Biodiversity in small remnants of native grassland and woodland in Melbourne: is it worth worrying about?

John Morgan
Department of Botany
La Trobe University
Lowland Temperate Grasslands in Australia
Distribution of Melbourne’s Native Grasslands
A key question

Do ‘small’ remnants of native grassland & woodland retain ecological values that worth retaining, even in an urban context?
‘Patch’: an important concept in conservation biology

- Working hypothesis: *Large habitat patches are important for conservation of biodiversity in fragmented ecosystems*
  - Island Biogeography Theory
  - Edge effects
Size, isolation, shape → patch predictors of diversity
Moving beyond species richness and habitat area

- Richness in small remnants might be interpreted by "Passive Sampling"
  random placement hypothesis

Large patches have a higher probability of being occupied at random by a given individual or species than smaller patches
Moving beyond species richness and habitat area

• Richness in small remnants might be interpreted by “Passive Sampling”
  
  random placement hypothesis
Assessing passive sampling using species accumulation curves

Fig. 3. Conceptual model of how passive sampling affects the expected cumulative species richness in small and large habitat patches, other things being equal. Patches are added sequentially from largest to smallest (dotted line) or smallest to largest (solid line). The number of patches added is depicted on the x-axis; the y-axis shows the expected species richness. From: Fischer & Lindenmayer (2002) Biol. Conserv. 106: 129-136
Grassland species accumulation curves
Grassland species accumulation curves

Cumulative # species

Number of patches added

1 ha

Smallest to largest
Largest to smallest
This suggests

• Grassland species are not strongly area-dependent (91% spp. found in remnants ≤1 ha)

• Compositional turnover (dissimilarity) is high between remnants – i.e. each site can play a critical role in conserving Regional biodiversity
NO DISTURBANCE
NO MOWING PLEASE

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AUSTRALIAN NATIVE GRASSLANDS: GUIDING LANDSCAPES AND COMMUNITIES IN TRANSITION
What leads to effective management?
What leads to effective management?
What leads to effective management?
Other benefits of biodiversity....
Summary

Habitat fragmentation

Species diversity in small remnants

area

habitat history

landscape context

compositional turnover

majority of plant spp. not confined to large patches

Small patches are valuable for biodiversity conservation + starting points for recovery of landscape
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