



Figure 1: Image of a squirrel glider ¹

Squirrel Glider Habitat Degradation

Assessment 2 – Report Card 2020

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INTRODUCTION

This report card will assess the habitat degradation of Squirrel Gliders in the council area of Albury, New South Wales, with specific focus on the suburbs of Thurgoona and Wurlinga. Evidence will be presented about a current decline in old gum trees with hollows, where the Squirrel Glider lives, and then a review of current management approaches to address this issue will be conducted. Ultimately, this report card aims to contribute to improving such management approaches.

The Squirrel Glider

The Squirrel Glider (*Petaurus norfolcensis*) is a native, nocturnal Australian marsupial.² It is found in four states, South Australia, Victoria, Queensland and New South Wales². In all these states except Queensland, Squirrel Gliders are listed on the threatened species list³. The distribution of Squirrel Gliders is highlighted in figure 2 below.⁴

Squirrel gliders do not spend much time on the ground and instead they glide between gum trees. On the ground they are vulnerable to predators such as foxes and cats.



Figure 2: Map illustrating squirrel glider distribution⁴

Map: Where is Albury?

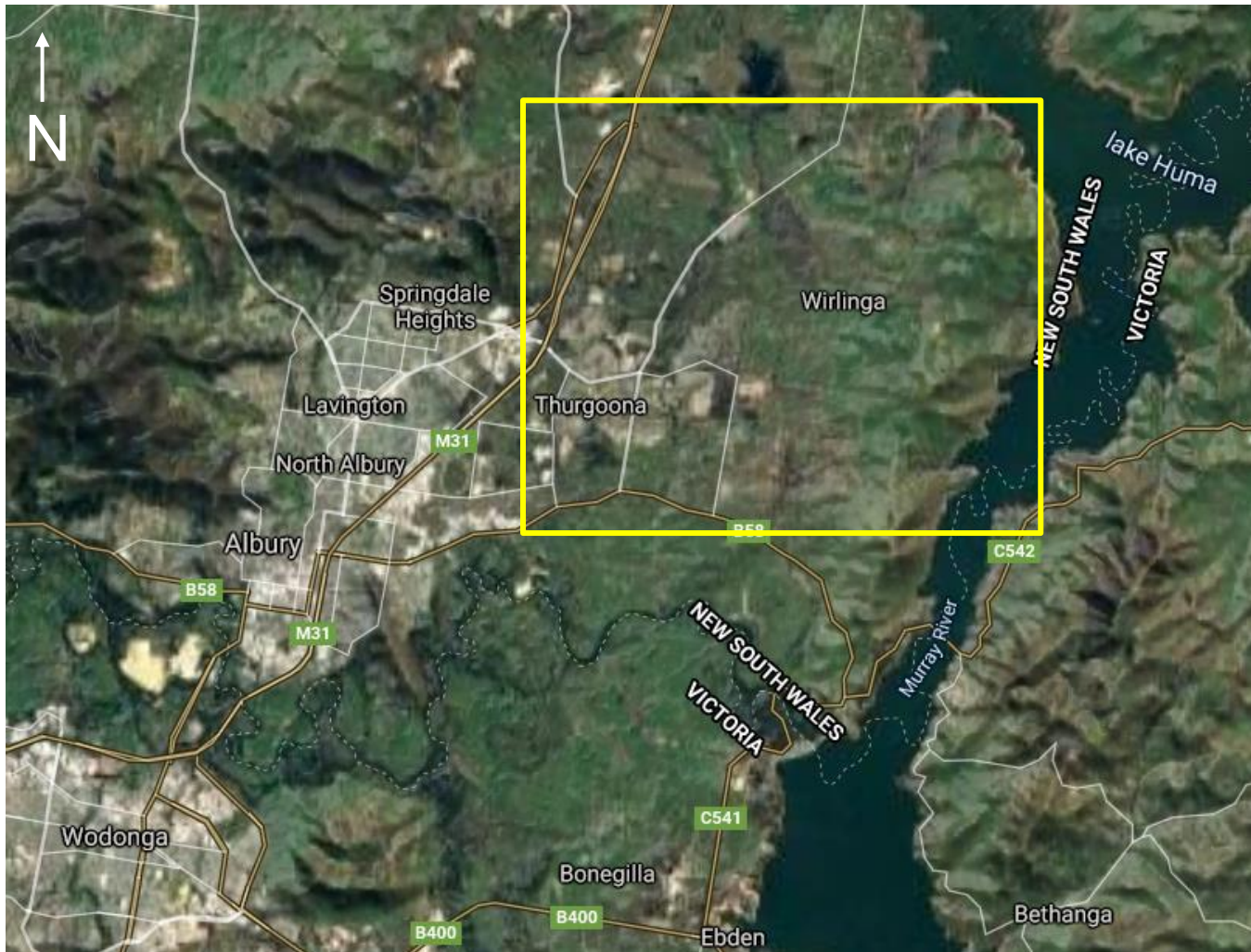


Figure 3: Map of Albury area⁵

Albury is located on the border of New South Wales and Victoria. The Murray River runs along the south boundary and the large Hume Weir is to the East.

The yellow box in figure 3 highlights the area this report examines. This is a rapidly growing part of Albury with many new roads and buildings being constructed.⁶ It is also the area with the highest squirrel glider population in the region³.



Figure 4: Map of Albury in relation to capital cities⁷

DPSIR Framework

This report card follows the DPSIR framework. It begins by looking at the state and trend of urban sprawl and land clearing in Albury and then outlines the impacts of this for the population of squirrel gliders. The report will then look at the pressures and drivers causing population decline and evaluate the policy and management responses. The relationship between the DPSIR sections is outlined below in figure 5.

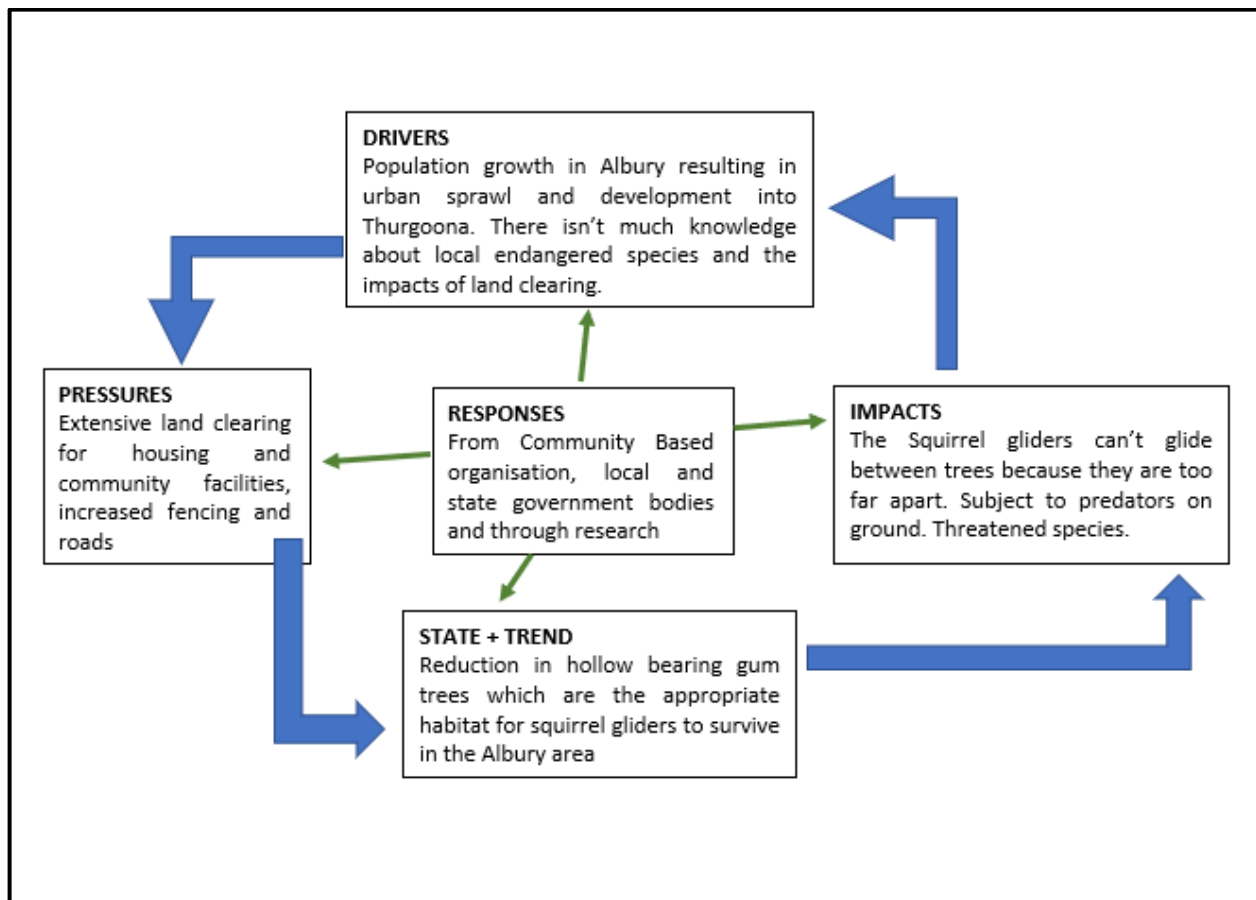


Figure 5: Graph outlining the connections between drivers, pressures, state, impacts and responses to squirrel glider habitat degradation.

Methods

This report card was put together by:

- Analysing academic research for background information and impacts
- Collating government and community responses through websites and reports
- Observing hollow bearing trees and development projects by visiting Thurgoona

STATE AND TREND

Over the past 20 years there has been extensive urban sprawl from the City of Albury into the suburb of Thurgoona, and more recently Wirlinga.

Urbanisation: Clearance of native vegetation and replacement with human land uses and constructions such as houses and roads⁸

Urban Sprawl: the expansion of the geographic extent of cities and towns⁹

These geographical patterns of human movement and development have resulted in significant land clearing for the construction of residential housing, shops, businesses, parks and a school.⁶ A major concern with land clearing is the abolishment of gum trees that are over one years old. Such trees, with open hollows provide homes for squirrel gliders, and as they disappear, so too does the habitats of the gliders.⁹

Albury has a temperate climate, with native land being dominated by woodlands with eucalypt species.¹⁰ Temperate woodlands are easy to clear and attractive for farmland.⁹

In the last 200 years, 85% of native vegetation has been cleared in the North-east Victoria/ South-east New South Wales region.⁸

This high number is a result of extensive agricultural practices in the area, upgrading of infrastructure (such as the Hume Highway developments in 2007)⁸ and the construction of the Hume Dam in 1917 which has a surface area of 20,000 hectares.¹¹

Trend

There is continued population growth projected in Albury. In 2018 the Thurgoona/Wirlinga population was 9,500.⁶ This number is expected to grow to 17,500 by 2036 and surpass 50,000 in the next 50 years.⁶ With this population growth will come further urban sprawl and developments of housing and major infrastructure.

IMPACTS

For Squirrel Gliders

Continuous urbanisation, urban sprawl and associated land clearing has led to a loss of appropriate habitat for squirrel gliders.^{1,8,9} Trees for squirrel gliders to nest in have become too far apart for them to glide between, and hence they must go on the ground where there is increased risk of being attacked by predators, such as foxes and cats.¹² Many of the remaining trees are on the side of the major Hume Highway which is difficult to cross and increases risk of being run over.¹³ Fencing is also a physical barrier and hazard. Other factors that come with urbanisation such as noise and light pollution also have an effect on the health of the squirrel glider population.⁹ These impacts ultimately lead to a decline in species count and possible extinction.



Figure 6: A tree suitable for squirrel gliders to inhabit¹

For Wider Biodiversity

When the distribution of a species in an ecosystem is altered, or a species becomes extinct, there are many flow-on effects for the wider biodiversity.¹⁴ It is difficult to identify what will exactly happen if squirrel gliders do become extinct, as there are so many variables to food chain patterns, but the extinction of squirrel gliders will alter the ecosystem's functions.⁸ This means it is even more important to ensure their survival.

PRESSURES

- ❖ Extensive land clearing for housing and community facilities
 - Declining amount of gum trees with hollows, where squirrel gliders inhabit⁴
- ❖ New physical barriers.
 - Construction of major roads
 - Housing and other buildings
 - Increased fencing



Figure 7: One of the many housing developments in Thurgoona¹⁵

DRIVERS

- ❖ Urbanisation⁸
- ❖ Population growth in Albury leading to urban sprawl and development in Thurgoona⁶
 - COVID-19 has made the prospect of working outside the office far more viable. The rapid adaption to online technologies has the potential to reshape the way people work. A hypothesis presented by geographers in the field is that there may be counter urbanisation, where people living in capital cities reside in regional areas.¹⁶
- ❖ Land use zoning¹⁷
 - Prioritisation of housing developments over restoring native vegetation.¹⁷
 - There are hollow-bearing trees on land that has been zoned for residential and commercial development.¹⁸
- ❖ Limited knowledge about local endangered species and impacts of land clearing in the community¹

RESPONSES

There have been both government and non-government responses to squirrel glider habitat degradation. These responses have largely been led by participatory community based organisations such as the Albury Conservation Company, who are key stakeholders in raising community awareness and building local programs for squirrel gliders conservation.

Community Based Organisations

❖ Albury Conservation Company (ACC)

Local “grassroots” community organisation run by a board of volunteer directors.¹⁹ ACC have organised and managed several programs which have promoted effective squirrel glider management.¹⁹ Their major conservation projects have included:

Building nest boxes: ACC have partnered with Thurgoona Men’s Shed to build nest boxes for native wildlife, predominately squirrel gliders. In the six years since the program began, more than 600 high quality boxes have been constructed and installed.²⁰

Mapping hollow trees: funded by the NSW Government’s Environment Trust, 523 hollow-bearing trees were mapped by ACC. When this was complete, a workshop was held in the community to highlight the need for preservation of these trees.¹⁸

Albury Wodonga threatened species monitoring: 30 motion sensing cameras have been installed to provide scientific evidence of the health of the local squirrel glider population.²¹

❖ Wirraminna Environmental Education Centre (WEEC)

Located just north of Albury in Burrumbuttock, the WEEC has had a positive influence spreading awareness in the community about squirrel gliders being threatened. They provide resources for schools and offer excursions to their centre where students learn about biodiversity.²² In 2018, they partnered with high schools ‘Murray High School’, ‘James Fallon High School’ and ‘Trinity College Albury’ to publish books about squirrel gliders in the local community.²² Furthermore, the WEEC have resources for people interested on their website and have made two videos on YouTube.²³

❖ Parklands Albury Wodonga

Parklands Albury Wodonga aim to spread awareness and preserve natural ecosystems in the local area.²⁴ Whilst they do not have any policies or programs that are aimed specifically at squirrel gliders, they do mention them regularly in their media reports and in their work. By helping to maintain parklands, they are also optimising habitat conditions for flora and fauna, including squirrel gliders.²⁴



Figure 8: Nest Box installed by ACC²⁰



Figure 9: Squirrel gliders using a nest box²⁰

Local Government

❖ Albury City Council Local Environment Plan (2010)

The aim of the local environment plan is to promote sustainable urban development through outlining land use zoning which attempts to develop Albury in a way that both promotes urban growth without having a significant impact on the biodiversity in the region.¹⁷ The area this report card is looking at has three main zones:

R1: General residential area - to provide housing needs for the community¹⁷

R5: Large lot residential - you need to consent for housing, and most commercial activities are prohibited. Aims to provide housing in a rural setting. ¹⁷

E3: Environmental management - development should not have adverse effect on ecological communities in this area. Houses, community facilities, agriculture, education facilities are all still permitted with consent. Retail, industries and multi-dwelling housing is prohibited.¹⁷

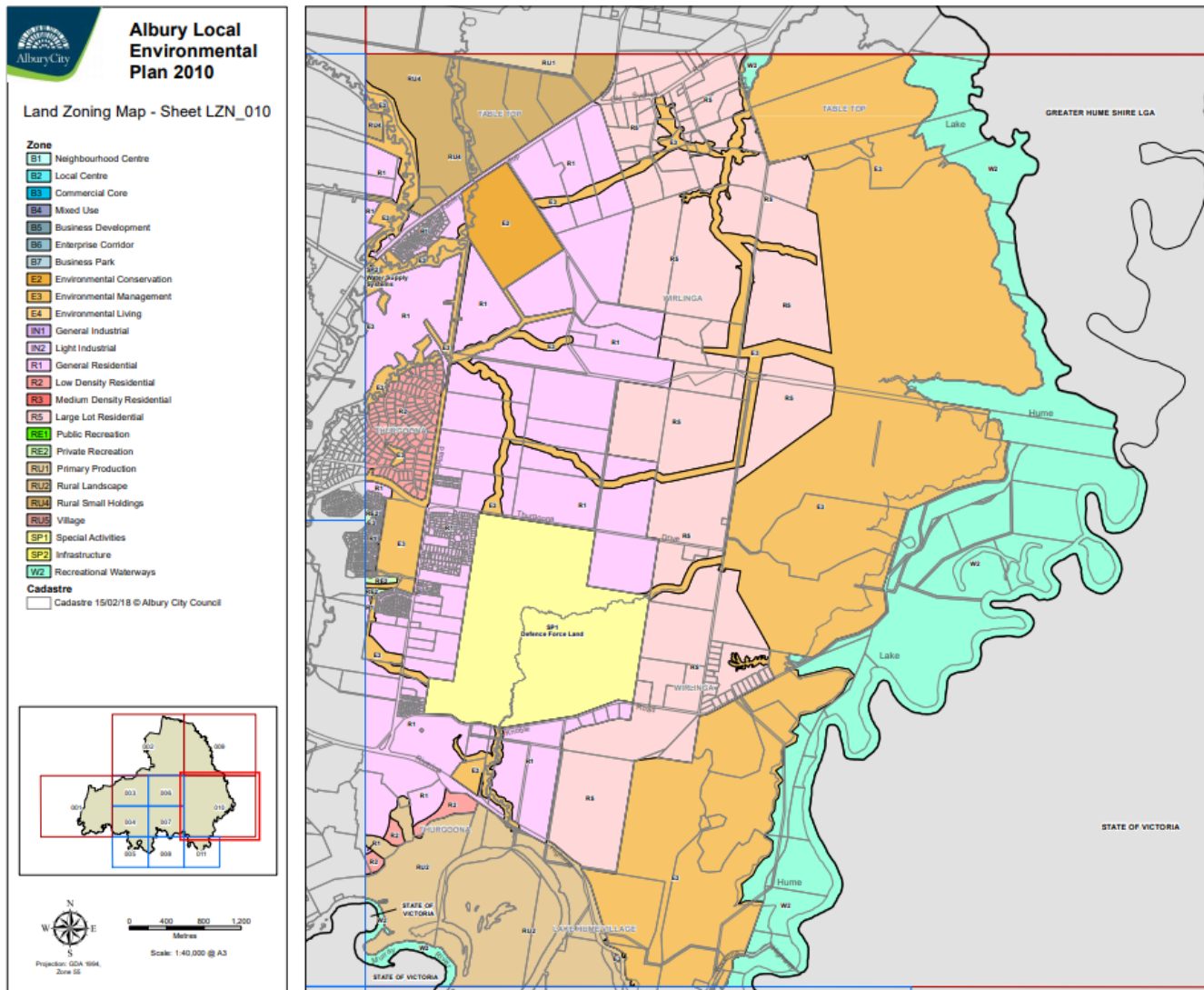


Figure 10: Land use zoning in the Thurgoona/ Wirlinga area, showing predominately R1, R5 and E3 zones¹⁷

❖ Regional Natural Environment Strategy

In July 2020, Albury City and Wodonga Council published their joint strategy and action plan to manage environmental issues. Three of their strategies directly relate to squirrel glider's survival and the management of their habitats:

- Ongoing awareness campaigns highlighting the value of hollow bearing trees and the threatened nature of squirrel gliders ²⁵
- Install nesting boxes that are of high quality and in appropriate locations ²⁵
- Collaborate with experts to monitor threatened species such as squirrel gliders ²⁵

State Government

❖ New South Wales Biodiversity Conservation Act 2016

The legislation under the Biodiversity Conservation Act established in 2016 makes it an offence to ‘damage the habitat of any threatened species.’²⁶ Theoretically, this makes it more difficult to clear land in Thurgoona and Wurlinga.

❖ Murray Local Land Services LAMP

Murray local land services is a part of the New South Wales Office of Environment and Heritage. They have created a local area management plan (LAMP) with the aim of maintaining, or increasing, squirrel glider’s population.⁴ It applies to the whole Murray River region. The main projects include replacing barbed wire fencing in high risk areas, installing nest boxes and planting trees which squirrel gliders can use to stop between gum trees.⁴ The LAMP is voluntary, which means it relies on community support.⁴ To engage landowners, they published a guide giving information about squirrel gliders and the importance of maintaining hollow bearing trees.⁴ It gives tips on how to use nest boxes, reduce barbed wire use and the importance of responsible cat ownership.⁴

Research

The issue of squirrel glider habitat degradation in the Albury area has attracted some research from universities in Australia. Researchers from Charles Sturt University, which has a campus in Thurgoona, have published some papers about the impact of urban sprawl on squirrel gliders.⁹ Similarly, scientists at Australian National University have explored the preferred habitats and threats facing squirrel gliders in the Albury region.⁸ Students from Monash University and the University of Melbourne have researched some of the impacts of the Hume Highway on the ability of Squirrel Gliders to move between trees and explored some potential management methods such as canopy bridges.²⁷ There is great potential for further research in the area.

EVALUATION AND REFLECTION

The environmental problem of degradation of squirrel glider's habitats in the Albury area has received growing attention in the community over the last five years. As the suburbs of Thurgoona and Wurlinga have become more urbanised, recognition of habitat destruction has increased. As outlined in this report, there have been responses from different stakeholders, both government and non-government based. After completing the report card, it has become clear that the responses with the greatest impact and effectiveness has been from community organisations, such as the Albury Conservation Council (ACC)¹ and Wirraminna Environmental Education Centre.²³ The success of these groups highlight the importance of participation from community members when addressing localised environmental problems. ACC particularly have raised significant awareness about the issue through communicating with local media and partnering with other groups, such as Men's Shed, to build nest boxes and monitor the species.^{18,20,21}

Government responses on the other hand have been less effective at targeting the specific environmental problem. Whilst the New South Wales Biodiversity Act aims to help maintain biodiversity in the state by making it illegal to damage the habitats of threatened species, there are a few loopholes. For example, if a person is unaware that they are damaging a threatened species habitat, they are exempt from penalty.²⁶ The Albury City Council's 'Local Environment Plan' includes land use zoning for sustainable development in Thurgoona and Wurlinga.¹⁷ There are three main zones in the area and housing development is allowed with consent in all of them. The plan does not mention clearing native vegetation, and rather focusses on the opportunity to provide housing. The data provided by the Albury Conservation Company outlines that hollow bearing trees exist in areas that are zoned for development.¹⁸ It is a complex issue, as the area grows there is an obvious demand for further housing, however legislation such as this land zoning would be more effective in preserving natural ecosystems and squirrel glider populations if it clearly ruled against clearing native vegetation for any development.

Some government responses have been more effective, such as the local area management plan, however this still relies on volunteer participation.⁴ Albury and Wodonga's recent publication 'regional natural environment strategy' has been successful in targeting squirrel gliders in a few of their strategies, however whether these have been effective is yet to be known, as it was only published in July 2020.²⁵

A common theme with a lot of the responses is that they don't directly address the pressures and drivers. Instead they look for ways which squirrel gliders can adapt to the changing environment - such as installing nest boxes. Urbanisation is a major pressure and such a big concept that it is difficult to address in a fair way, however greater emphasis on the need to maintain ecological communities from government bodies would help address the problem.



Figure 11: Image of Squirrel Glider ¹

Ultimately, whilst there has been growing awareness and responses to the changing environment in Thurgoona and Wirringa, and the impact this has on squirrel gliders, there is still more that can be done to reduce the possibility of the native animal becoming entirely extinct.

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