



SURVIVING URBANISATION: LANDSCAPE GENETICS ELUCIDATING THE DECLINE OF WHITE'S SKINK (*Liopholis whitii*)



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Background

Urbanisation results in habitat loss, fragmentation and conversion of natural habitats into human-modified ecosystems that can reduce the abundance and diversity of native species [1]. The White's skink (*Liopholis whitii*) is a medium sized Scincid lizard, widespread in south-eastern Australia. However, there has been a documented decline in populations around urban Melbourne [2,3].

Research Question

Has urbanisation and landscape heterogeneity effected the genetic diversity and connectivity of the White's skink?

Aims

To test whether heterozygosity and effective population size will be lower within populations in urban areas compared to non-urban areas

To determine whether individual inbreeding coefficients will be higher in urban populations when compared to non-urban

To understand the relative effects of micro/macrohabitat variables & surrounding urbanisation on genetic diversity

Study Areas

- 9x Remnant Urban
 - 2x Remnant Rural
 - 4x Extensive Native Habitat
- (Areas selected based on recent findings) See Fig. 1.



Phillip Island - White's skink study area (remnant rural study area)



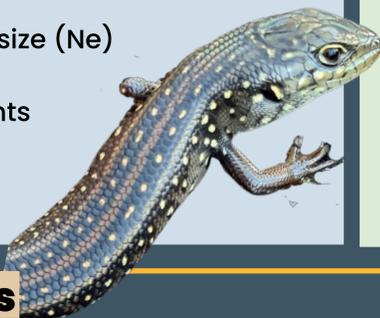
Figure 1. a) Remnant urban study areas b) Remnant rural (white circles) and extensive native habitat study area (green polygons)

Study Design Genetic diversity

- A maximum of 20 tail tips will be collected from skinks at each of the 15 study areas for genetic analysis (300 max.) in addition to 20 museum specimens

Genetic Variation Measures

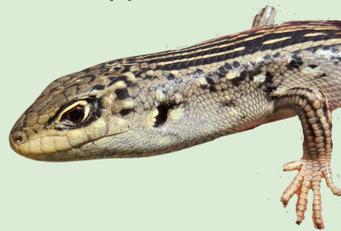
- Effective population size (N_e)
- Heterozygosity
- Inbreeding coefficients



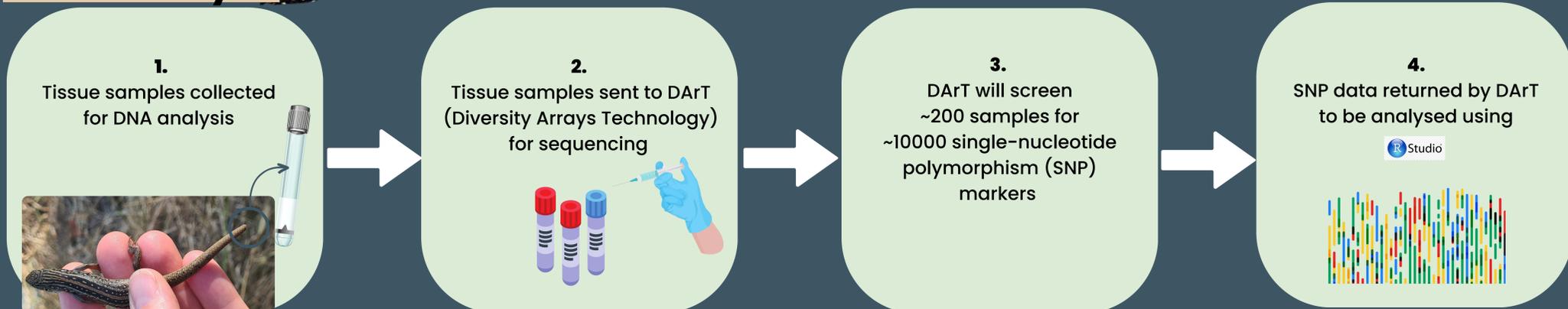
Study Design Landscape attributes

Habitat Measures

- **Microhabitat variables**
 - measuring % of ground cover, canopy closure and % of native vegetation
 - distance from patch edge
- **Macrohabitat variables**
 - patch size
 - patch connectivity
 - habitat heterogeneity
- **Surrounding context/Urbanisation**
 - urban pressure



Genetic Analysis



Expected Results



Figure 2. Heterozygosity and effective population size (N_e) is expected to increase within populations as patch size increases

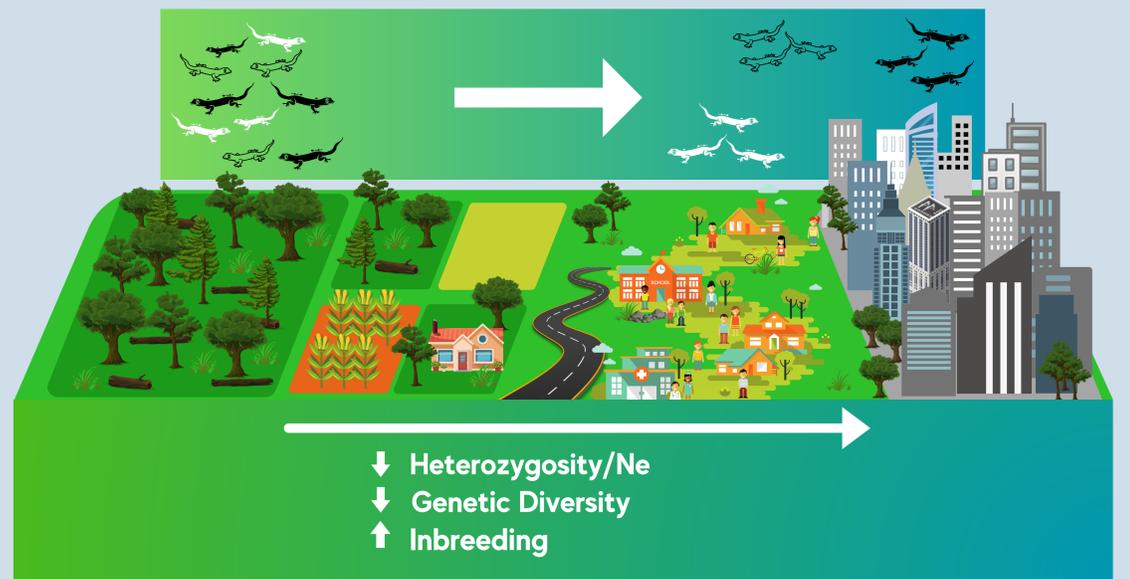


Figure 3. Flow diagram depicting the outcome of genetic analyses once White's skinks move from extensive native areas to rural then to urban areas [4]