

Ecological Research and Management of Biodiversity in National Parks: Royal National Park as a Case Study



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Aim of this paper



- To consider the role of ecological research in Reserve management,
- I will focus on vertebrate wildlife & use Royal NP as case study
- Disclaimer – recognition that Parks are not just managed for Biodiversity & Parks such as Royal have very complex management issues.

- How do we manage conservation reserves for their biodiversity?
- One might assume that ecological science can offer a prescription for how to manage reserves.

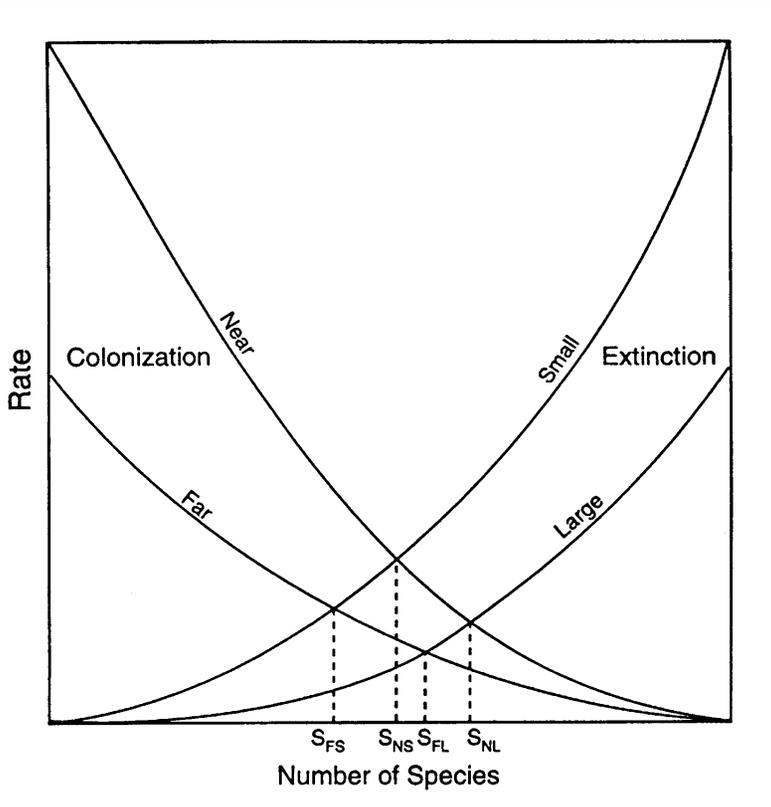


- The reality is there is no single recipe.
- Ecological science can provide some guiding principles.



What are the guiding principles?

- The Equilibrium Theory of Island Biogeography



MacArthur & Wilson (1967)

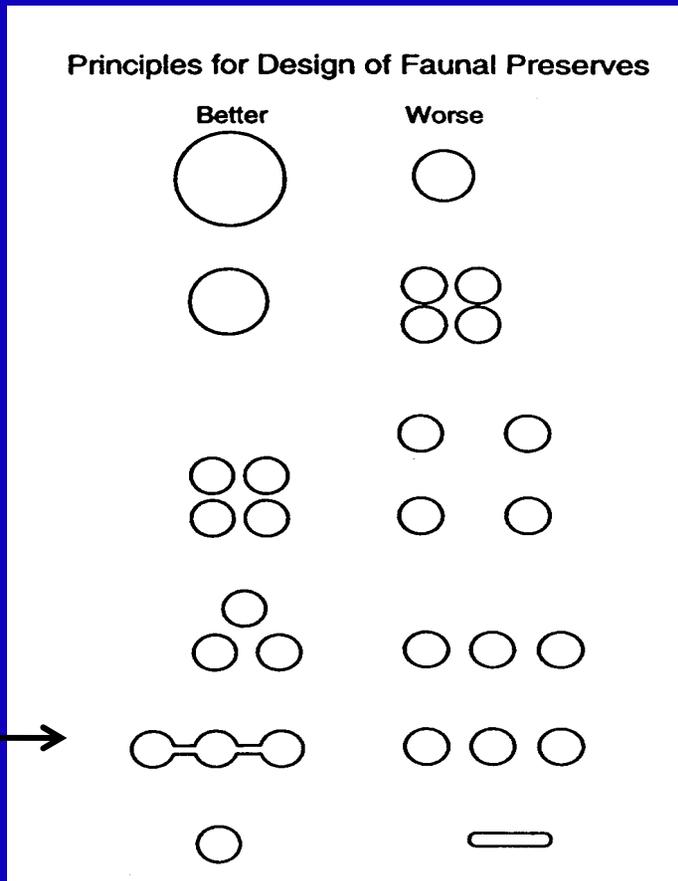
This highlights importance of:

Area (extinction → population size)

Distance (colonisation)

What are the guiding principles?

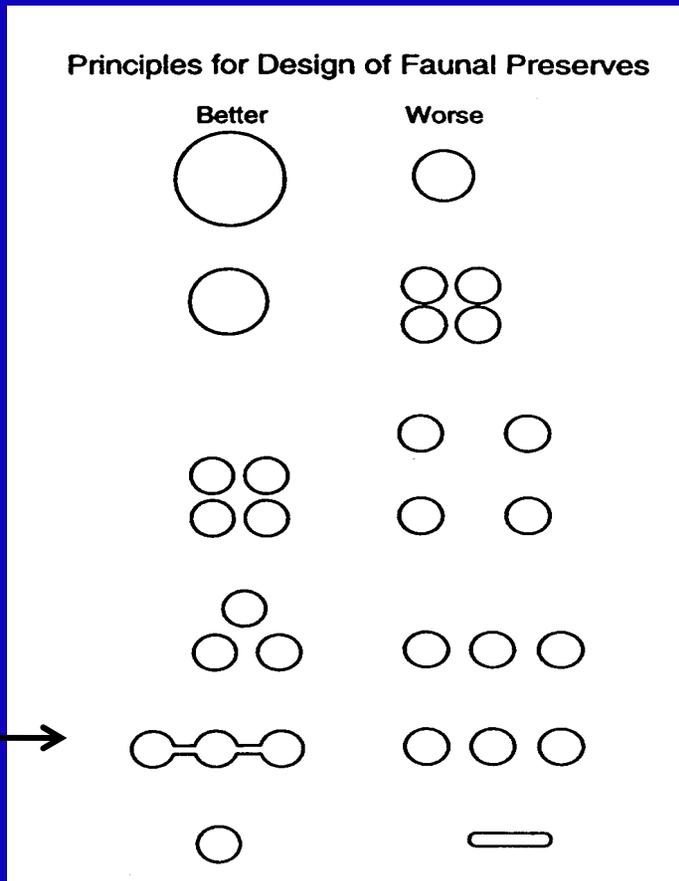
- The Equilibrium Theory of Island Biogeography



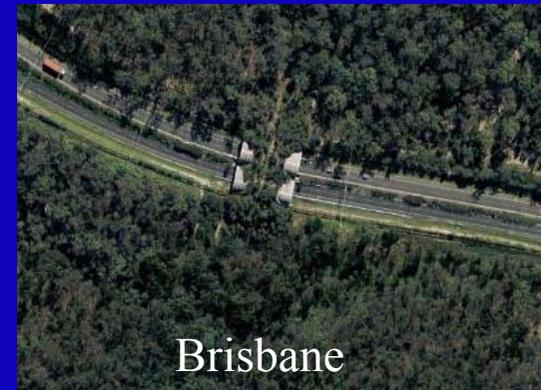
Diamond (1975)

What are the guiding principles?

- The Equilibrium Theory of Island Biogeography



Diamond (1975)



What are the guiding principles? A Focus on Threatened Species

- *NSW Endangered Fauna Interim Protection Act (1991)* preceded the *NSW Threatened Species Conservation Act (1995)*.
- Gives a focus in biodiversity management in Parks (& elsewhere) to threatened species.
- But how do we manage these species? *I'll get back to you.*



So how is Biodiversity managed in Royal NP?

NPWS (2000) – Plan of Management

6 OBJECTIVES OF MANAGEMENT including:

- the conservation of wildlife and natural biodiversity;
- the maintenance of natural processes as far as is possible;



So how is Biodiversity managed in Royal NP?

NPWS (2000) – Plan of Management

In addition:

- “Royal National Park will be used as a primary venue within the southern Sydney Metropolitan area for the promotion of natural and cultural heritage conservation in NSW generally and for promoting the work of the Service.”



Policies & Framework for Management

- Native & introduced animals
 - “Research into the life history and habitat requirements of key species will continue to be encouraged.



Policies & Framework for Management

- Actions
 - “Fauna surveys will be carried out ..., with priority on threatened or restricted species, including bats and herpetofauna.”



Biodiversity Management in Royal NP

Is it different or similar in other NPs?

e.g. Ku-ring-gai Chase NP (15,000 ha)

Bundjalung NP (18,000 ha)

Yuraygir NP (32,000 ha)

Broadly speaking they are generic with some local details.

Strong reliance on encouraging research.

What Role Can Research Play in Managing Biodiversity in Parks?

- Ecological Research can fall into one of 2 categories:
 - That of generic application to reserve management
 - That which is specific to a given reserve, or of specific application to a reserve due to the circumstances (e.g. species) of that reserve.
- Let's look at Royal as a case study.



3 Big Management Issues

- Habitat connectivity
- Fire management
- Habitat degradation



Habitat Connectivity – invoking Island Biogeography

- Has Royal NP become an ark?

Has the greater glider become extinct in Royal?

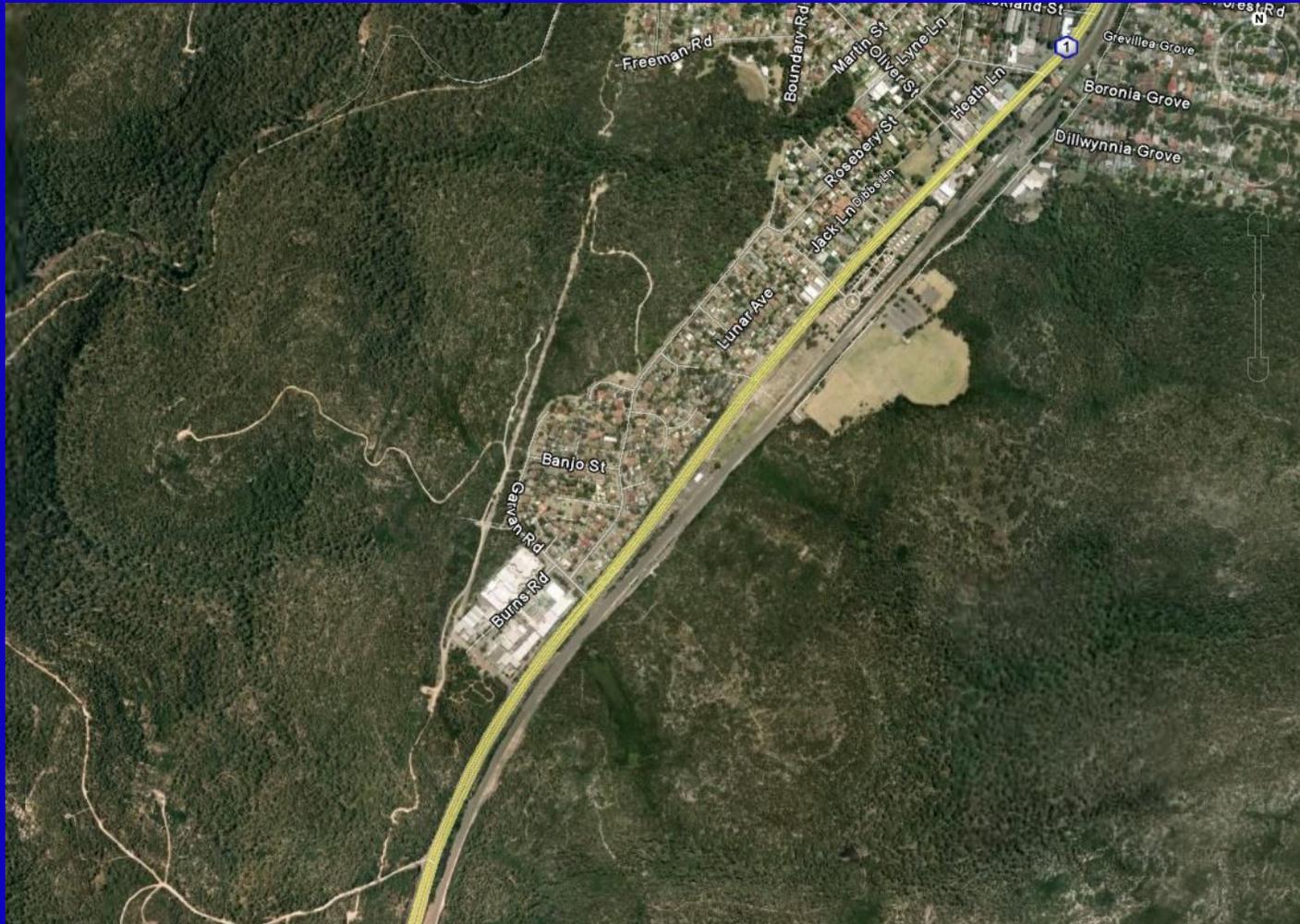
Lack of connectivity may hinder recolonisation, generally & after wildfire.



Urban Development at Heathcote



South of Heathcote



Is the Freeway a barrier?

Are there any solutions?

- Research is progressing due to major road projects in eastern Australia.
- Mitigation by underpasses & overpasses.
- Main groups to be affected are frogs, some reptiles & some ground-avoiding arboreal mammals (e.g. greater glider).

(Taylor & Goldingay 2010)



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HC500 HYPERFIRE

RECONYX

Goldingay et al. (2011);
Taylor & Goldingay (in press)



Weston et al. (2011)

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Taylor & Goldingay (unpubl.)



HC500 HYPERFIRE

RECONYA

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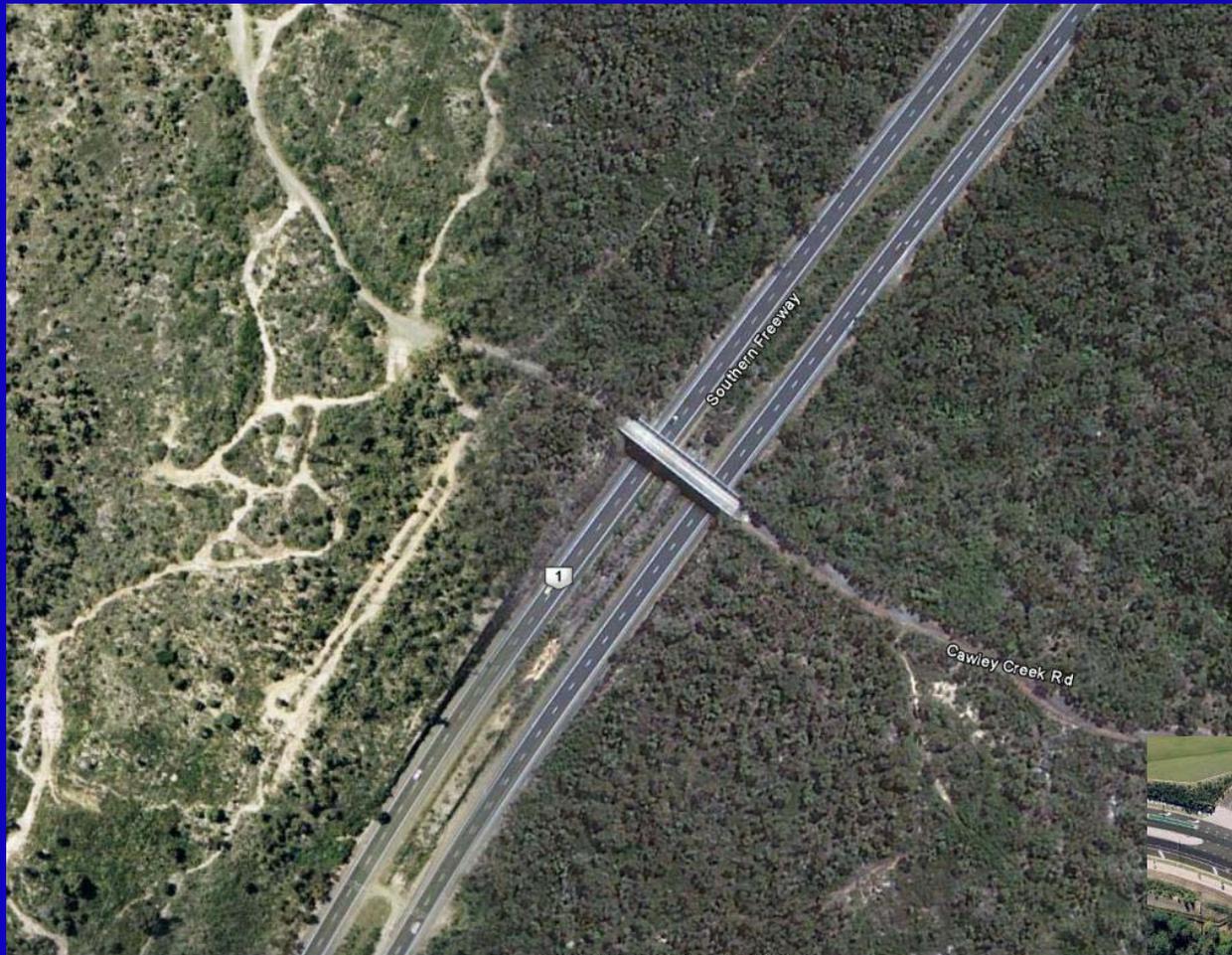


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HC500 HYPERFIRE

RECONYA

Retro-fitting is an option to link Royal to Heathcote NP over the Southern Freeway



Existing overpass

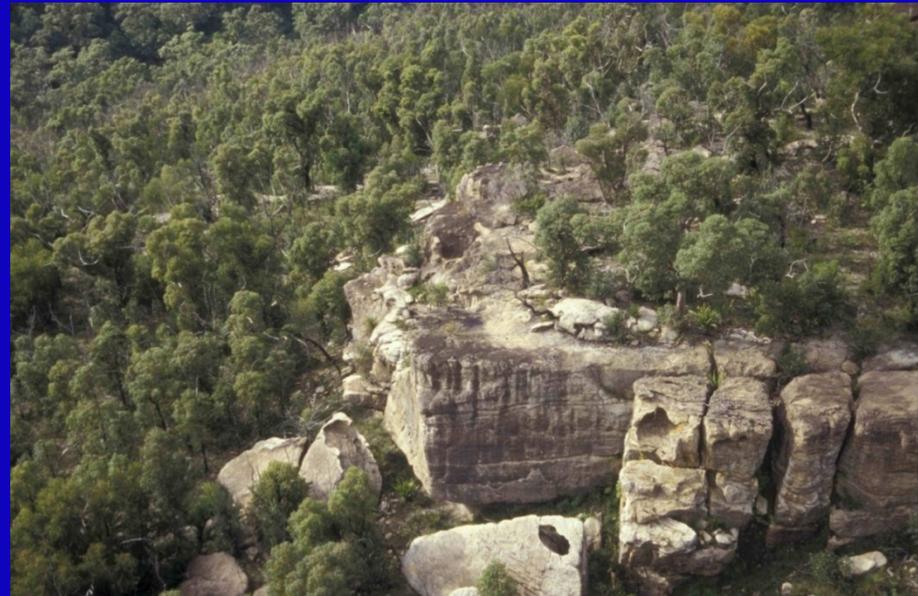
Southern Freeway



Existing underpass

Habitat Degradation & Australia's Most Endangered Snake

- Lessons from Royal NP



Monitoring of experimentally constructed rock outcrops



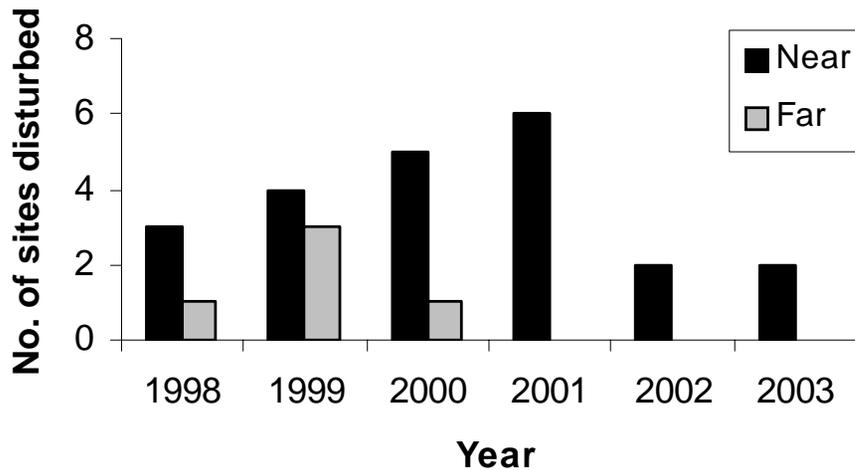
Outcrops located near & far
from roads & walking tracks

Goldingay & Newell (2000; unpubl.)



Monitoring of experimentally constructed rock outcrops

Disturbance to 10-rock outcrops



Disturbance more frequent & more intense at near sites.



Lessons for rock-dwelling reptiles everywhere.

Fire Management

- A work in progress – Royal NP has a lot to offer



Conclusion

Research – Plan of Management (NPWS 2000)

- “Research will also establish the requirements for the management of particular species.
- Data and findings from research studies and surveys will be utilised in park management.”