

Greater Gliders

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Outline

1. Introduction
2. Biology and ecology
3. Threats
4. Conservation Needs
5. What we can do, and are doing



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Introduction

Barometer of change

Conservation status – dramatic declines over last 30 years throughout its range, @ 90% decline central Qld (clearing), similar in Victoria (logging), 100% decline in coastal NSW (??)



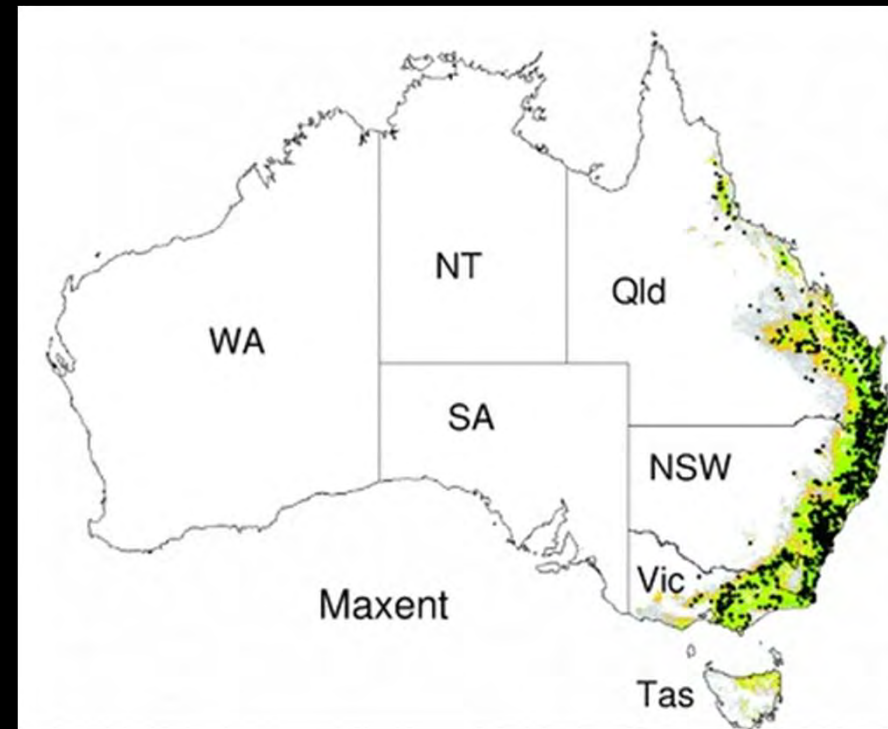
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Distribution

Tall eucalypt forests and woodlands

Very reliant on particular habitat features, so won't be found everywhere

Share a similar distribution to the yellow-bellied glider *Petaurus australis*



Taxonomy

Northern



Petauroides minor

Central



Petauroides armillatus

Southern



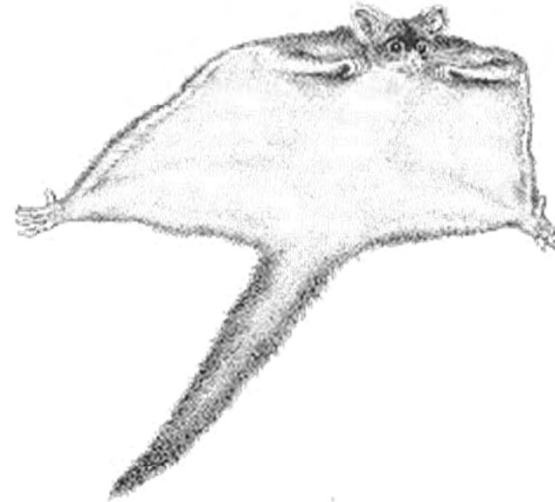
Petauroides volans

Petauroides volans (central and southern)

Biology



© Carly Starr



Biology

Many colour morphs: From white to chocolate brown to black



© Bruce Thompson



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Ecology - feeding



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Ecology – favourite species to forage in?

Some favourite foody species -

North Qld: *Corymbia intermedia*, ***C. citriodora***, *Eucalyptus tereticornis*, *E. portuensis*, *E. moluccana*

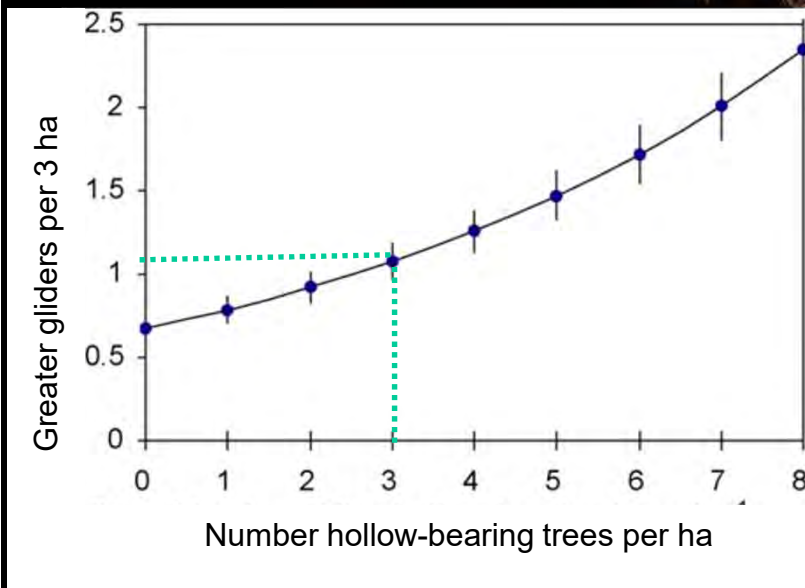
Central and southern Qld: *E. latisinensis*, *E. tereticornis*, *C. intermedia*, ***C. citriodora***, *E. crebra*,



12.5.7 *Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus portuensis*

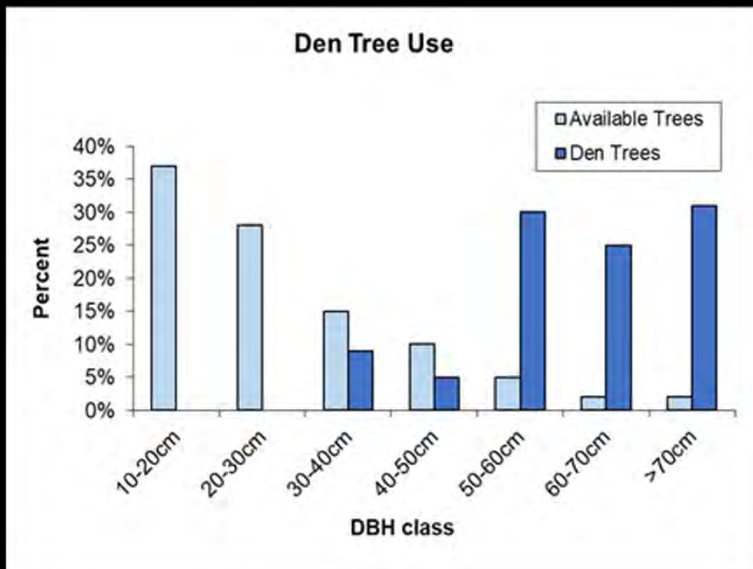
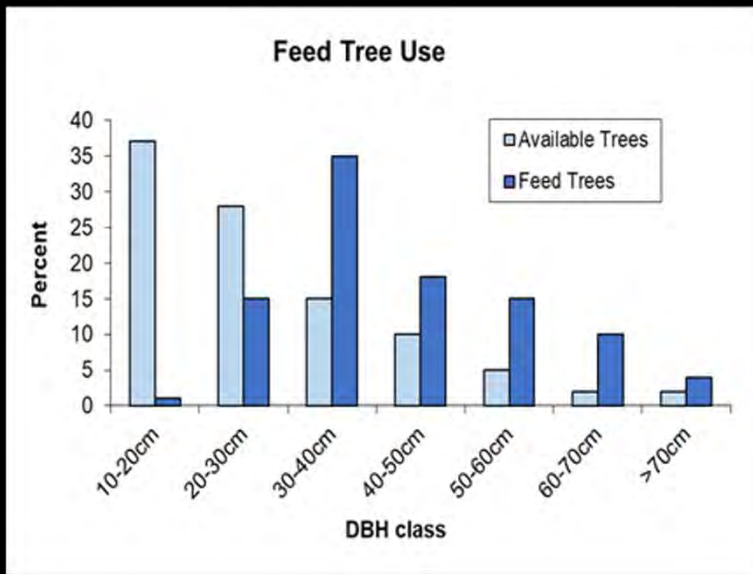
Ecology - denning

One GG (for every 3 ha)
needs > 3 live HBTs per ha



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Ecology – favourite sizes?

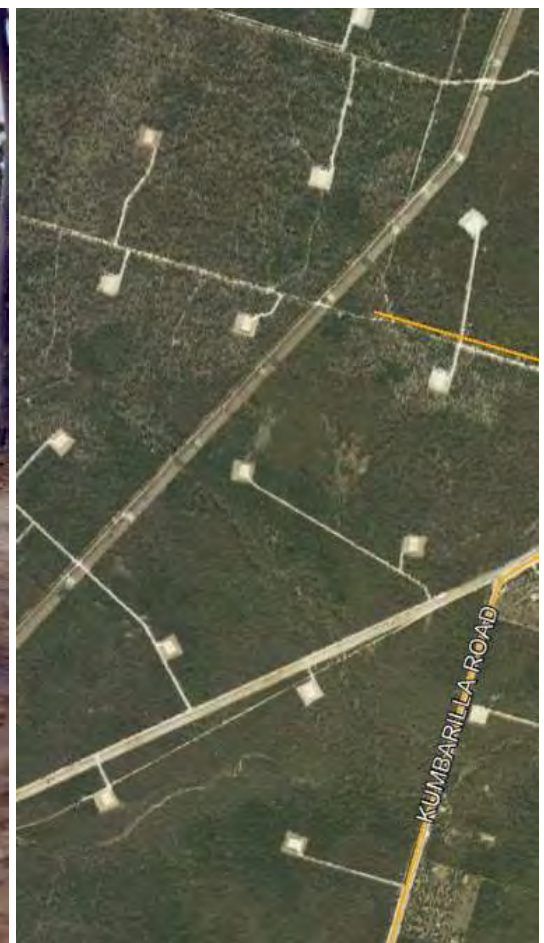


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Smith G.C., Mathieson, M.T. and Hogan, L.D. (2007). Home range and habitat use of a low-density population of greater gliders, *Petauroides volans* (Pseudocheiridae: Marsupialia), in a hollow-limiting environment. *Wildlife Research* 34, 472–483.

Threats – habitat clearing

In Qld, broadscale clearing largely ceased under the Vegetation Management Act... but there are exceptions...



*https://gympietoday.com.au/news/2021/04/09/koala-land-cleared/attachment/koalaclear_233543_02-jpg/

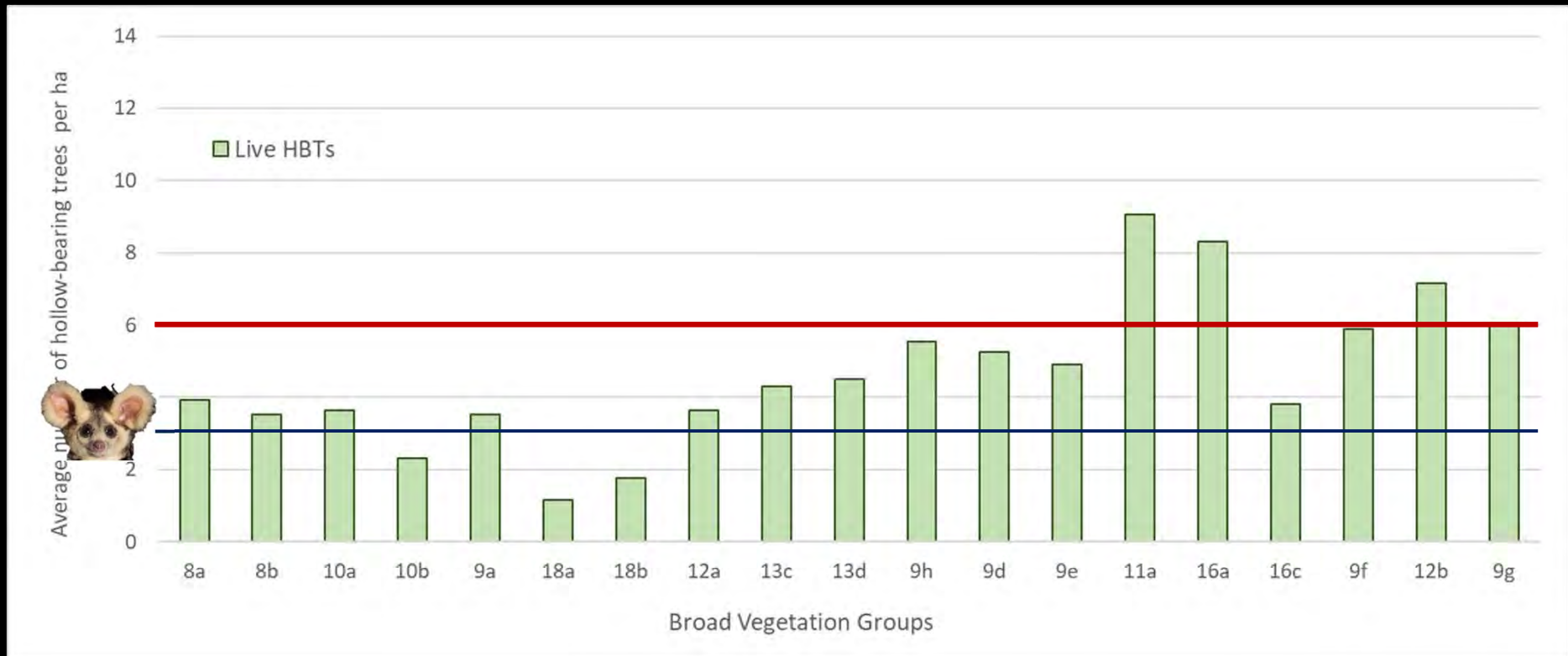
Threats – habitat modification

Greater gliders decline with loss of large and hollow-bearing trees



Threats – habitat modification

Queensland's hollow-bearing tree resource in GG habitat



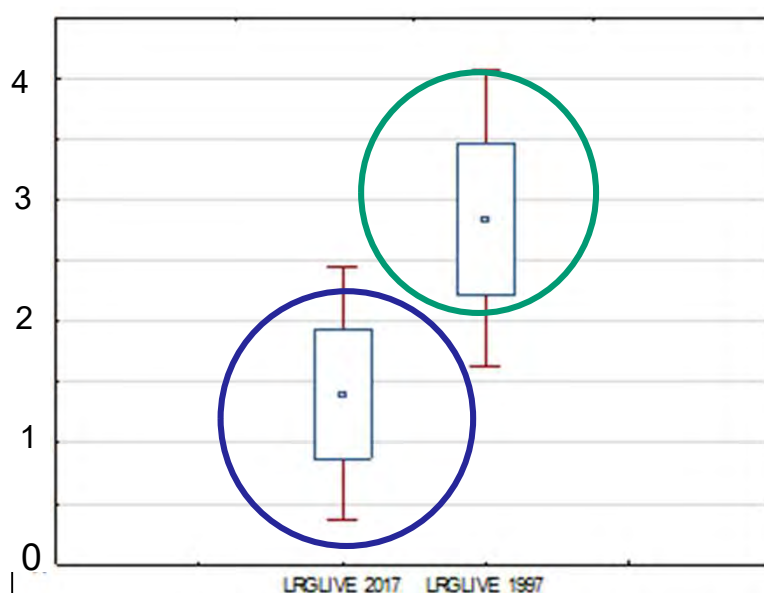
Threats – habitat modification

Loss of live hollow-bearing trees

- Cutting them down – historic logging rules*

“Useless veterans should be eliminated as soon as possible..”**

- Drought – big old trees more susceptible due to hydraulic failure***
- Windthrow and prescribed burns



In 20 years 25% decline in large live trees in St Mary SF



*Eyre T.J. (2005) Hollow-bearing trees in large glider habitat in south-east Queensland Australia. *Pacific Conservation Biology* 11, 23-37.

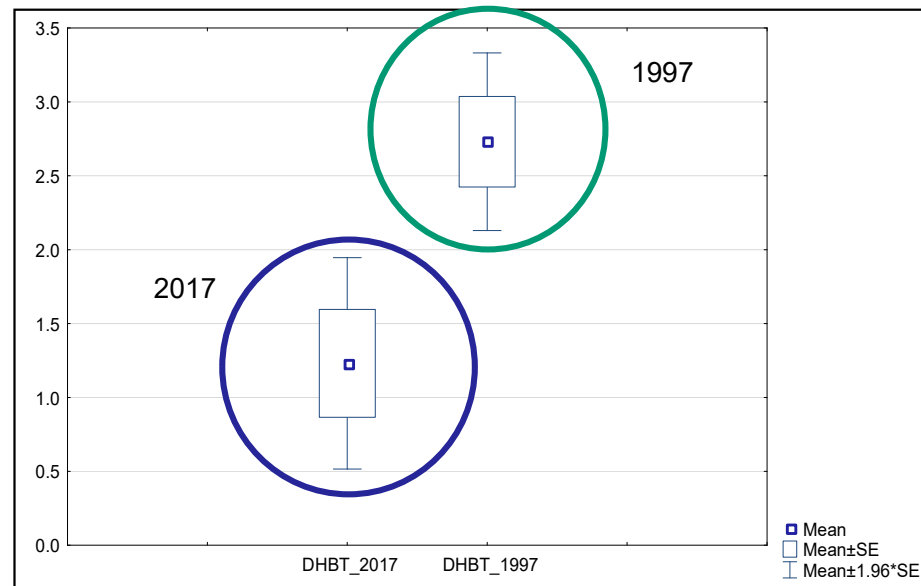
**Jacobs MR. (1955) Growth Habits of the Eucalypts. Forestry and Timber Bureau, Canberra.

***Bennett et al. (2015) *Nature Plants* 1, Article No. 15139; Rowland et al. (2015) *Nature* 528, 119-122.

Threats – habitat modification

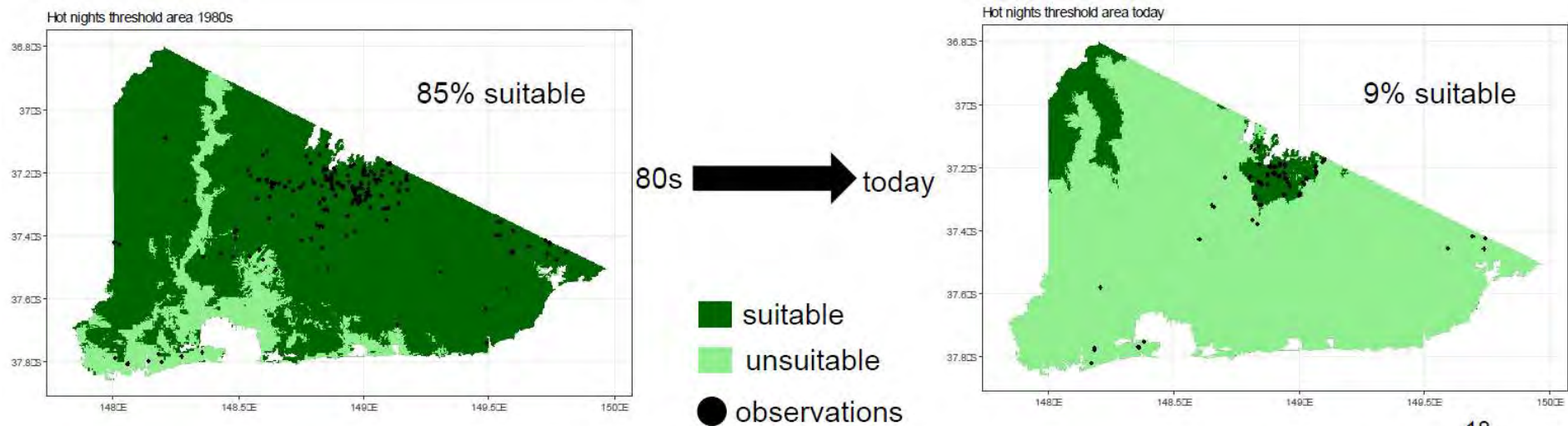
Loss of dead hollow-bearing trees

- Dead hollow-bearing trees highly susceptible to fire – big chimneys
- In 20 years, dead hollow-bearing trees have declined by 46% in southeast Queensland, mainly due to fire



Threats – Direct climate change

- Greater gliders become hyperthermic $>20^{\circ}\text{C}$, and need to use energy and water to keep cool
- Increasing aridity and warmer temperatures plays havoc on their unique physiology, where they stop eating
- In Victoria, recent research has shown that increased number of hot nights $> 20^{\circ}\text{C}$ since the 1980's has had a clear impact on greater glider occupancy of potentially suitable habitat*
- Warmer temperatures and increased CO_2 levels also alter the nutrition, digestibility and toxicity of their sole food source – eucalypt leaves.



*Wagner B., et al. (2020) Climate change drives habitat contraction of a nocturnal arboreal marsupial at its physiological limits. *Ecosphere* 11 (10).

Threats – indirect climate change ...Wildfire

- Catastrophic 'Mega-fires' in Central and SE Qld, coastal NSW and Victoria late 2018 and 2019/20 – more than 30% of their habitat burnt
- Driven by climate change – increased dry times and temperatures
- Predicted in the 2008 Garnaut report that 'by 2020 we will directly observe a fire season that starts earlier, ends later and will be more intense'
- Direct impact on greater gliders - loss of food and shelter
- Loss of connectivity and large tracts of habitat



Threats – indirect climate change ...Wildfire



PHOTO: Fires raged at Adelaide Park, west of Yeppoon over the weekend (Supplied: Matthew Dinte)



© Stuart McMahon, NSW PWS



© George Lemann via WIRES



Widespread loss of habitat trees, homeless gliders



© The Armidale Express

Things we can do (and are doing)



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Knowing what the problem is the first step, and then what to do is the second step, and then action!

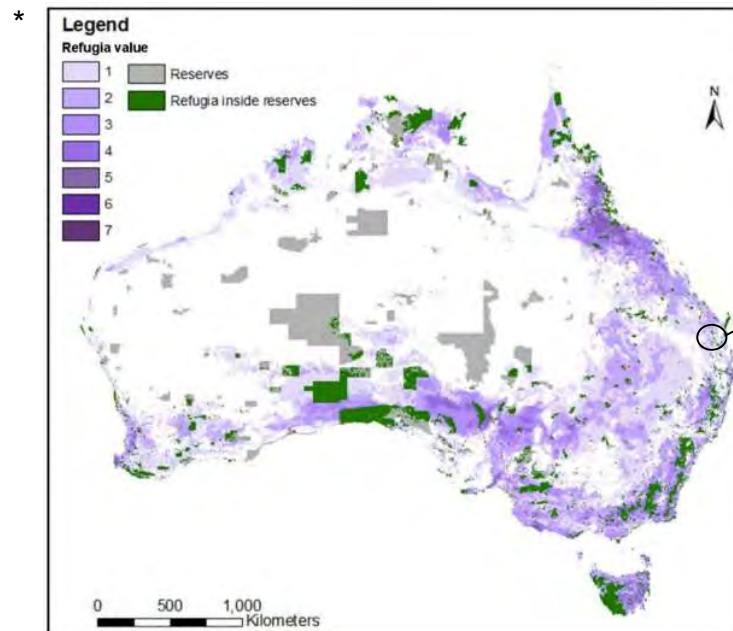
1. Find – future climate refugia for greater gliders
2. Restore – where glider habitat is lost
3. Protect – where habitat remains
4. Watch – monitoring gliders and their habitat
5. Stay positive, collaborate and engage

Things we can do (and are doing)

Find refugia

Areas where greater gliders are likely to persist through climate change, then protect it!

****usually**** High elevation areas where it is cooler and climate is going to be more stable will be key refuge areas for GGs through climate change



*Reside, A.E. et al. (2013) Climate change refugia for terrestrial biodiversity: defining areas that promote species persistence and ecosystem resilience in the face of global climate change. In National Climate Change Adaptation Research Facility, Gold Coast.

Things we can do (and are doing)

Restore habitat

By..

1. Increasing the extent and connectivity of available glider habitat through environmental plantings and/or managing native forest regrowth
 2. Improving habitat condition over time - looking after large old trees, putting up nest boxes in the meantime
- Carbon farming schemes such as Queensland's Land Restoration Fund and the Biodiversity Stewardship Program aim to provide income for land managers in return for measurable biodiversity benefits.
 - Current collaborative projects Methods 2 Market and Steak n Wood aim to showcase how we can align grazing and timber production with carbon farming and biodiversity benefits



Things we can do (and are doing)

Nest Boxes

Large old trees with hollows take a really long time to develop....

Nest boxes may help in the interim!



Things we can do (and are doing)

Protect habitat

Stop clearing habitat

Protecting habitat trees from prescribed burns

Protecting habitat trees and 'recruit' habitat trees from active removal

- 1996 in Qld – prescriptions for retention of Habitat trees in GG habitat; 6 trees per ha + 2 recruit

Using wildlife friendly fencing



Things we can do (and are doing)



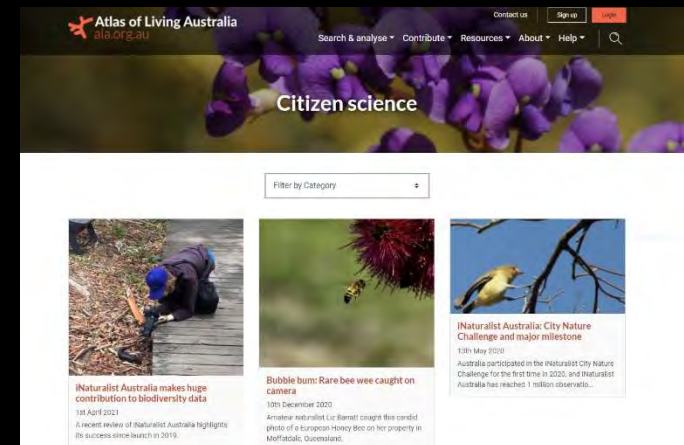
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Keep watch, engage and stay positive!

Monitoring species can be expensive and resource intensive. But it is the only way to assess how gliders are faring.

Spotlighting is easy and lots of fun. Absences just as important as presences...

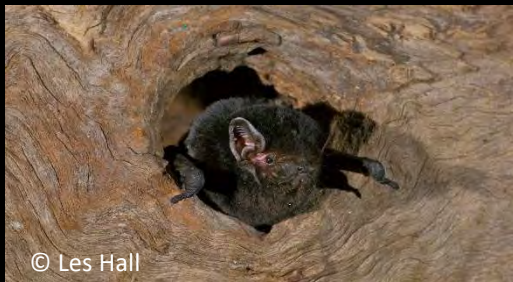
Everyone can help! Lots of citizen science projects e.g. Wildlife Queensland ; Atlas of Living Australia citizen science portal



Finally....

By looking after greater gliders, we are also looking after a range of other species

13% of all of Australia's frogs, reptiles, birds and mammals depend on hollow-bearing trees



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Take home message

Greater gliders are declining due to interactive effect of habitat modification and climate change

Protecting glider habitat WILL help them get through the impacts of climate change

We know a lot, and are continuing to learn about what we can do to build resilience for gliders.

Active collaboration between all levels of government, universities, Industry, NRMs, NGOs and the community is KEY

Every contribution, from protecting a habitat tree to restoring strategic patches will make a difference

Stay positive, share knowledge on gliders and keep interested, join the YBG project!

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Thank you

Thank you!

- Colleagues who shared their knowledge and research; April Reside (UQ), Ben Wagner (UniMelb), Geoff Smith, Mike Mathieson, Luke Hogan (DES), Matt Cecil (Wildlife Qld), Carly Starr (Bush Heritage Australia); David Lindenmayer (ANU), Brendan Wintle (UniMelb), John Winter, Rod Kavanagh, Shane Maloney
- Colleagues who shared their photos; Rachel Lyon (Noosa Landcare); Josh and Sam (YBG project); Luke Hogan, Dan Ferguson, Jesse Rowland, Stuart McMahon, Carly Starr
- Wildlife Queensland and the Glider Network / YBG Project for CARING and being proactive about glider conservation
- YOU! For tuning in and being interested.

