Appendix S3: Description of Data

Our target region is defined by "IBRA" regions (Interim Biogeographic Regionalisation of Australia) in the state of New South Wales (NSW) (Figure C1). Our selected IBRA regions cover tbe NSW coast and escarpments, tablelands and inland slopes of the Great Dividing Range. Species were selected based on several criteria: (a) likely to be detected if present; (b) likely to be correctly identified; (c) a large proportion of the extant species range in the selected IBRA regions; (d) survey data (presence-absence) well known to one of the authors (DK).

Colour in map	Name
Chartreuse	Sydney Basin
Blue	South East Highlands (ACT & NSW)
Green	South East Corner
Dark blue	Australian Alps (ACT & NSW)
Yellow	North Coast (NSW)
Brown	New England Tablelands (NSW)
Orange	South East Queensland (NSW)

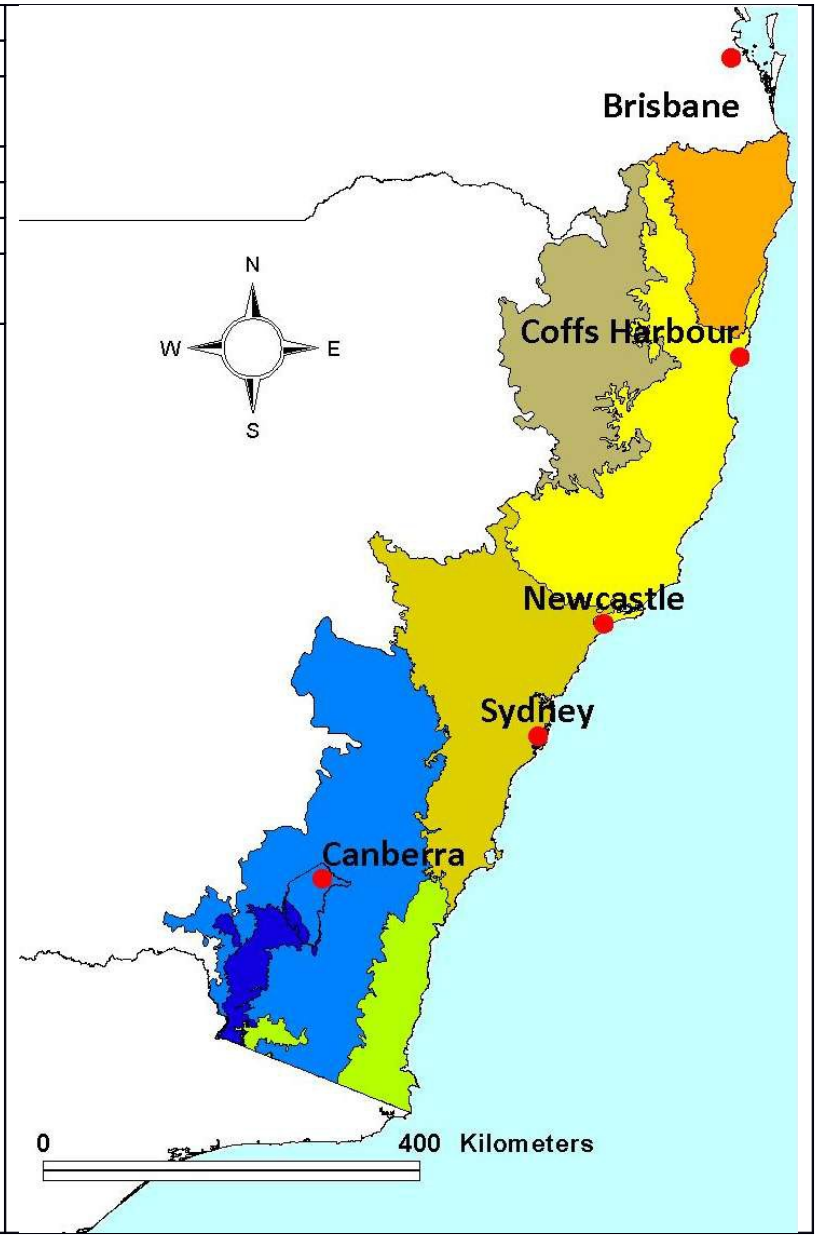

Figure C1: IBRA regions used in the study.

All species data were collated July to August 2013. Presence-absence (PA) data were downloaded from the Flora Survey Module of the Atlas of NSW Wildlife, Office of Environment and Heritage (OEH). All "full floristics" data for all selected IBRA regions were downloaded. All quadrats were retained except for 10 recorded prior to 1970 and 122 whose locations had missing environmental data. This left 32612 quadrats, with 7 to 2003 presence records per species (Table C1)

Presence-only (PO) data were sourced from two repositories:

1. "NSW Atlas" - records from the Atlas of NSW Wildlife, Office of Environment and Heritage (OEH). The full record set included presence records from the PA data; PA presences were removed using the "LocationKey" unique identifier. Species names as per Table C1 were used; downloads included all subspecies. This Atlas can be accessed at http://www.bionet.nsw.gov.au/ (last accessed July 2014)
2. "ALA" – records from the Atlas of Living Australia, excluding those with data provider = OEH. See Table C1 for details of any decisions about species nomenclature. This atlas can be accessed at http://www.ala.org.au/ (last accessed July 2014).

These two data sources were combined, then PO data further "cleaned" as follows:

- no records prior to 1970 were retained, since older records tend to have poorer locational accuracy
- all recorded accuracies were initially retained. This decision was based on the knowledge that accuracies are assigned in different ways depending on the data provider, sometimes based on record date rather than on true accuracy information. Visual checks of random subsets of the data across accuracy classes led us to conclude that records assigned a less accurate location class were no more likely to be in unlikely locations than those with supposedly accurate locations (basis for judgement: expert knowledge of species and their distribution: DK)
- for each species, records were reduced to one per unique location, where "unique" = rounded to closest metre. This decision reflects the fact that atlas records are submitted from multiple providers, and multiple records of the same species are possible. For instance, a collector might take several specimens from a tree and lodge them in different herbaria. Similarly, the same tree might be recorded by different people or at different times.
- all records for all species were visually examined in a GIS by DK and clearly erroneous records deleted
- records for *Eucalyptus dalrympleana* were divided into northern and southern "species" (at latitude -32.5 degrees) because they are known to have different environmental associations.

Table C1: Details of species (table continues over page)

Species name	Species code	# Presences in PA	# Presences in PO	Comments
Angophora bakeri	angobake	439	508	
Corymbia eximia	coryexim	438	502	
Corymbia maculata	corymacu	1388	1806	
Eucalyptus agglomerata	eucaaggl	1025	1009	
Eucalyptus aggregata	eucaaggr	22	154	
Eucalyptus blaxlandii	eucablax	225	183	
Eucalyptus cinerea	eucacine	55	171	
Eucalyptus cypellocarpa	eucacype	1290	1536	
Eucalyptus dalrympleana - northern subsp	eucadalh	86	493	North of -32.45 latitude
Eucalyptus dalrympleana - southern subsp	eucadalr	172	1674	South of -32.45 latitude
Eucalyptus deanei	eucadean	304	182	
Eucalyptus delegatensis subsp. delegatensis	eucadeld	112	271	
Eucalyptus dives	eucadive	905	1103	
Eucalyptus fastigata	eucafast	753	993	
Eucalyptus fraxinoides	eucafrax	125	339	
Eucalyptus gregsoniana	eucagreg	7	121	
Eucalyptus luehmanniana	eucalueh	41	358	
Eucalyptus moluccana	eucamolu	804	1007	
Eucalyptus niphophila	eucaniph	35	262	Named E. pauciflora subsp niphophila in ALA
Eucalyptus obliqua	eucaobli	953	847	
Eucalyptus obstans	eucaobst	31	166	Named E. burgessiana in ALA
Eucalyptus oreades	eucaorea	99	165	
Eucalyptus ovata	eucaovat	109	209	
Eucalyptus parramattensis	eucaparr	19	1438	
Eucalyptus parvula	eucaparv	7	116	
Eucalyptus pauciflora	eucapauc	1094	1489	
Eucalyptus pilularis	eucapilu	1777	2437	
Eucalyptus piperita	eucapipe	1762	1633	
Eucalyptus punctata	eucapunc	2103	1451	
Eucalyptus quadrangulata	eucaquad	141	320	
Eucalyptus robusta	eucarobu	538	900	
Eucalyptus rossii	eucaross	613	674	
Eucalyptus sieberi	eucasieb	2003	2483	
Eucalyptus squamosa	eucasqua	63	194	
Eucalyptus stenostoma	eucasten	18	90	
Eucalyptus tricarpa	eucatric	149	204	

Environmental data included climatic, topographic and substrate variables (Table C2) with 9 second (~ 250m x 250m) grid cells, unprojected.

Table C2. Candidate covariates for species distributions (table continues over page). Note the climate variables are long-term averaged data, using data supplied with ANUCLIM version 6.1 (ANU 2014) and estimated to 9 arc-second based on GeoScience Australia's 9 second Digital Elevation Model.

Variable code	Variable	units	Longer explanation or comment
bc02	Mean Diurnal Temperature Range	degrees C	Mean Diurnal Range (mean(period max-min)) - The mean of all the weekly diurnal temperature ranges. Each weekly diurnal range is the difference between that week's maximum and minimum temperature.
bc04	Temperature Seasonality (C of V)	dimensionless	Temperature Seasonality (C of V) - The temperature Coefficient of Variation (C of V) is the standard deviation of the weekly mean temperatures expressed as a percentage of the mean of those temperatures (i.e. the annual mean).
bc05	Maximum Temperature of Warmest Period	degrees C	Maximum Temperature of Warmest Period - The highest temperature of any weekly maximum temperature.
bc12	Annual Precipitation	mm	Annual Precipitation - The sum of all the monthly precipitation estimates.
bc14	Precipitation of Driest Period	mm	Precipitation of Driest Period - The precipitation of the driest week
bc21	Highest Period Radiation	W/m2/day	Highest Period Radiation - The largest radiation estimate for all weeks.
bc32	Mean Moisture Index of Highest Quarter MI	index	Mean Moisture Index of Highest Quarter MI - The quarter of the year having the highest moisture index value is determined (to the nearest week), and the average moisture index value is calculated.

Variable code	Variable	units	Longer explanation or comment
bc33	Mean Moisture Index of Lowest Quarter MI	index	Mean Moisture Index of Lowest Quarter MI - The quarter of the year having the lowest moisture index value is determined (to the nearest week), and the average moisture index value is calculated.
mvbf	Mutliresolution valleybottom flatness	index	MVBF classifies degrees of valley bottom flatness based on integrating estimates of 'flatness' and 'lowness' computed at a range of scales. MVBF is an expression of local relief in terms of valley confinement and floodplain extent with values typically ranging from2.5 in narrow confined valleys to ≥ 8 in broad floodplains. Threshold values of 4-4.5 are often used to designate floodplains. See Gallant & Dowling 2003
rjja	rain june july aug	mm	Precipitation in June, July, and August
rseas	annual rainfall seasonality - warm (+ve) or cool (-ve) rainfall-dominated period	magnitudes	Annual rainfall seasonality is the factor variable in which warm-season-dominated rainfall is the ratio + warm-season/cool-season, and cool-season-dominated rainfall is the ratio -(minus sign) cool-season/warm-season; where the warm season rainfall is defined as the sum of rainfall over the six months Oct-Nov-Dec-Jan-Feb-Mar and the cool season rainfall is defined as the sum of rainfall over the six months Apr-May-Jun-Jul-Aug-Sep
rugg	Ruggedness		Std deviation of elevation.in a 5 by 5 cell square centred on the cell of interest. Estimated on the 9 second DEM.
subs	Substrate class		Based on the 1:1 miliion surface geology of Australia and Keith 2011, but – using Keith's knowledge of local conditions - collapsed to classes 0 (unclassified), 2 (siliceous white sandstones), 5 (low quartz primarily sedimentary), 6 (felsic intrusives), 7 (high quartz sedimentary), 8 (mafic volcanics & intrusives), 11 (floodplain, estuarine and lacustrine alluvium & sediments), 12 (residual alluvial/colluvial sand & gravel), 15 (felsic volcanics) (see footnote 1)
twmd	Median topographic wetness		Topographic wetness was estimated from a finer grain (~30m) digital elevation model (DEM) by John Gallant, CSIRO, then summarised to 9 second as median or maximum.
twmx	Maximum topographic wetness		

[1] Substrate classes. Note that class 5 (previously "low quartz sedimentary") includes ex-categories 14 (ultramafic igneous & metamorphics), 19 (aeolian (red) sandplains) and 20 (limestone); class 12 includes 9 (residual alluvial sands); class 11 (previously "floodplain alluvium") includes 10 (estuarine sediments) and 13 (lacustrine sediments)

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