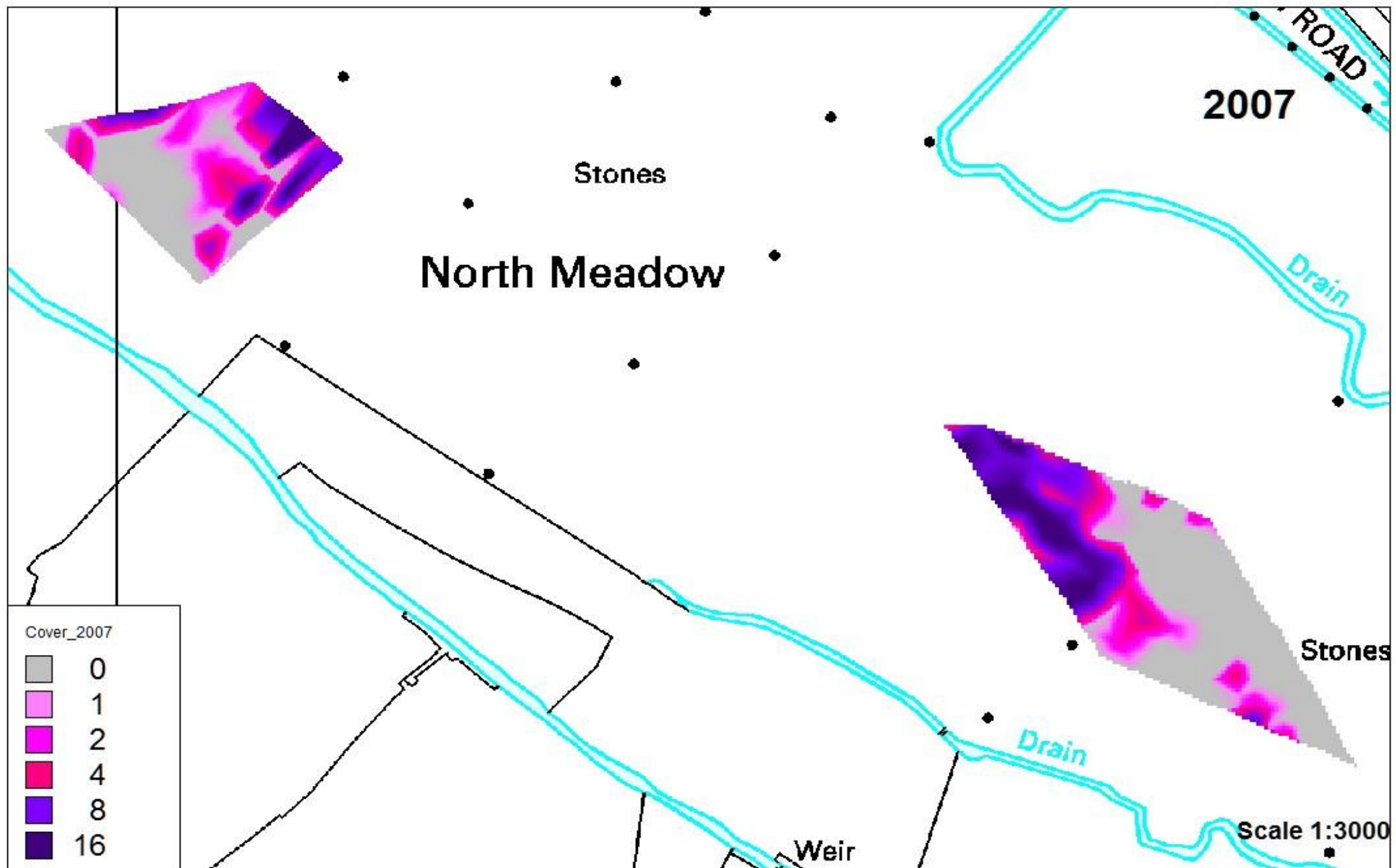




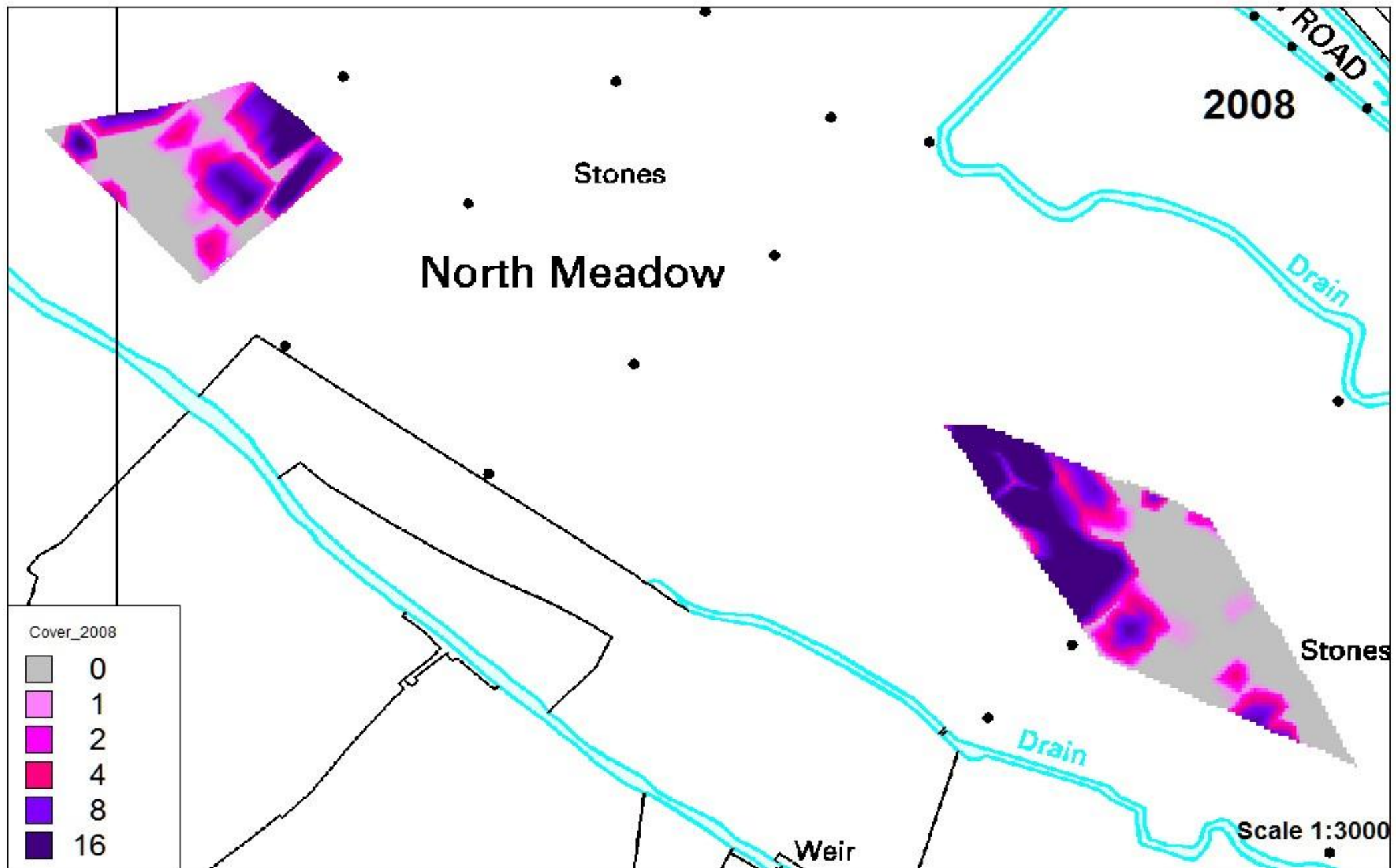


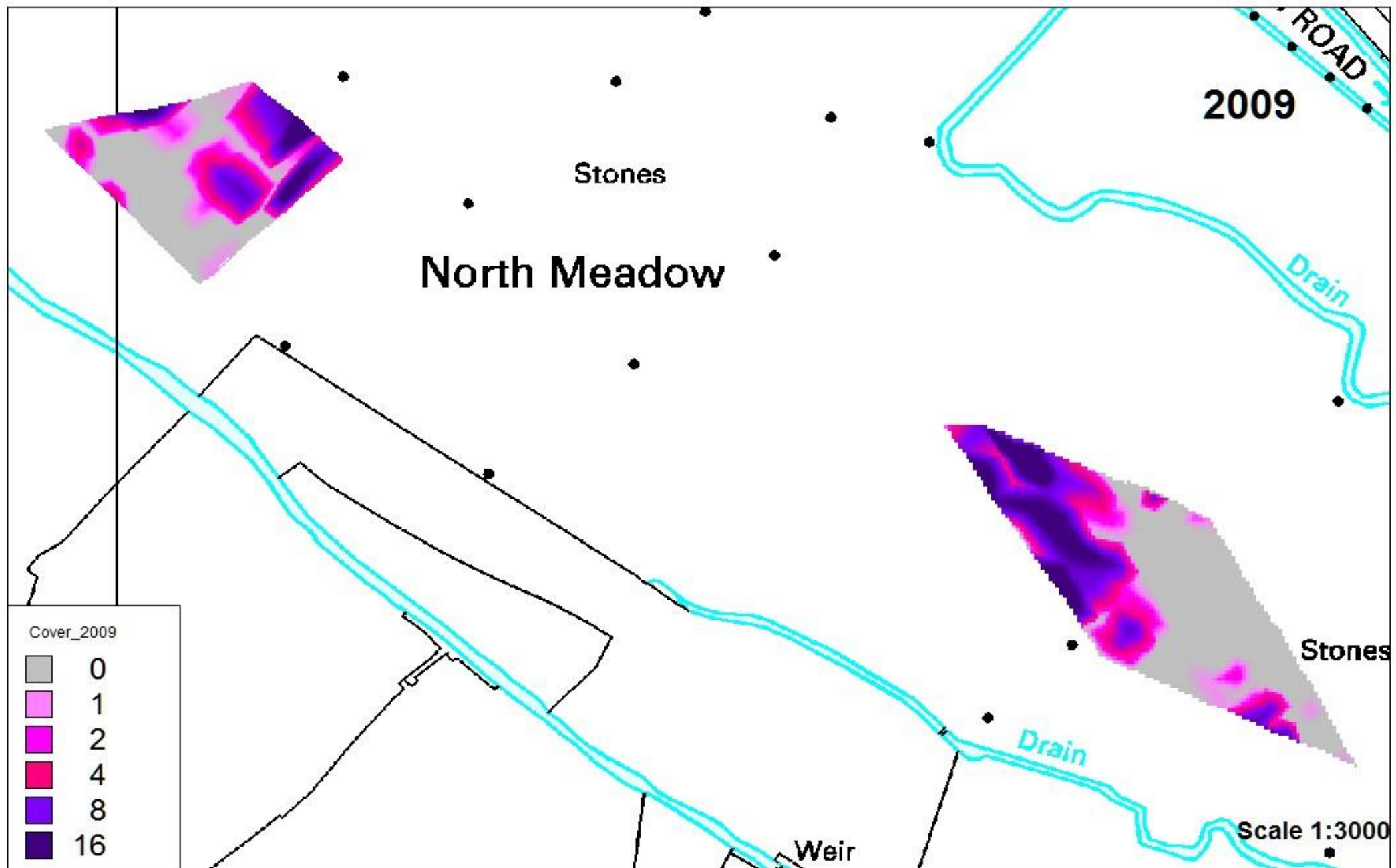


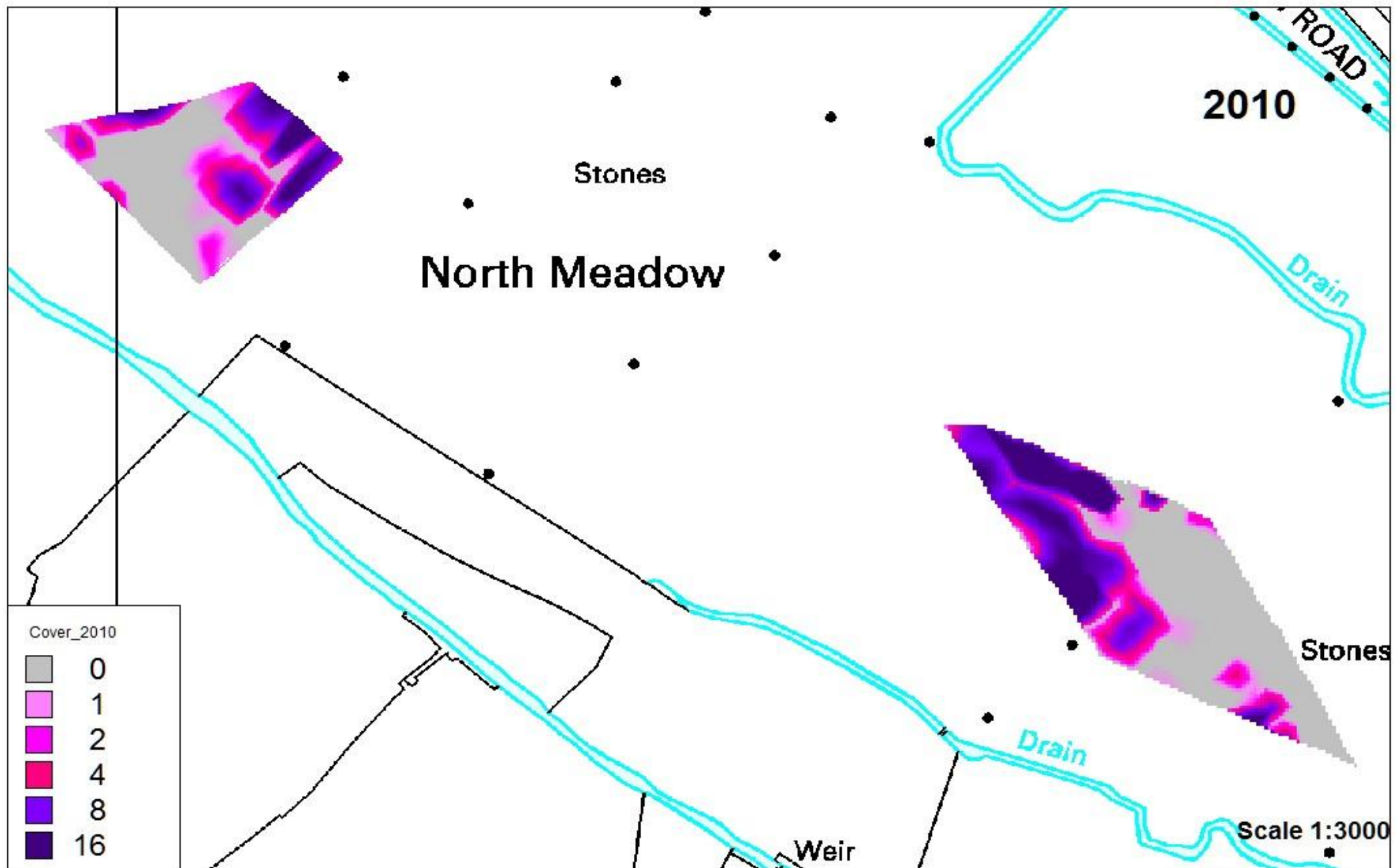


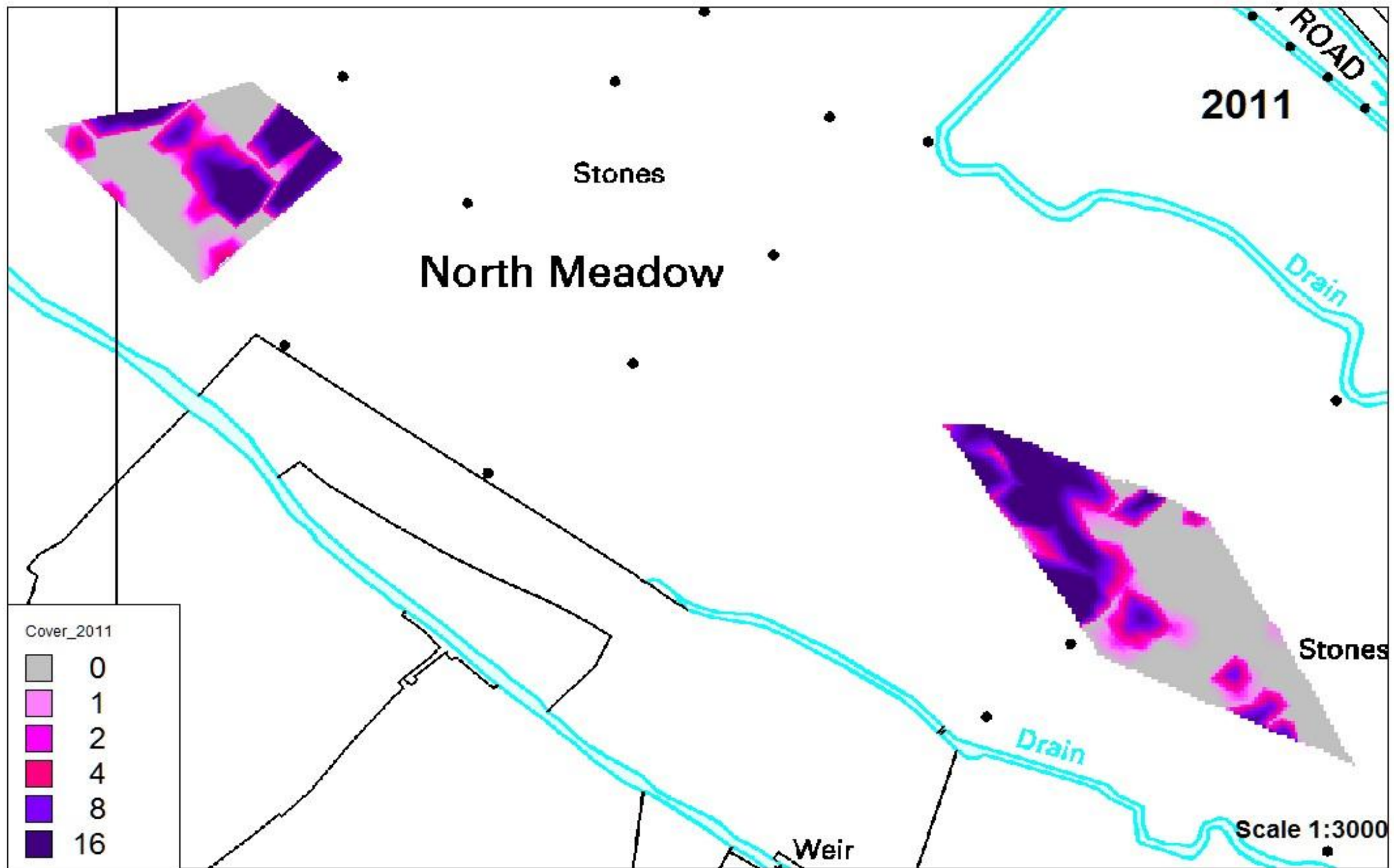




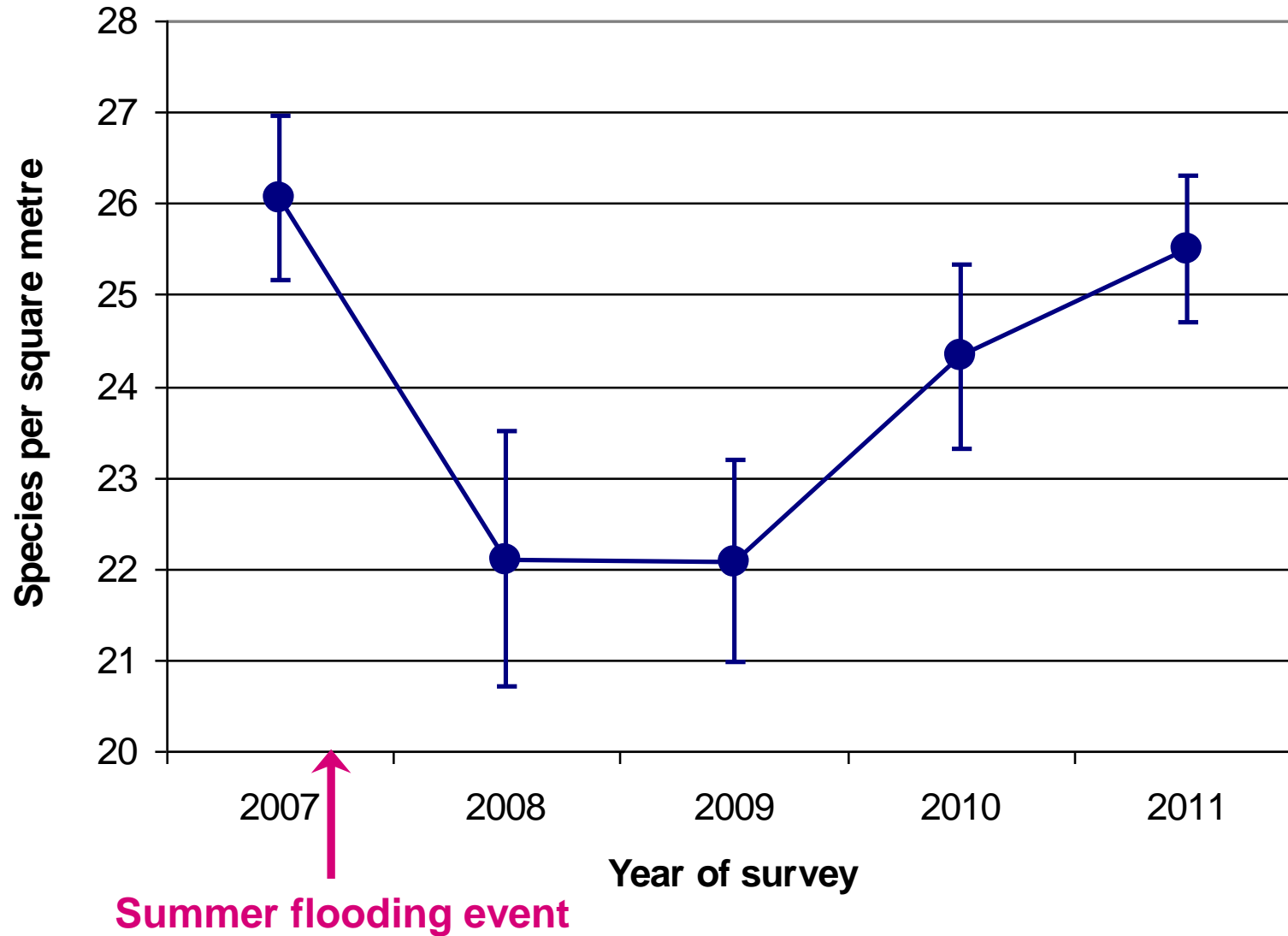


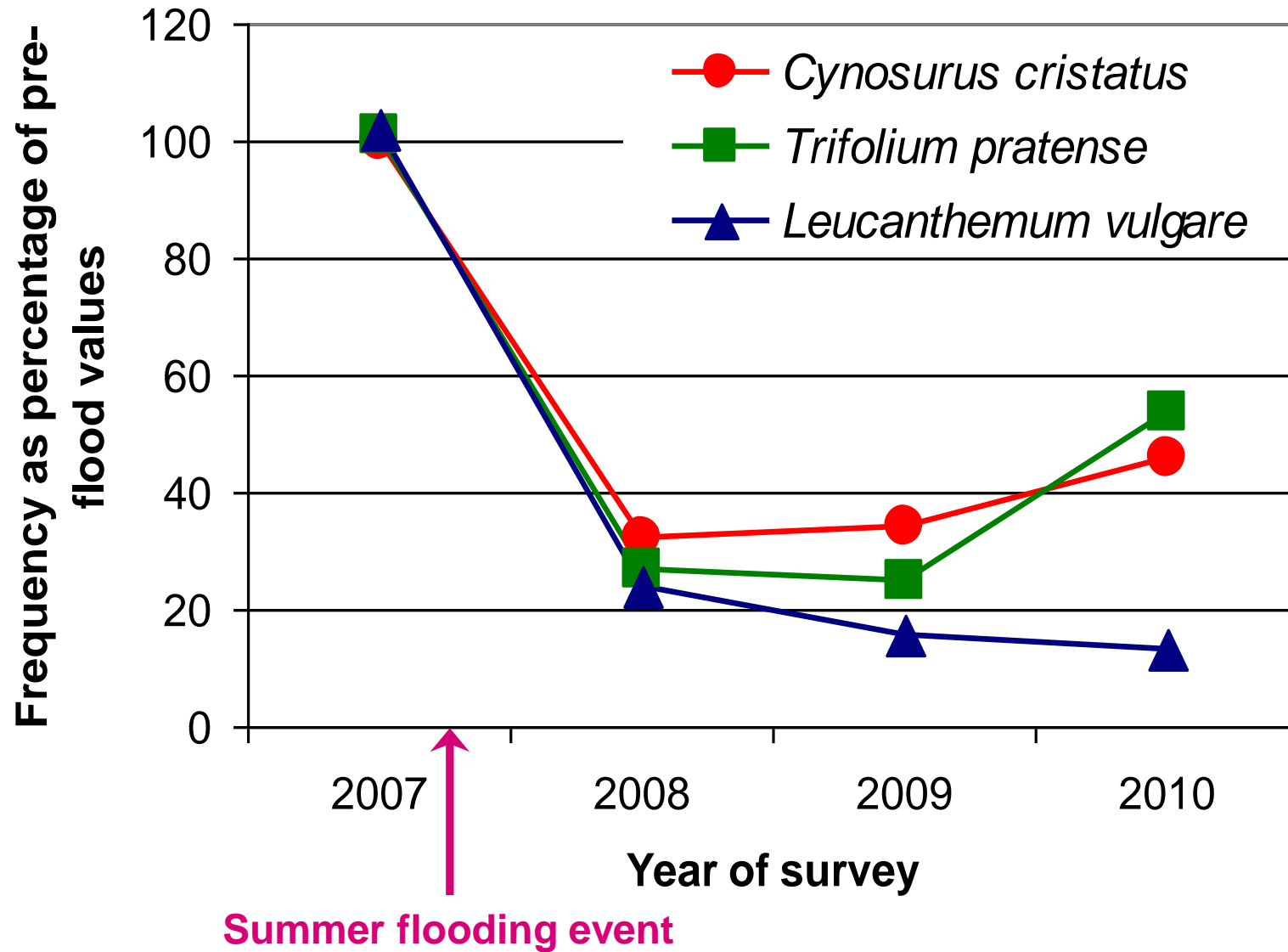


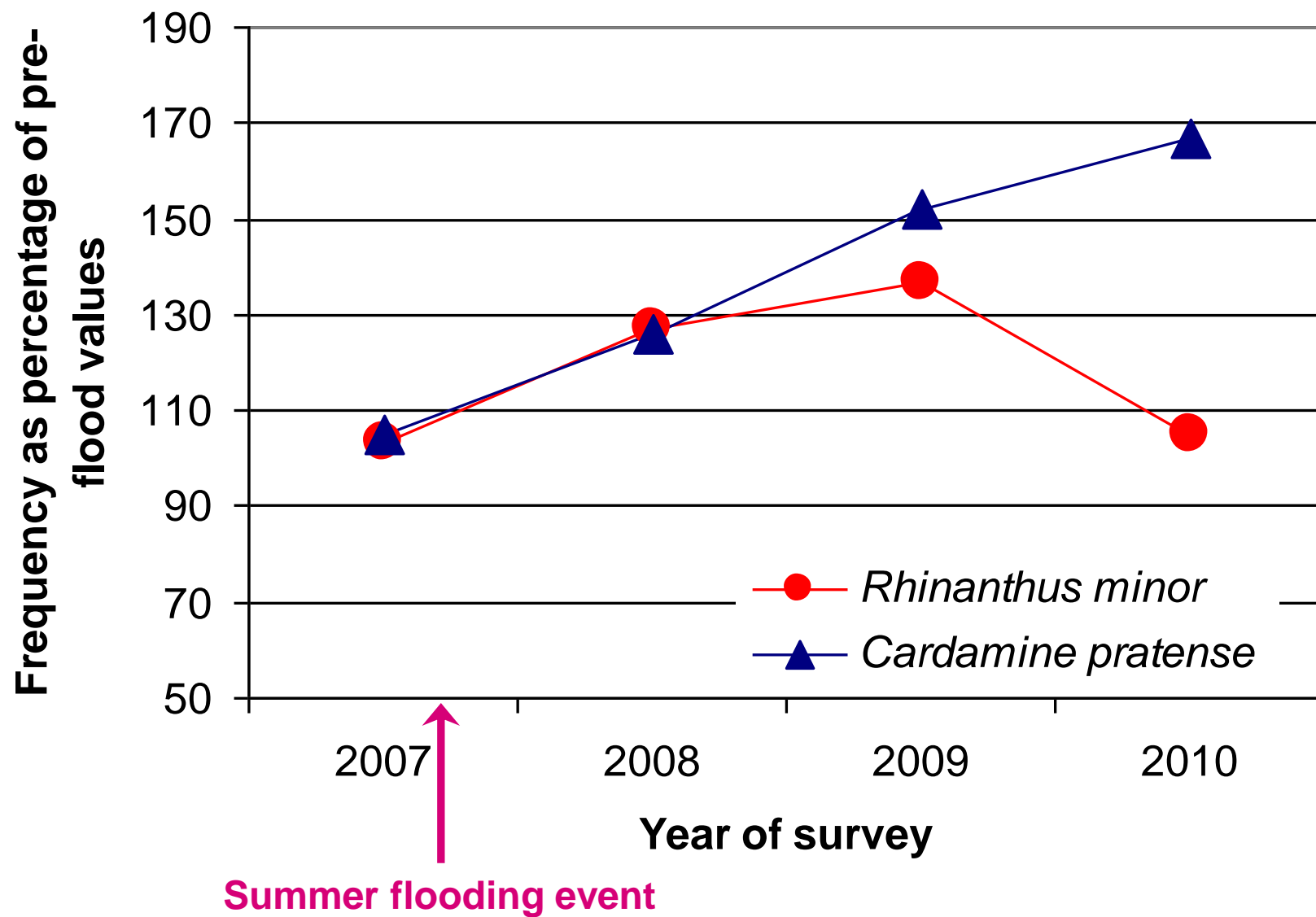




# Impact of summer flood on species richness







*Fritillaria meleagris*  
(*Liliaceae*)

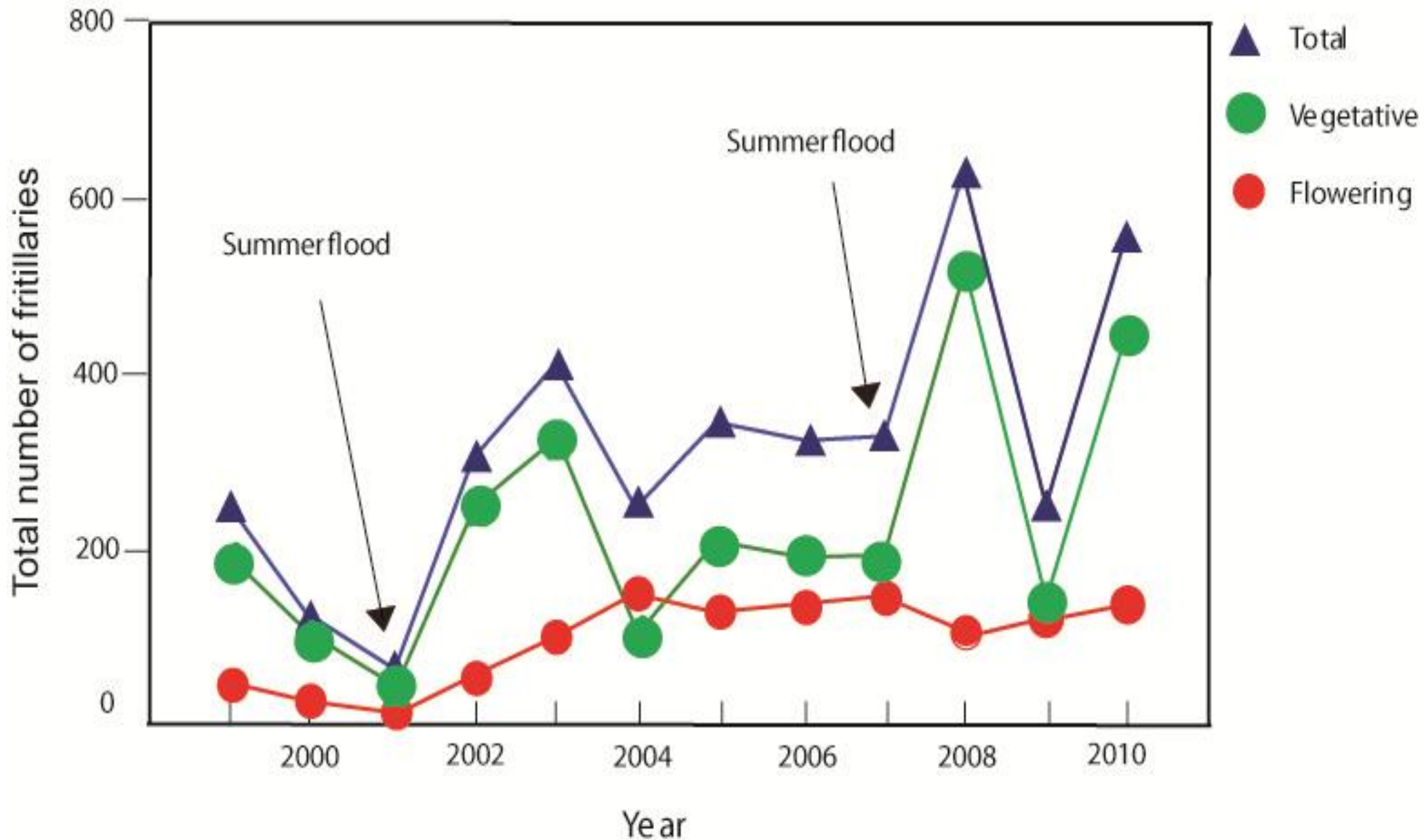
- Iconic species of floodplain meadows
- Long-lived perennial reproducing by seed







# Abundance of fritillaries at North Meadow, Cricklade 1999-2010



# Summary

- Composition of floodplain plant communities is strongly determined by hydrology
- The temporal variability of water-regime may assist in the maintenance of  $\alpha$ -diversity
- Restoration schemes should be staged over a number of years in order to provide opportunities for a wide range of species to establish.



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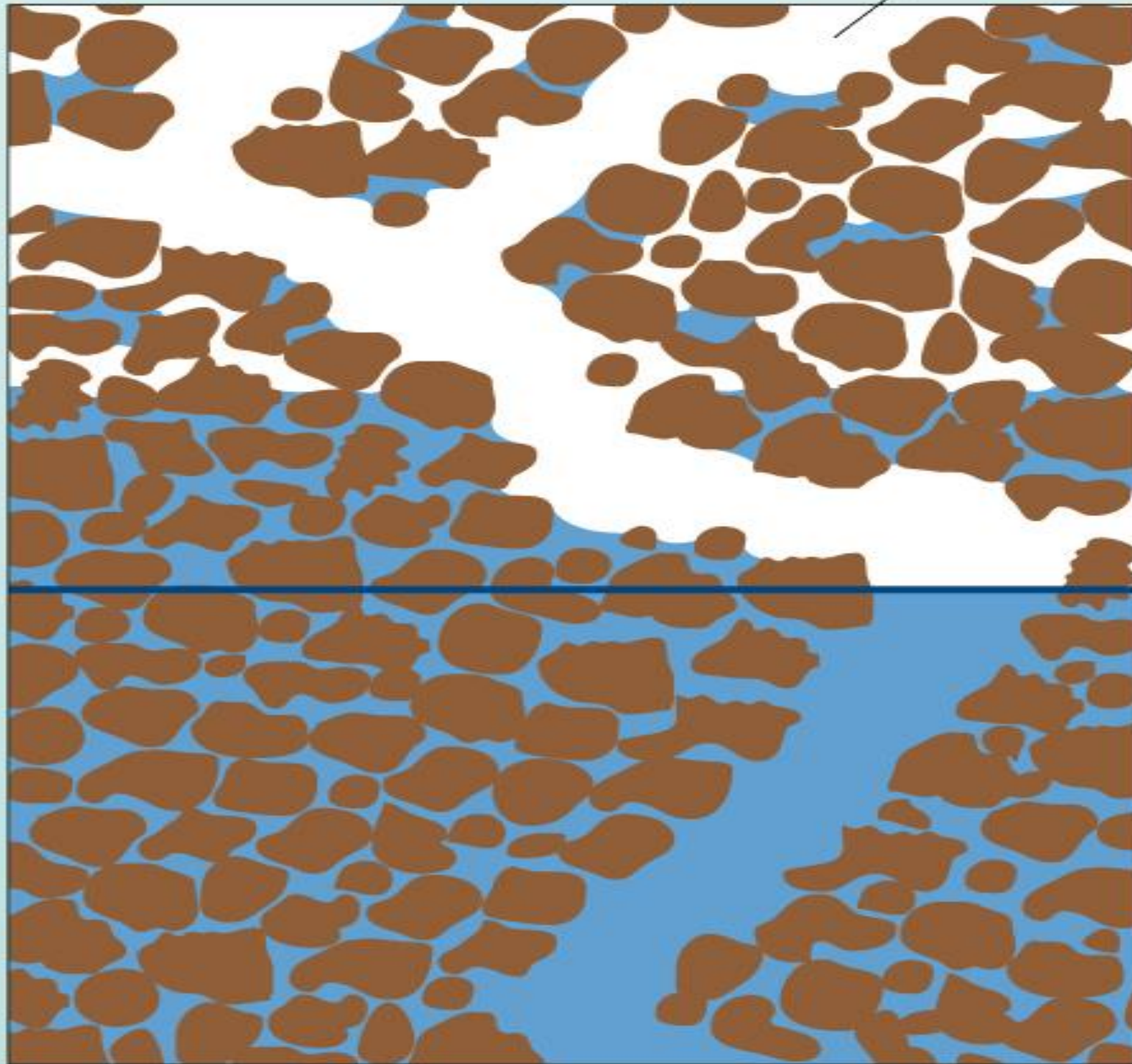
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[www.floodplainmeadows.org.uk](http://www.floodplainmeadows.org.uk)

macropore



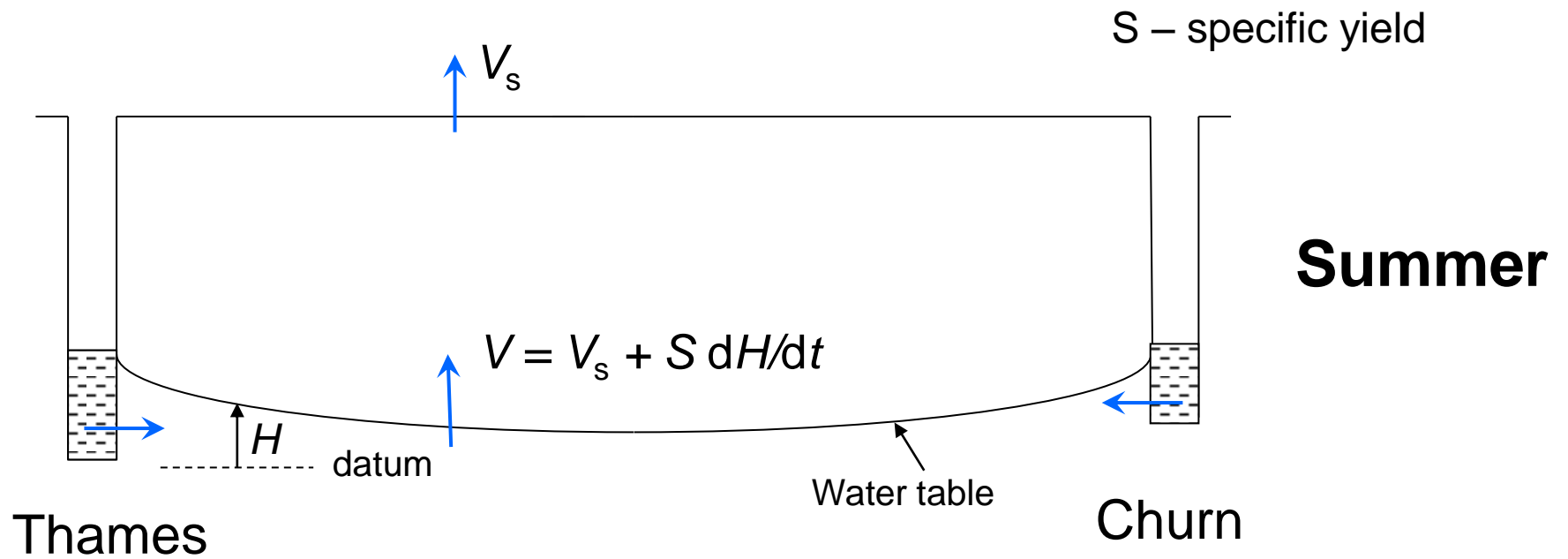
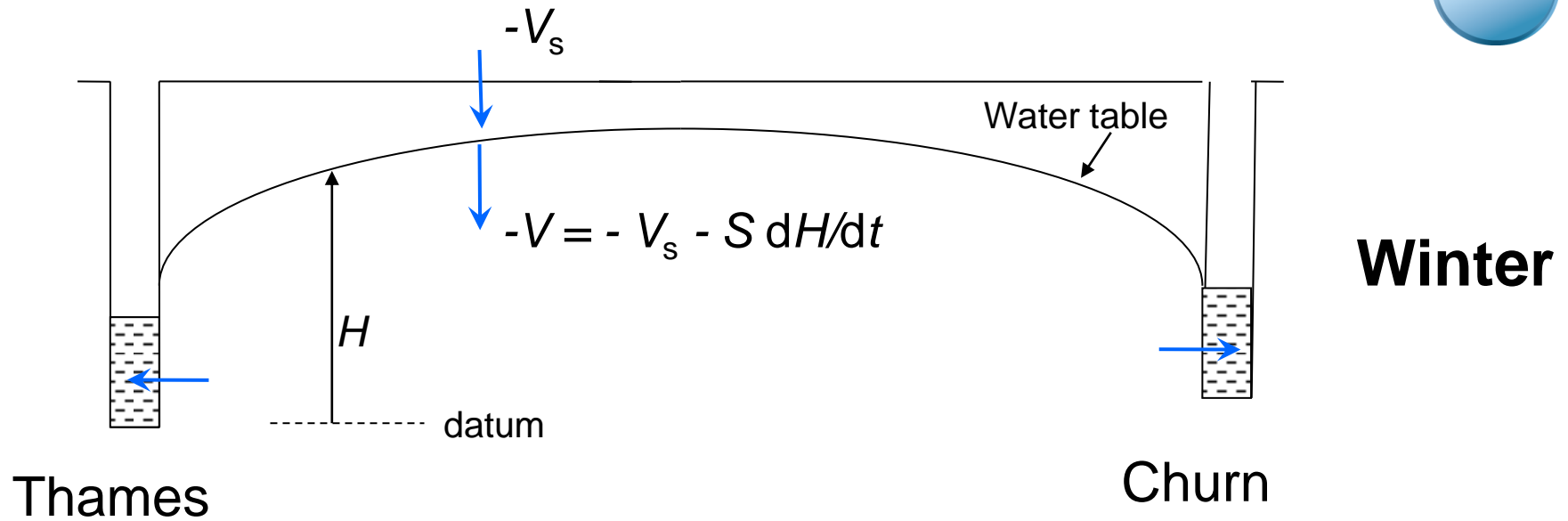
unsaturated zone

capillary fringe

water table

saturated zone

# Water tables between rivers





**Flood receding from Cricklade North Meadow**