

Experimental Biodiversity Accounting in Australia



Suzi Bond, Jane McDonald &
Michael Vardon

suzi.bond@abs.gov.au

j.mcdonald9@uq.edu.au

michael.vardon@abs.gov.au

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Definition of biodiversity in SEEA EEA (after Convention of Biodiversity)

The variability among living things and the ecosystems they inhabit, and is composed of three levels:

- genes
- species and
- ecosystems

Ecosystems are further defined as ‘a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit’.



SEEA EEA biodiversity accounts

Species

- Accounts of species abundance by Kingdom (table 4.7)
- Accounts of threatened species
- Accounts of ecosystem condition include biodiversity (table 4.4)

Ecosystems

- Link to land cover accounts (paragraph 4.106)
- Link of land cover to species abundance (paragraph 4.117, figure 4.2)

Experimental accounts of threatened species, by species groups 2000

	Introdu- ced species	Native species				
		Unprotec- ted	Protect- ed	Rare and endange- red	Total native species	Total species
Animals						
Vertebrates						
-Mammals	15	2	112	20	114	129
-Birds	10	0	458	33	458	468
-Reptiles	2	0	202	26	202	204
-Amphibians	1	0	51	9	51	52
-Bony fish	4	56	0	0	56	60
-Cartilaginous fish	NA	NA	NA	NA	NA	NA
-Insects	0	11	2	0	13	13
Subtotal	32	69	825	88	894	926
Plants	376	5	3239	91	3244	6320
Subtotal	376	5	3239	91	3244	6320
Fungi	0	0	68	0	68	68
Subtotal	0	0	68	0	68	68
Protista	0	0	148	0	148	148
Subtotal	0	0	148	0	148	148
TOTAL	408	74	4280	179	4354	4762

Experimental accounts of threatened species , all species 2000 to 2011

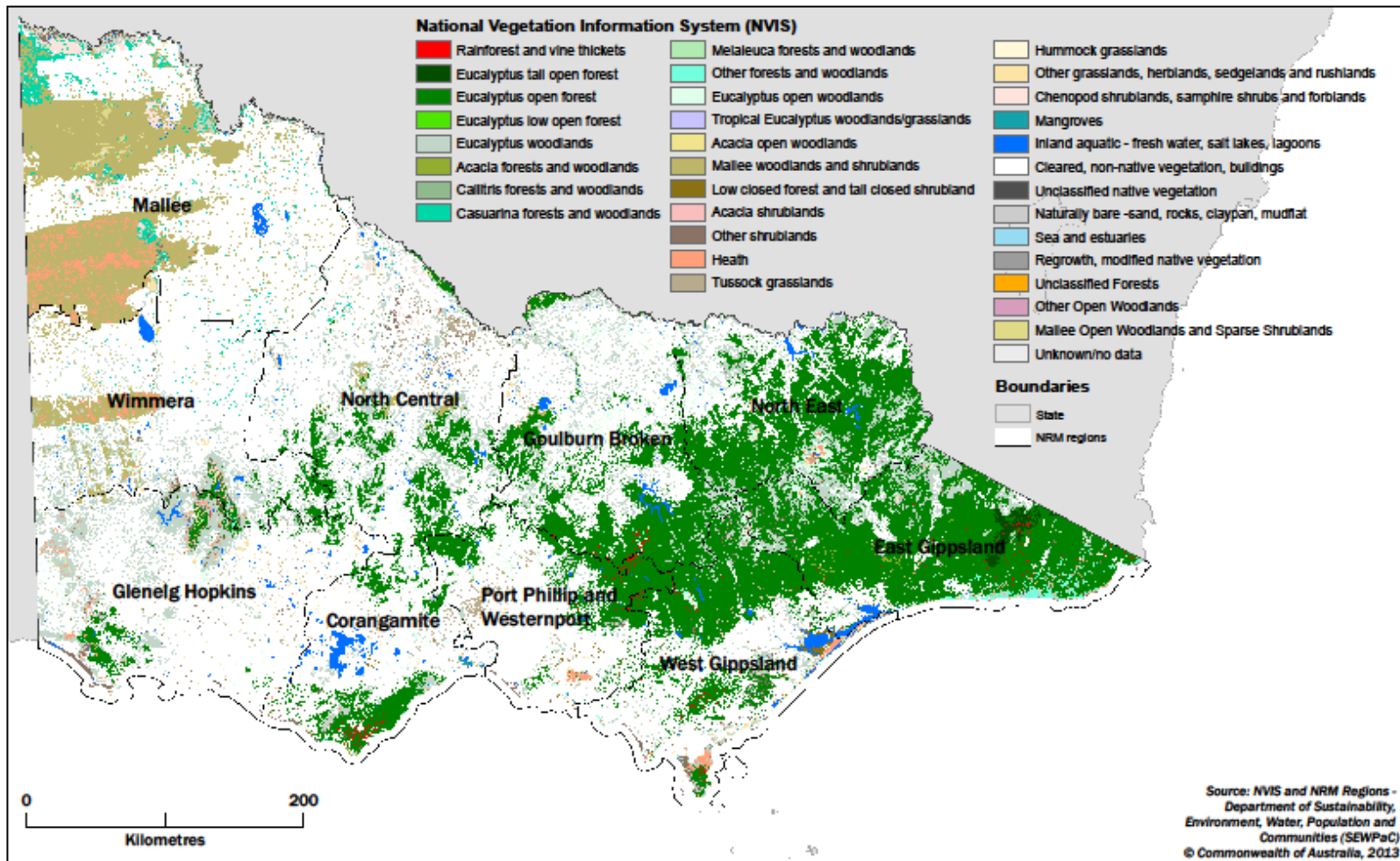
Burdekin NRM	Introduced	Native species				
		Unprotected	Protected	Rare and endangered	Total native species	Total species
Opening stock 2000	408	74	4280	179	4354	4762
Additions						
-from lower threat categories (ie increased risk of extinction)	NA	NA	NA	NA	NA	NA
-from higher threat categories (ie reduced risk of extinction)	NA	NA	NA	NA	NA	NA
-discoveries of new species	NA	NA	NA	NA	NA	NA
-rediscoveries of extinct species	NA	NA	NA	NA	NA	NA
-reclassifications(a)	NA	NA	NA	NA	NA	NA
Total additions	NA	NA	NA	NA	NA	NA
Reductions						
-to lower threat categories (ie reduced risk of extinction)	NA	NA	NA	NA	NA	NA
-to higher threat categories (ie increased risk of extinction)	NA	NA	NA	NA	NA	NA
-reclassifications(b)	NA	NA	NA	NA	NA	NA
Total reductions	NA	NA	NA	NA	NA	NA
Net change	121	34	353	30	387	508
Closing stock 2011	529	108	4633	209	4741	5270

Experimental accounts of threatened species, birds, Victoria, 2001 to 2006

		Extinct	Ex wild	Cr end	En	Vuln	L risk	Near thr	Data def	Least concern	Total
Opening stock	2001	0	0	1	4	10	0	0	0	363	378
Additions											
from lower threat categories											
from higher threat categories											
discoveries of new species											
rediscoveries of extinct species											
reclassifications											
updated assessments											
new additions to list											
Total additions		0	0	0	0	0	0	0	0	0	0
Reductions											
to lower threat categories											
to higher threat categories											
reclassifications											
local extinction											
updated assessments											
Total reductions		0	0	0	0	6	0	0	0	45	51
Closing stock	2006	0	0	1	4	4	0	0	0	318	327

Victorian land and ecosystem accounts: Native vegetation 1750 and 2006

Map 10 - 2006 NVIS grid overlaid with NRM regions for Victoria



Victorian land cover (ecosystem extent) accounts: relative vegetation 1750, 2006, area change and percentage remaining 1750 to 2006 by Natural Resource Management regions (NRM)

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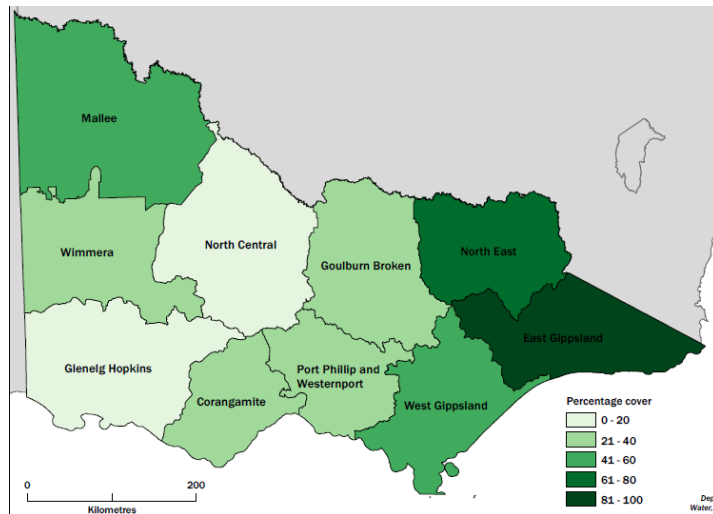
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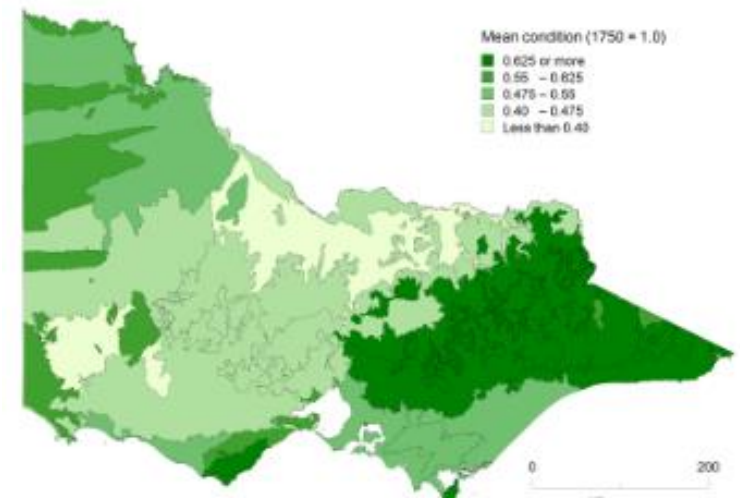
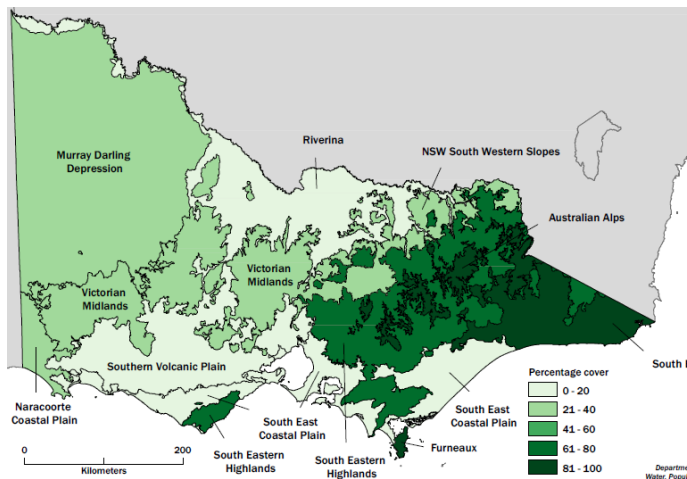
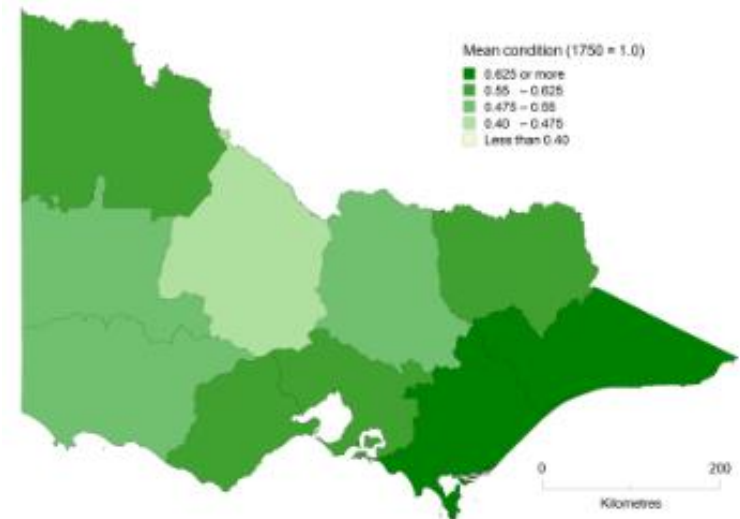
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Victorian land and ecosystem accounts: Native vegetation remaining compared to condition by NRM

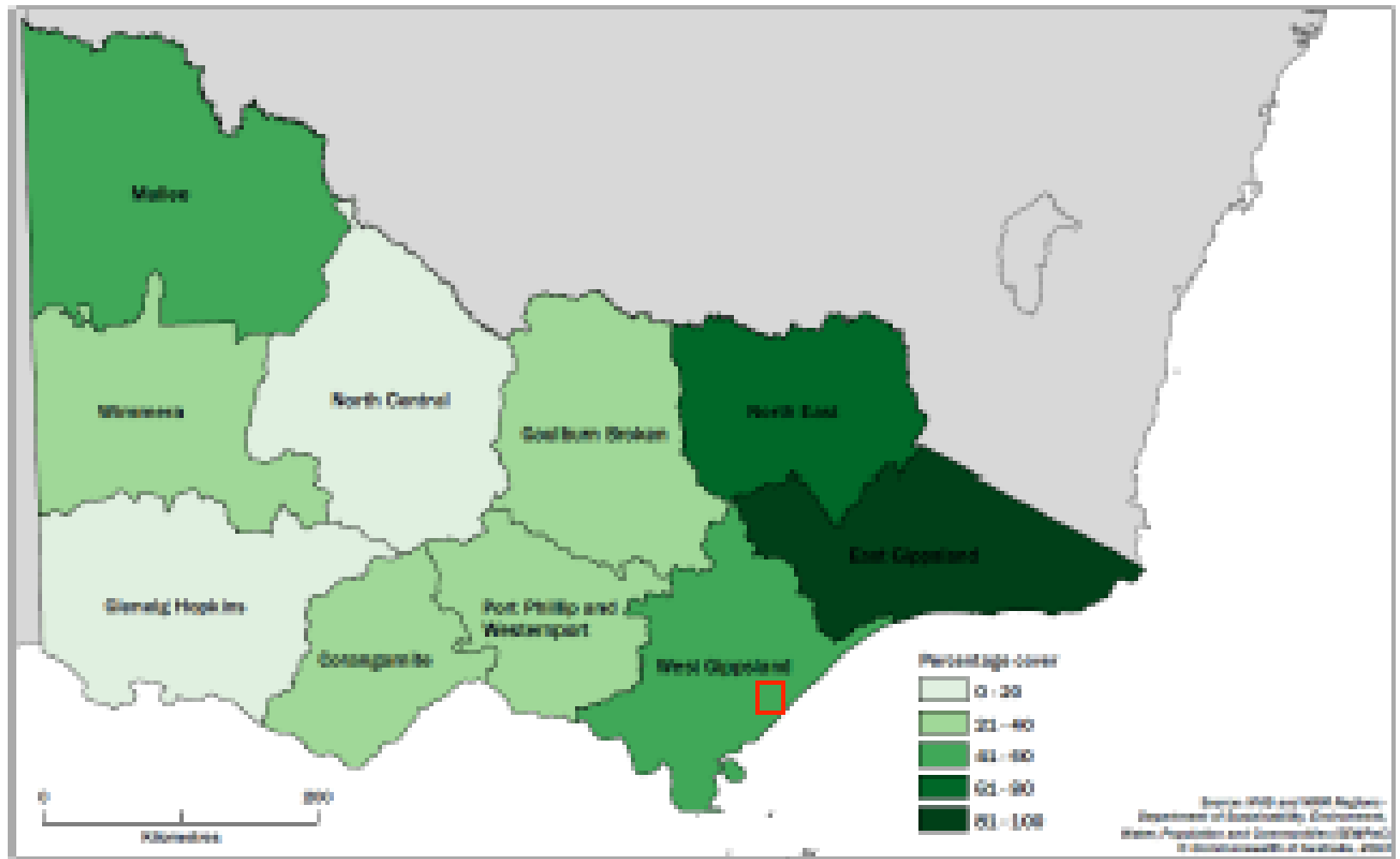
Per cent (%) of 1750 native vegetation
remaining in 2006



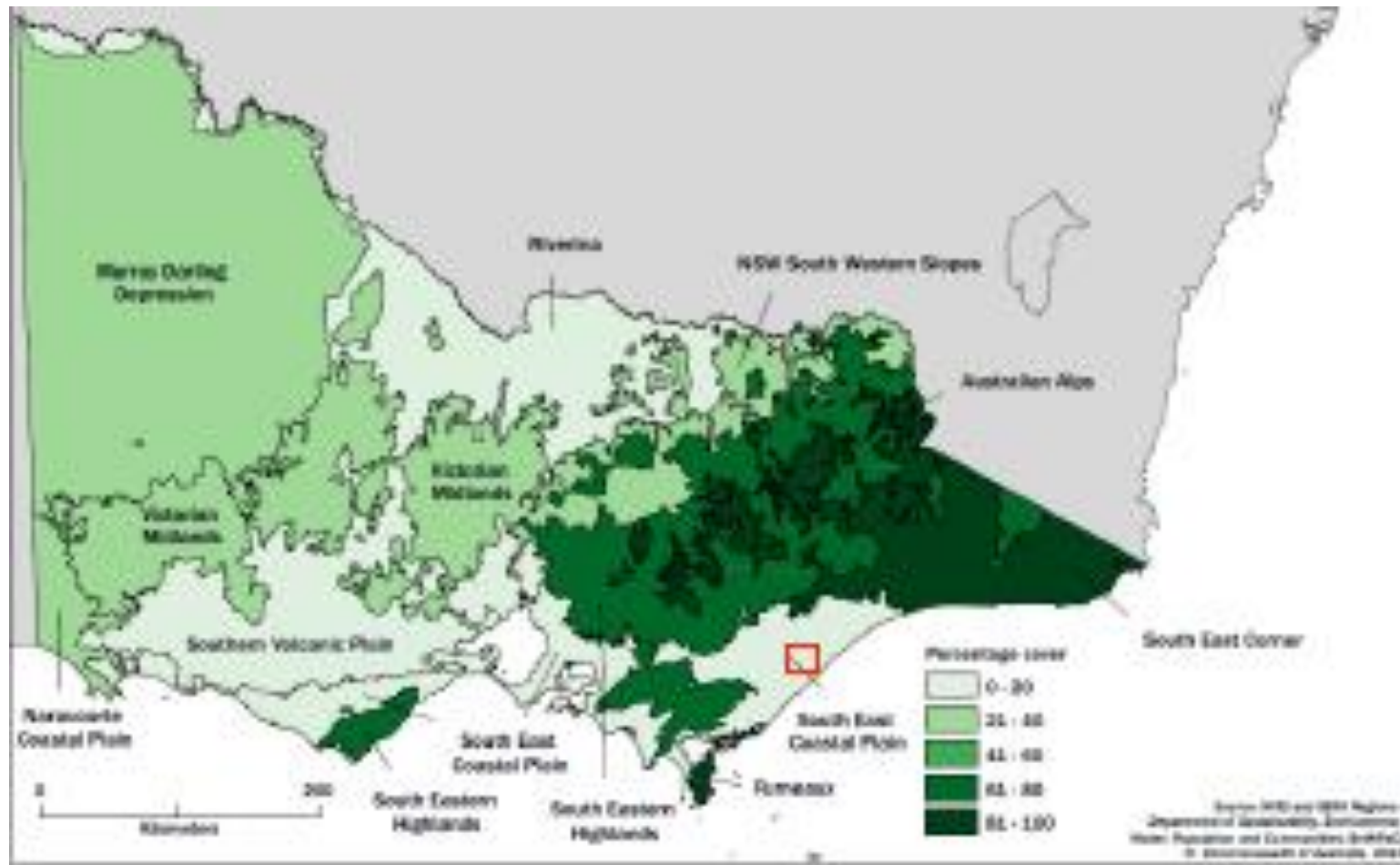
Condition of 1750 native vegetation
remaining in 2006



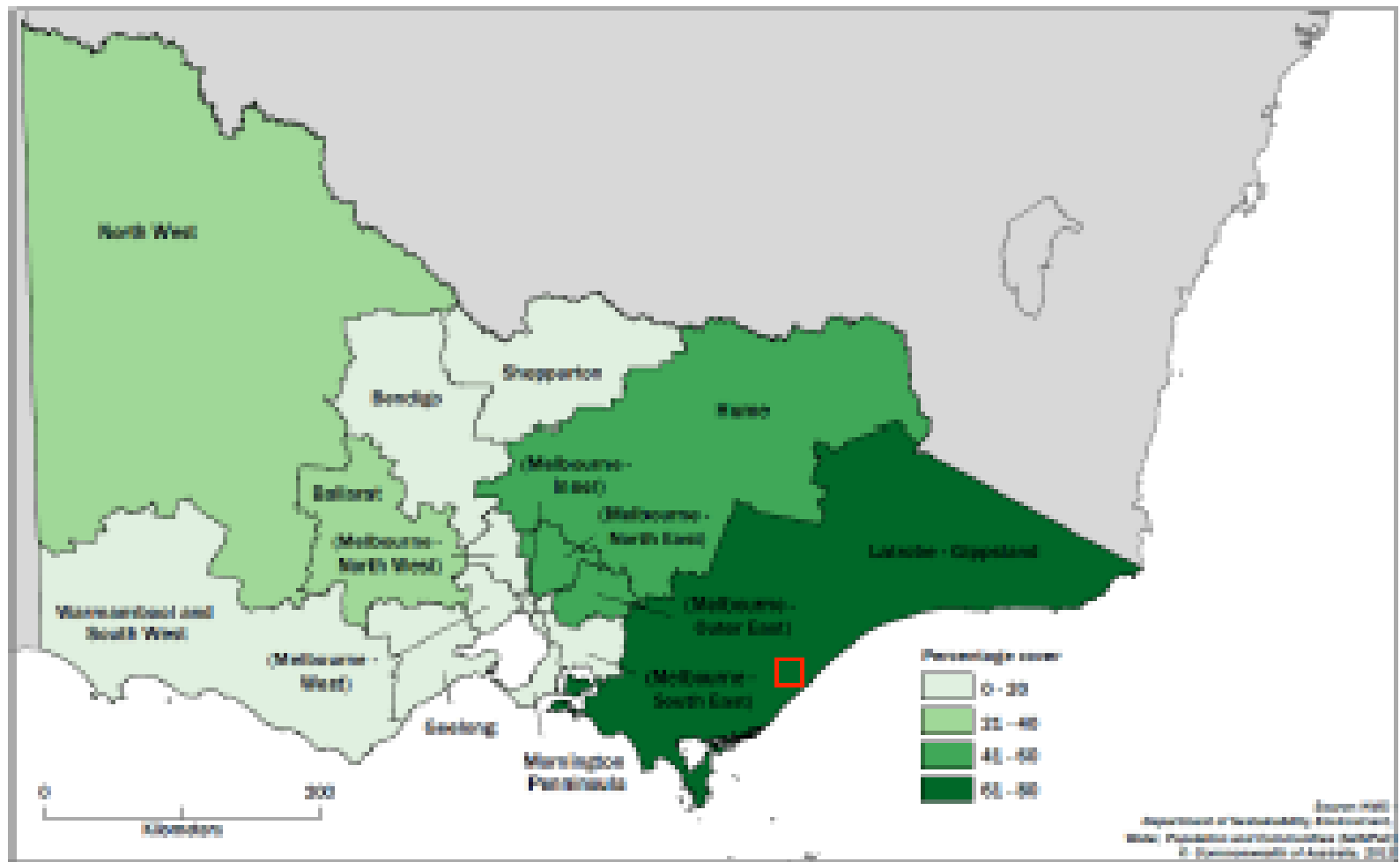
Victorian land cover accounts: Native vegetation remaining by NRM



Victorian land cover accounts: Native vegetation remaining by biogeographic regions (IBRA)



Victorian land cover accounts: Native vegetation remaining by Statistical Area Level 4 (SA4)



SA4 = 61-80

Using land cover (ecosystem extent) for developing metrics of biodiversity

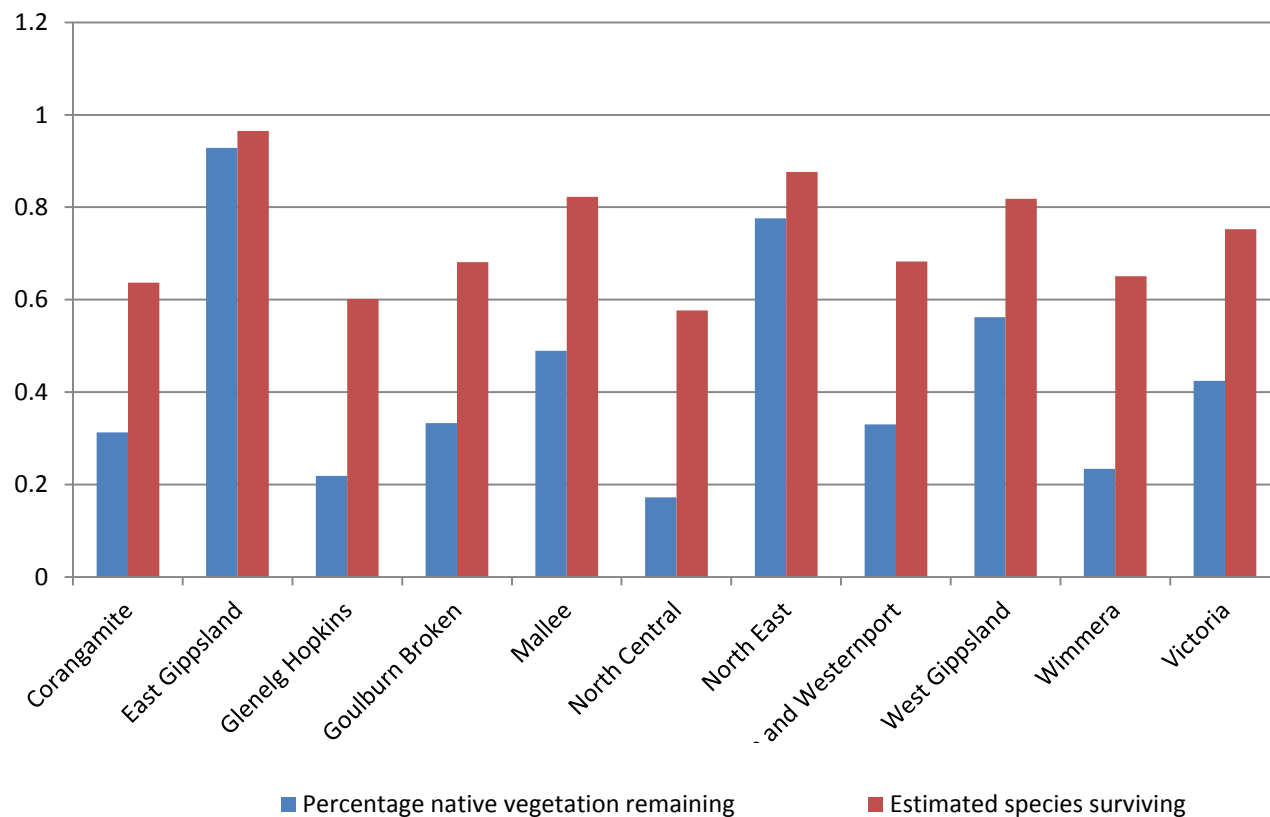
Species area curve E.g. Brooks et al (2002)

$$S_{\text{new}}/S_{\text{original}}=(A_{\text{new}}/A_{\text{original}})^z$$

Where S is species and A is area and z is equal to 0.25.



Experimental biodiversity accounts (metrics) from species area transformation for NRM's in Victoria



Key issues and questions

Data deficiencies

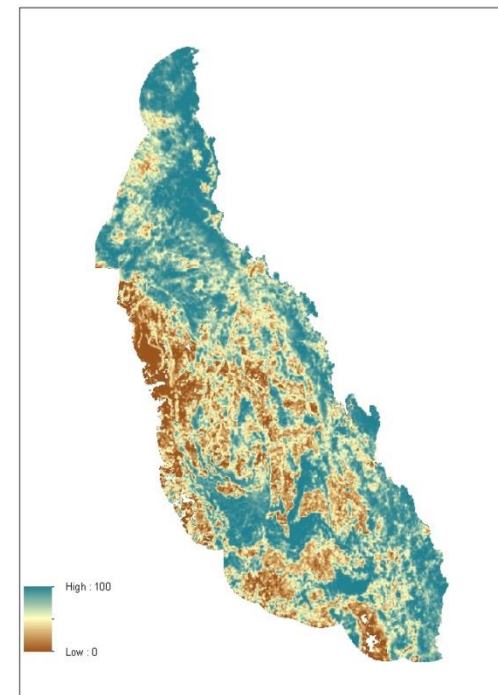
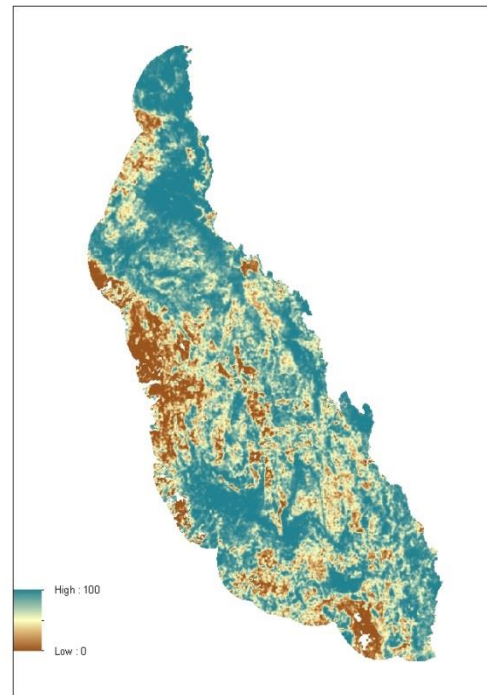
- Lack of systematic data collection
- Different classifications (Land cover, species status)
- Metadata needs to be improved

Spatial and boundary issues

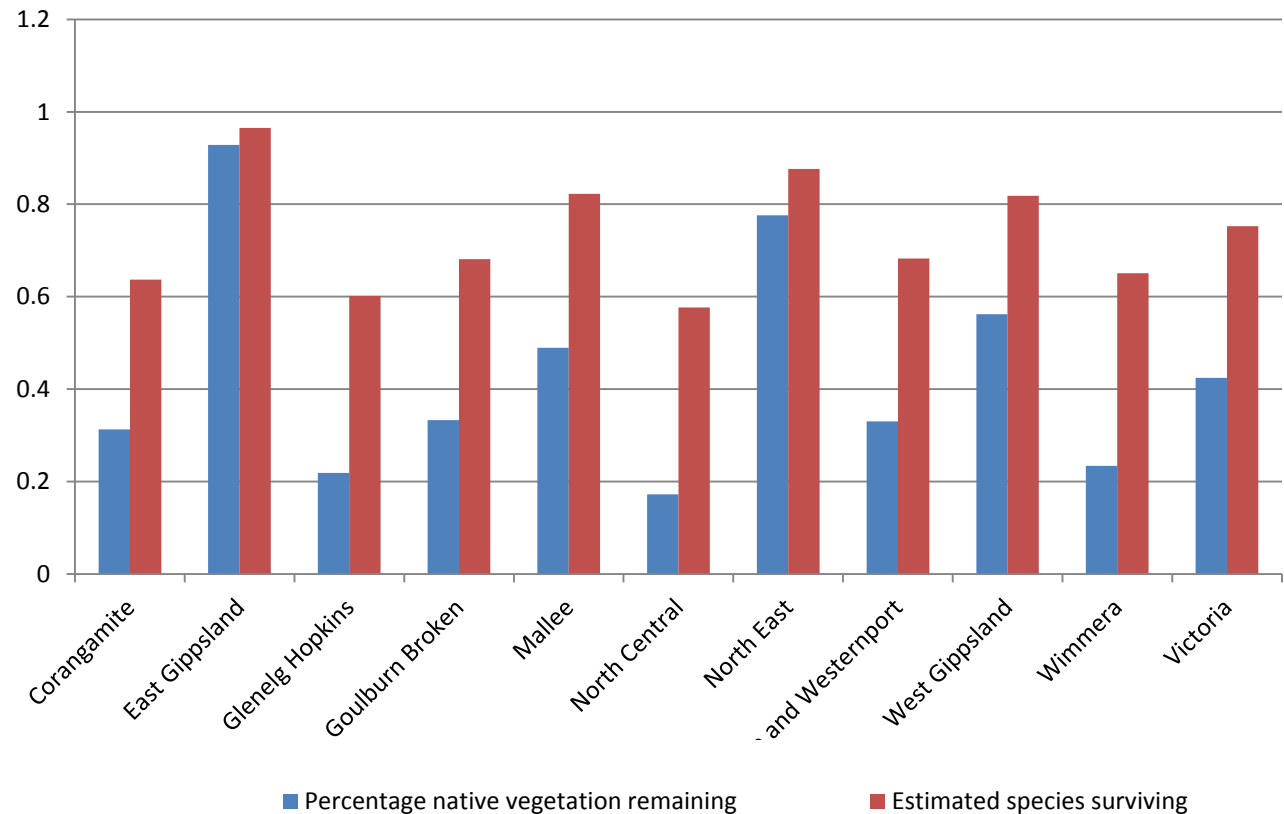
- Scale – locally extinct/globally abundant, globally rare/locally common
- Which spatial boundaries?



Experimental biodiversity accounts (metrics) from bird species area transformation in Queensland Great Barrier Reef Catchments (grid cells)



Experimental accounts of species area transformation for NRM's in Victoria





Experimental land, ecosystem and biodiversity accounts for Victoria:

ABS and Victorian Government Collaboration



Land Accounts Victoria, Experimental Estimates

<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4609.0.55.002>



Victoria Experimental Ecosystem Accounts

<http://www.dse.vic.gov.au/conservation-and-environment/ecomarkets/ecomarkets-science>



Other ecosystem accounting initiatives in Australia

Bureau of Meteorology

- 2013 The environment accounts landscape

http://www.bom.gov.au/environment/doc/environmental_accounts_landscape.pdf

Department of Agriculture Forestry and Fisheries

- 2012 Discussion paper on Ecosystem services

<http://www.daff.gov.au/natural-resources/ecosystem-services/ecosystem-services-report>

Department of Sustainability, Environment, Water, Population and Communities

- – 2010 Ecosystem services: Key concepts and applications

<http://www.environment.gov.au/biodiversity/publications/ecosystem-services.html>

Wentworth Group

- 2008 Accounting for Nature (trials to be published soon)

<http://www.wentworthgroup.org/>

South East Queensland Catchments

- 2012 Ecosystem Services Framework SEQ

<http://www.ecosystemserveseq.com.au/>

Australia 21 Ecosystem Services

