

Addendum to proposed Squirrel Glider monitoring plan for Thurgoona-Wirlinga.

In March 2017, the Albury Conservation Company initiated an independent review of the Proposed Squirrel Glider Monitoring Plan for Thurgoona-Wirlinga. Three reviewers were asked to provide feedback on the plan. The terms of reference provided to the reviewers included:

- 1) Review the whole monitoring plan;
- 2) Determine whether the aims of the monitoring plan (section 2.1.1) adequately address major threats associated with urban development; and,
- 3) Determine whether the plan will address the aims, particularly in relation to the proposed monitoring design.

In response to the feedback provided by the reviewers, the Albury Conservation Company made a decision to refine the proposed aims and objectives of the monitoring plan to focus primarily on determining the effects of urban development on the presence/distribution of Squirrel Gliders across the Thurgoona-Wirlinga landscape over time. Urban development is progressing rapidly in the study area, and it is this landscape-scale change that is likely to impact populations of gliders in the region. This addendum builds on the proposed monitoring plan prepared by Australian Research Centre for Urban Ecology (ARCUE) and takes into account suggestions made by the reviewers, especially in relation to the experimental design and main aims.

Refined aims of the monitoring plan:

- 1) To determine the impact of urbanisation on Squirrel Glider populations with key 'stronghold' patches (as indicated by previous studies).
- 2) Evaluate the effectiveness of management actions designed to improve the persistence of Squirrel Glider populations in 'lower quality' patches.
- 3) Engage the community in the protection, and enhancement of Squirrel Glider populations by providing avenues to participate in monitoring and restoration works.
- 4) Maintain a strong base program but be amenable to incorporating complementary research projects as funding and opportunities become available.

Key features of a monitoring program.

To evaluate impacts of urban development on Squirrel Glider populations in the Thurgoona-Wirlinga study area, a monitoring program should address some/all of the following design criteria.

- **Stratifying design features.** Including known habitat requirements of the Squirrel Glider in the study area (e.g. large remnant blocks, roadside vegetation, riparian areas and forward tree plantings) and utilising existing Squirrel Glider records.

- **Treatments** that contrasts different land use zones (e.g. urban, peri-urban and rural).
- **Control/reference sites** where conditions remain unchanged. This provides an idea of background changes not related to urban development.
- **Experimental component** - areas planned to be developed versus areas planned to be revegetated. Pre-surveys in these areas are important as it gives a strong 'before and after' contrast to the design.

A proposed stratified monitoring program:

Taking into account the above design features, a 4 x 4 factorial experiment with 16 treatments is proposed (Figure 1). The two stratifying design variables are **habitat** (based on wildlife atlas records and known habitat requirements of the species) and **land use** (based on level of development). Habitat includes four levels: 1) large blocks of remnant vegetation, 2) roadside corridors, 3) riparian areas, and 4) forward tree plantings. Land use includes four levels: 1) urban areas, 2) peri-urban areas under development, 3) peri-urban areas under proposed development, and 4) rural farmland.

	Urban (control)	Peri-urban approved development (treatment)	Peri-urban proposed development (treatment)	Rural (control)	Total
Large remnants	6	6	6	6	24
Roadside reserves	6	6	6	6	24
Riparian areas	6	6	6	6	24
Forward tree plantings	6	6	6	6	24
Total	24	24	24	24	96

Figure 1. A proposed 4 x 4 factorial experiment to monitor Squirrel Gliders in the Thurgoona-Wirlinga area.

The following steps are required before a monitoring program can be implemented:

- Map the main habitat features listed in Figure 1. and create a GIS spatial layer
- Map the main land use zones listed in Figure 1. and create a GIS spatial layer
- Overlay existing Squirrel Glider records
- Develop a table of polygons to enumerate all 16 treatments
- From the table, randomly select 6 replicates in each of the 16 treatments, including known Squirrel Glider records where possible
- Ground-truth selected sites, evaluate access and other logistical constraints