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Mapping the Drivers of Climate Change Vulnerability for Australia's Threatened Species

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Abstract

Effective conservation management for climate adaptation rests on understanding the factors driving species' vulnerability in a spatially explicit manner so as to direct on-ground action. However, there have been only few attempts to map the spatial distribution of the factors driving vulnerability to climate change. Here we conduct a species-level assessment of climate change vulnerability for a sample of Australia's threatened species and map the distribution of species affected by each factor driving climate change vulnerability across the continent. Almost half of the threatened species assessed were considered vulnerable to the impacts of climate change: amphibians being the most vulnerable group, followed by plants, reptiles, mammals and birds. Species with more restricted distributions were more likely to show high climate change vulnerability than widespread species. The main factors driving climate change vulnerability were low genetic variation, dependence on a particular disturbance regime and reliance on a particular moisture regime or habitat. The geographic distribution of the species impacted by each driver varies markedly across the continent, for example species impacted by low genetic variation are prevalent across the human-dominated south-east of the country, while reliance on particular moisture regimes is prevalent across northern Australia. Our results show that actions to address climate adaptation will need to be spatially appropriate, and that in some regions a complex suite of factors driving climate change vulnerability will need to be addressed. Taxonomic and geographic variation in the factors driving climate change vulnerability highlights an urgent need for a spatial prioritisation of climate adaptation actions for threatened species.

Introduction

Climate change poses a serious and accelerating threat to species and ecosystems worldwide [1–3]. Along with habitat loss through human land use, climate change is a major contributor to biodiversity loss in the 21st century [4]. Assessments of the extent to which species are vulnerable to climate change allow us to evaluate the relative importance of the threat of climate

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change against the range of other threats facing species [5–6]. However, while many such assessments exist [7–13], studies tend to focus on a single region, species or taxonomic group and to our knowledge none has yet mapped the individual drivers spatially. As a consequence there remains considerable uncertainty about where and how we should take on-ground action to help vulnerable species adapt to climate change [14].

Several approaches have been used to assess vulnerability to climate change. These range from assessments of climate change processes coupled with literature-based evaluations of how these might affect species or ecosystems [15–16], to the use of species distribution models predicting the change in geographic distribution required for a species to track suitable climatic conditions [8, 17–20]. Another method is to generate climate change vulnerability indices that summarise detailed information on the sensitivity of species to climate change and their adaptive capacity to respond to changing conditions, as well as their exposure to a changing climate [8, 12, 21]. Sensitivity is determined by the adaptive capacity and resilience of a species, and depends on intrinsic traits such as physiological tolerances, biological traits and genetic diversity [21–22]. Exposure expresses the magnitude of the change in the climatic conditions (e.g. temperature, precipitation) within the geographic area occupied by the species. Vulnerability indices are often expressed as a overall measure of the potential harm of climate change to a species or ecosystem and can be summarised in a single number, but because they are built on detailed information about the factors driving climate change vulnerability, they can also be decomposed to reveal spatial and taxonomic variation in the underlying causes of climate change vulnerability. Pinpointing these causes can help begin the process of designing management actions aimed at addressing them. Here we assess which factors drive climate change vulnerability, and how those drivers are distributed spatially. Designing a set of management actions for climate adaptation therefore depends on (i) a clear understanding of the extent to which species are vulnerable to climate change, (ii) knowledge about which aspects of a species' ecology drive its climate change vulnerability, and (iii) information on how species affected by the various drivers of climate change vulnerability are spatially distributed.

Assessments of species' vulnerability to climate change have multiplied rapidly following the development of vulnerability assessment toolkits and frameworks (e.g. [23–26]). Gardali et al. [11] used exposure and sensitivity to assess 358 Californian birds, classifying 36% of them as vulnerable to climate change. A recent global assessment based on species traits concluded that 24% of birds, 22% of amphibians and 15% of corals are highly climate change vulnerable under an optimistic climate change scenario, rising to 50%, 44% and 32% respectively under a pessimistic climate change scenario [23]. The same study demonstrated relatively low spatial congruence between the distributions of species with high exposure, high sensitivity and low adaptive capacity, suggesting that different aspects of climate change vulnerability may be important in different places. Here we further expand on this work by mapping the distributions of species affected by individual climate change vulnerability factors.

In this paper we determine the factors driving climate change vulnerability for a representative set of 213 threatened species across Australia. We (i) assess the climate change vulnerability of the species accounting for exposure, sensitivity and adaptive capacity, (ii) identify which species and taxonomic groups are most vulnerable to climate change, and (iii) determine the spatial distribution of species affected by each climate change vulnerability factor. We associate specific climate change vulnerability factors with the areas in which the species occur, indicating which climate adaptation actions (management to conserve species in a changing climate) will be needed in each bioregion across the continent. In so doing, we pave the way for building a spatially explicit prioritisation of management actions to protect threatened species under climate change.

Methods

Species assessed

We assessed vulnerability to climate change for a sample of species listed as threatened in Australia's Environment Protection and Biodiversity Conservation Act (EPCB Act; [27]). All birds (n = 44), mammals (n = 43), amphibians (n = 19) and reptiles (n = 14) with known population trends [28] were selected from this list. We then randomly chose a species from each plant family to form a subset (n = 112) of plant species from the 705 listed plants with known population trends. Maps of the current distribution of the species were obtained from DSEWPaC [29]. We considered only polygons that were identified as having known or likely species occurrences and removed from the analysis polygons where species "may occur".

General approach

To estimate each species' vulnerability to climate change we used the NatureServe climate change vulnerability index [26]. This index was developed according to the framework produced by Williams et al. [21], and integrates information on exposure (six factors: two direct and four indirect, Table 1; for full details on how we converted raw data into categorical scores for indirect exposure factors, see S2 Table) and intrinsic sensitivity to climate change (sixteen factors; Table 1). Based on analysis of relevant literature, we scored each factor according to its contribution to each species' vulnerability: 'decrease vulnerability' (DV), 'somewhat decrease vulnerability' (SDV), neutral (N), 'somewhat increase vulnerability' (SIV), 'increase vulnerability' (IV), 'greatly increase vulnerability' (GIV; S1 Dataset). Where there was uncertainty about a classification, we assigned a species to multiple categories as advised by Young et al. [26].

The indirect exposure and sensitivity factors were combined and weighted by direct exposure to generate a continuous climate change vulnerability index value for each species (for full detail see: [26, 30]). For this purpose scores of each factor (those comprising indirect exposure and sensitivity) were translated into a numerical value (DV = -2, SDV = -1, N = 0, SIV = 1, IV = 2, GIV = 3), where multiple categories were scored as an average of the two categories used. The numerical value for each factor was then multiplied by an index of direct exposure to climate change based on the proportion of the species' geographic distribution exposed to different magnitudes of changing mean annual temperature and mean annual moisture index ([30], S1 Table). The values for each factor were then summed to produce the overall index value. The NatureServe approach assigns the final numerical score to a category of climate change vulnerability (eg. moderately vulnerable). However, we here used the underlying continuous values to allow a finer grained analysis. The final index value therefore integrates information on (i) sensitivity, as estimated from biological traits, (ii) indirect exposure to climate change, as estimated from the spatial overlap between the species' distribution and three indirect exposure factors (natural barriers, anthropogenic barriers and sea-level rise), and (iii) direct exposure to climate change as estimated from climate projections within the geographic distribution of the species. Species that have both high sensitivity and high exposure to rapid climate change ultimately score as the most climate change vulnerable. Sparse information often limited the number of factors that we could assess, but a minimum of 13 out of the 20 sensitivity and indirect exposure factors is required by the NatureServe index to estimate overall vulnerability ([26]; the factors we used are listed in Table 1). Sufficient information was available for 213 out of the 232 species initially selected (S2 Dataset). The NatureServe approach focuses on the intrinsic traits and physiological characteristics of a species and does not include geographic range size or anthropogenic threats to the species. This renders the index comparable among species with differing conservation status or geographic range size.

Table 1. Factors used to calculate the climate change vulnerability index.

Category	*Factor*	*Description*
Direct exposure	Difference in mean annual temperature	Calculated from the proportion of each species' geographic range affected by each of five different magnitudes of mean annual temperature change across Australia (S1 Table).
	Difference in mean annual moisture index	Calculated from the proportion of each species' geographic range affected by each of six different magnitudes of annual moisture index change across Australia (S1 Table).
Indirect exposure	Exposure to sea level rise	Exposure of species' geographic range to areas likely to be inundated by sea level rise.
	Distribution relative to natural barriers	Overlap of a 50km buffer from the edge of the species' current distributions with natural barriers, comprising highlands, major water bodies and areas devoid of any vegetation.
	Distribution relative to anthropogenic barriers	Overlap of a 50km buffer from the edge of the species' current distributions with anthropogenic barriers, comprising urban, cultivated and managed areas.
Sensitivity	Dispersal ability	Scored based on the known or predicted dispersal or movement capacity. Species better able to disperse or move long distances are expected to be better able to track suitable climate conditions.
	Reliance on cool temperatures	Scored based on reliance on a cool temperature environment (such as frost pockets, alpine areas or south-facing slopes).
	Reliance on a particular moisture regime or habitat	Scored based on reliance on a seasonal hydrological regime and/or a specific aquatic or wetland habitat or localised moisture regime. For example, some species require a certain amount of rainfall each season, or a certain proximity to standing water.
	Dependence on a specific disturbance regime likely to be impacted by climate change	Scored based on sensitivity to changes in particular disturbance regimes, such as fire or flood, which are likely to change with climate. For example some species rely on fire for reproduction and some on flood for dispersal. Species have increased vulnerability if the altered regime is likely to negatively impact the species (eg. increased frequency of fire).
	Dependence on snow-cover habitats	Scored based on reliance dependance on habitats associated with ice or snow during all or parts of their life cycle (eg. winter hibernation).
	Reliance on a particular abiotic feature or derivatives	Scored based on reliance on, or restriction to, specific abiotic features, particulary where uncommon in the landscape (eg. restriction to sand dunes, caves or a particular soil type).
	Reliance on other species for habitat	Scored based on dependence on other species to provide habitat (eg. relying on particular plant species for breeding or feeding).
	Dietary versatility (animals only); or	Scored based on reliance on a particular taxon for diet (eg. only eats termites).
	Pollinator versatility (plants only)	Scored based on reliance on a particular taxon for pollination.
	Dependence on other species for propagule dispersal	Scored based on reliance on another species to disperse propagules (most animals do not rely on other species in this way).
	Reliance on another species for other interspecfic interaction	Scored based on reliance on another species for a interspecific interaction not covered by habitat, diet, pollinator or propagule dispersal (eg. reliance on a mycorrhizal symbiosis).
	Measured genetic variation (when available); or	Scored based a direct measure of genetic variation. Species have increased vulnerability when their genetic variation has been determined to be low in comparison with related species.
	Occurrence of bottlenecks in recent evolutionary history (measured genetic variation not available)	Scored based on signs of a recent genetic bottleneck, for example severe range contraction or steep population decline.

Note that a species may only be scored on dietary versatility OR pollinator versatility and measured genetic variation OR occurrence of recent population bottlenecks (described in text as 'low genetic variation'). Owing to limited data availability, in our assessment we did not include 'predicted impact of land use change resulting from human responses to climate change','historical thermal or hydrological niche'or 'phenological response to climate change', which are available for scoring in the original NatureServe index [26].

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Exposure

As a proxy for species' direct exposure to climate change we used projections of mean annual temperature and mean annual moisture index under the IPCC A1F1 scenario, in which the world remains heavily reliant on fossil fuels [31] for the time horizon 2050 (S1 Table). Climatic layers were generated using the software package ANUCLIM (v6.1), based on a 9-second digital elevation model for Australia. Adapting the scheme given in Young et al [26] for an Australian context, we categorised projected change in annual mean temperature and change in mean annual moisture index according to the categories in S1 Table. A change of 0–1°C was scored as category 1, whereas a change greater than 2.25°C was scored as category 5. We then calculated the proportion of each species' current distribution that would be affected by the different magnitudes of climate change.

Indirect exposure was assessed by estimating the extent to which each species' current geographic distribution overlaps natural and anthropogenic barriers, or regions affected by sea level rise (S2 Table). As some species are expected to track suitable climatic conditions beyond their current distribution through dispersal, it is anticipated that species surrounded by natural and anthropogenic barriers will have greater difficulty tracking a changing climate [32–33]. Natural barriers were major water bodies (oceans and inland lakes), areas devoid of vegetation, and highlands across the continent. We extracted features categorised as 'water' or 'bare ground' from the United States Geological Survey Global Land Cover 2000 dataset (v.1; [34]), and combined these with the distribution of land greater than 700m above sea level, based on a global digital elevation model at 30m spatial resolution from the National Geophysical Data Center of the National Oceanic and Atmospheric Administration [35]. Anthropogenic barriers were approximated by mapping the distribution of urban, cultivated and managed land uses from the Global Land Cover 2000 dataset [34]. These features represent land converted in cities, urban areas and farmland, which will act as dispersal barriers for many threatened species. Proximity to natural and anthropogenic barriers was calculated by defining a 50km buffer [26] around each species' current geographic distribution and overlaying this onto the distributions of the barriers to calculate the proportion of the buffer that overlaps with barriers (S2 Table). Species for which anthropogenic barriers were unlikely to represent a dispersal barrier (e.g. many birds, such as the Tasmanian wedge-tailed eagle *Aquila audax fleayi*) were scored as neutral (N) for this factor.

Sensitivity

The extent to which intrinsic traits and environmental requirements render species sensitive to climate change was determined by collecting information on ten sensitivity factors (Table 1). Species were scored for each factor using information from the Australian federal government's Species Profile and Threats Database [27], draft and approved species recovery plans, conservation and listing advice, state level species information profiles, and relevant scientific literature (S2 Dataset). Recourse to the scientific literature was necessary primarily to derive scores for dispersal ability, reliance on pollinators and genetic variability (e.g. direct genetic variation estimates, or signs of a recent genetic bottleneck) which government databases and recovery plans often lacked.

Index variability according to range size and taxonomic group

We used an analysis of covariance (ANCOVA) to test for a possible relationship between taxonomic group and vulnerability index score, while accounting for the difference in geographic range size ($\log_{10}$-transformed). Neither geographic range size nor any other variables relating to conservation status (ie. extinction risk) are included in the vulnerability index calculation, which is founded only upon intrinsic biological variables and exposure measures [26]. This allows the analysis to assess climate change vulnerability separately from extinction risk, which also includes other threats, such as habitat loss and population declines. A one-way analysis of variance (ANOVA) was used to test for a difference in mean climate change vulnerability among taxonomic groups. All statistical tests were performed using the statistical package R version 2.13.0 [36].

The spatial distribution of climate change vulnerability

We mapped separately the distribution of the species that are affected by each factor driving climate change vulnerability. A species was considered to be affected by a particular sensitivity factor if it was scored as 'somewhat increased vulnerability' (SIV) or higher for that factor, indicating that this factor is contributing to the species overall vulnerability. For indirect exposure factors, the species was only considered affected if it was scored as 'increased vulnerability' (IV) or higher. The rationale behind this is that indirect exposure factors (eg. sea level rise or natural barriers) generally affect a species only in some parts of its range and are not range-wide. Only including those species that were scored as at least IV, ensured that a large portion of their range was affected by an indirect exposure factor.

The distribution of species affected by the vulnerability factors were mapped using the bioregions of the Interim Biogeographic Regionalisation of Australia (IBRA, v6.1), the landscape divisions used for national conservation planning in Australia [37]. A factor was considered to be present in a given bioregion if 10% or more of the range of a species affected by that factor fell within it. Each factor was mapped separately showing the percentage of species affected by it in each bioregion, thus accounting for the different number of species present in the different bioregions. Because a species is only scored for either 'genetic variation' or 'signs of recent bottlenecks' (see Table 1) these were merged for spatial analysis under 'low genetic variation'. The major factor driving vulnerability for any given bioregion was the one that affected the largest percentage of species.

Results

Climate change vulnerability index values for the 213 threatened species assessed ranged from 11.3 (extremely vulnerable) for the mountain pygmy possum (*Burramys parvus*) to -5 (low vulnerability) for the western quoll (*Dasyurus geoffroii;* S3 Table). By convention, a score above four indicates moderate or high climate change vulnerability, while a value below -2.0 indicates that the species might benefit from climate change [26]. Mean vulnerability index across species was 3.6, and the median was 3.8, with most species showing intermediate levels of vulnerability and relatively few showing particularly low or high vulnerability (S3 Table). Indeed, the frequency distribution of index values was not significantly different from normal (Shapiro-Wilk test: $W = 0.992$, $p = 0.275$). Ninety-six species (45.1% of the total) had an index value exceeding 4.0, indicating that nearly half of Australia's threatened species considered are moderately to highly vulnerable to climate change (Table 2).

An ANCOVA using geographic range size ($\log_{10}$ transformed) and taxonomic group as predictors revealed that both had a significant association with the vulnerability index ($F_{5,204} = 36.05$, $p < 0.001$). Geographic range size was negatively related to climate change vulnerability, with the most narrowly distributed species showing high to extreme vulnerability ($F_{1,204} = 133.64$, $p < 0.001$; Fig 1).

Climate change vulnerability varied significantly between taxonomic groups ($F_{4,204} = 11.66$, $p < 0.001$; Fig 2). Overall, amphibians were the most vulnerable group to climate change (mean = 5.0, SE = 0.5), followed by plants (mean = 5.0, SE = 0.2; Fig 2), reptiles (mean = 3.5, SE = 0.8), mammals (mean = 2.9, SE = 0.4) and finally birds (mean = 0.8, SE = 0.3).

Table 2. Number (and percentage) of threatened species within each taxon affected by each vulnerability factor.

	Plants n = 94	Amphibians n = 19	Reptiles n = 13	Birds n = 44	Mammals n = 43	All Taxa n = 213
Proximity to sea level rise	0 (0%)	0 (0%)	1 (7.7%)	2 (4.6%)	7 (16.3%)	10 (4.7%)
Proximity to natural barriers	14 (14.9%)	10 (52.6%)	2 (15.4%)	17 (38.6%)	18 (41.9%)	61 (28.6%)
Proximity to Anthropogenic barriers	17 (18.1%)	0 (0%)	1 (7.7%)	0 (0%)	2 (4.7%)	20 (9.4%)
Poor dispersal ability	57 (60.6%)	7 (36.8%)	2 (15.4%)	0 (0%)	3 (7.0%)	69 (32.4%)
Reliance on cool temperatures	11 (11.7%)	6 (31.6%)	2 (15.4%)	0 (0%)	4 (9.3%)	23 (10.8%)
Reliance on a particular moisture regime or habitat	64 (68.1%)	19 (100%)	5 (38.5%)	19 (43.2%)	20 (46.5%)	127 (59.6%)
Reliance on a particular disturbance regime	70 (74.5%)	10 (52.6%)	4 (30.8%)	28 (63.6%)	30 (69.8%)	142 (66.7%)
Reliance on snow-cover habitats	1 (1.1%)	2 (10.5%)	0 (0%)	0 (0%)	1 (2.3%)	4 (1.9%)
Reliance on a particular abiotic feature or derivative	27 (28.7%)	9 (47.4%)	4 (30.8%)	0 (0%)	14 (32.6%)	54 (25.4%)
Reliance on another species for habitat	14 (14.9%)	0 (0%)	3 (23.1%)	6 (13.6%)	7 (16.3%)	30 (14.1%)
Reliance on a particular species for diet	-	1 (5.3%)	4 (30.8%)	3 (6.8%)	5 (11.6%)	13 (6.1%)
Reliance on a particular species for pollination	23 (24.5%)	-	-	-	-	23 (10.8%)
Reliance on a particular species for propagule dispersal	8 (8.5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	8 (3.8%)
Reliance on a particular species for other interspecific interaction	6 (6.4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	6 (2.8%)
Low genetic variation	50 (53.2%)	12 (63.3%)	7 (53.9%)	32 (72.7%)	22 (51.2%)	123 (57.8%)
Average number of factors affecting taxon	4.447	4.526	3.231	2.727	3.535	3.693
Proportion of species with moderate to high climate change vulnerability (>4.0)	58 (61.7%)	13 (68.4%)	7 (53.9%)	4 (9.1%)	14 (32.6%)	96 (45.07%)

The factor affecting the most species in each taxonomic group is underlined. Note that columns do not sum to the number of species in the group, because each species can be affected by more than one vulnerability factor.

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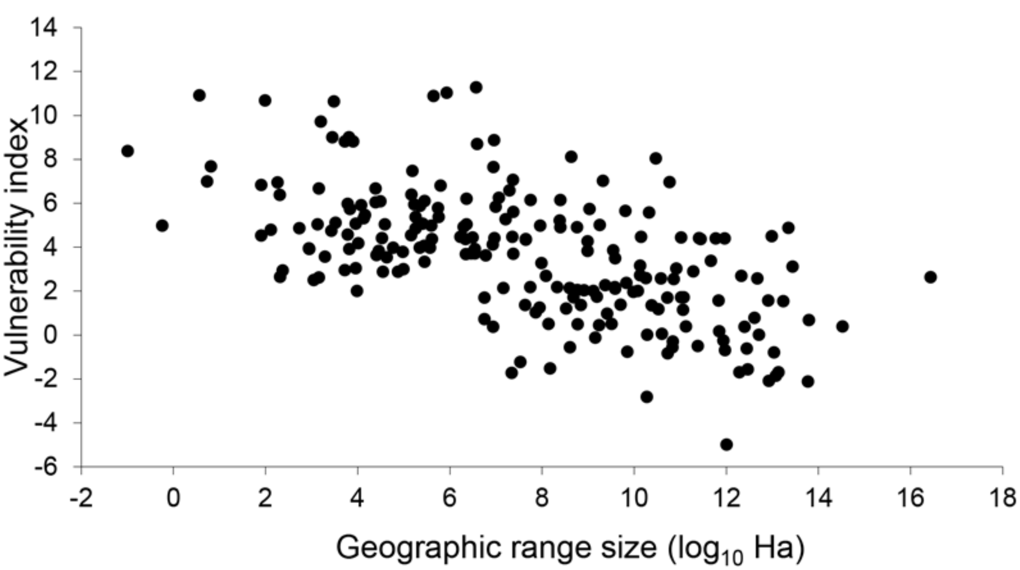

Fig 1. The relationship between climate change vulnerability index and geographic range size.

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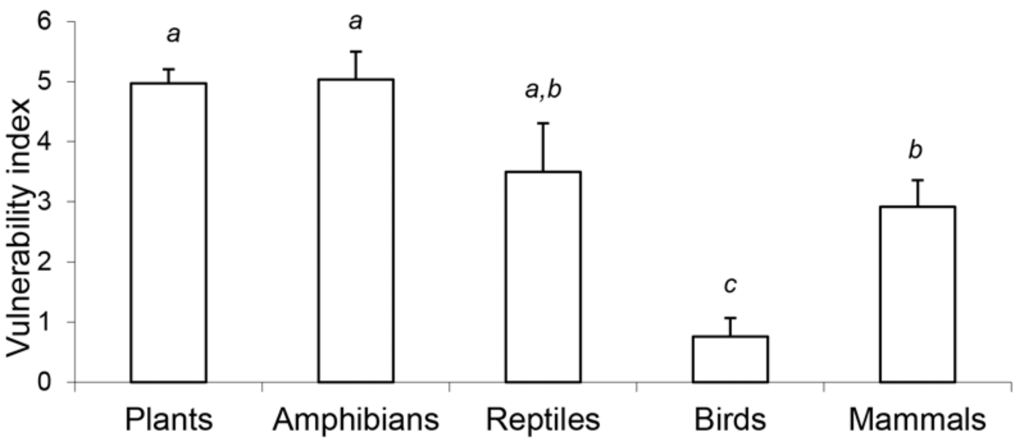

Fig 2. Mean climate change vulnerability for the five taxonomic groups of Australian threatened species considered in this study. Error bars represent 1 SE. Letters represent groups with no significant difference at a 95% CI, according to Tukey's honestly significant difference test.

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The main factors driving climate change vulnerability were dependence on a particular disturbance regime (typically fire), reliance on a particular moisture regime or habitat, and low genetic variation (Table 2). Different factors were important for different taxonomic groups, with reliance on particular moisture regimes and low genetic variation being most important for amphibians and reptiles, reliance on disturbance regimes and low genetic variation affecting birds and mammals, and poor dispersal ability and reliance on particular disturbance and moisture regimes affecting plants (Table 2). On average, birds were affected by the smallest number of factors (2.7), whilst amphibians (4.5) and plants (4.4) were affected by the most, suggesting that these latter groups will require a more complex portfolio of management actions to help them adapt to climate change.

Five factors stood out as having a pervasive influence on the assessed threatened species across much of Australia (Fig 3). These were reliance on a particular abiotic feature or derivative, reliance on a particular moisture regime or habitat, poor dispersal ability, reliance on a particular disturbance regime and low genetic variation (refer to Table 1 for complete descriptions of factors). Reliance on other species for propagule dispersal was uncommon among our sample of species although prevalent in the south-west corner of Western Australia and Tasmania, where two *Daviesia* species rely mainly on ants for seed dispersal [38]. Reliance on other species for pollination showed a similar pattern, affecting species along the eastern coastline, south-west Western Australia and northernmost Northern Territory. Reliance on cool temperatures, reliance on other species for diet and a reliance on species for other interactions (eg. mycorrhizal symbiosis) were all predominant factors in south-east Australia and Tasmania. A reliance of one species on other species for suitable habitat was the most prominent factor in western and north-west Queensland, while proximity to anthropogenic barriers mostly affected species along the south coast of the continent. Only the eight numerically most important factors are shown in Fig 3. Factors not shown are exposure to rising sea levels and proximity to natural barriers which affected only coastal species and those on either side of the Great Dividing Range, and reliance on snow cover which is confined to the Alps bioregion.

Discussion

To guide effective management, climate adaptation actions must be tailored to individual or multiple vulnerability factors. It is not enough to know that a species or region is vulnerable to climate change, we must know why it is vulnerable to derive a sensible on-ground management

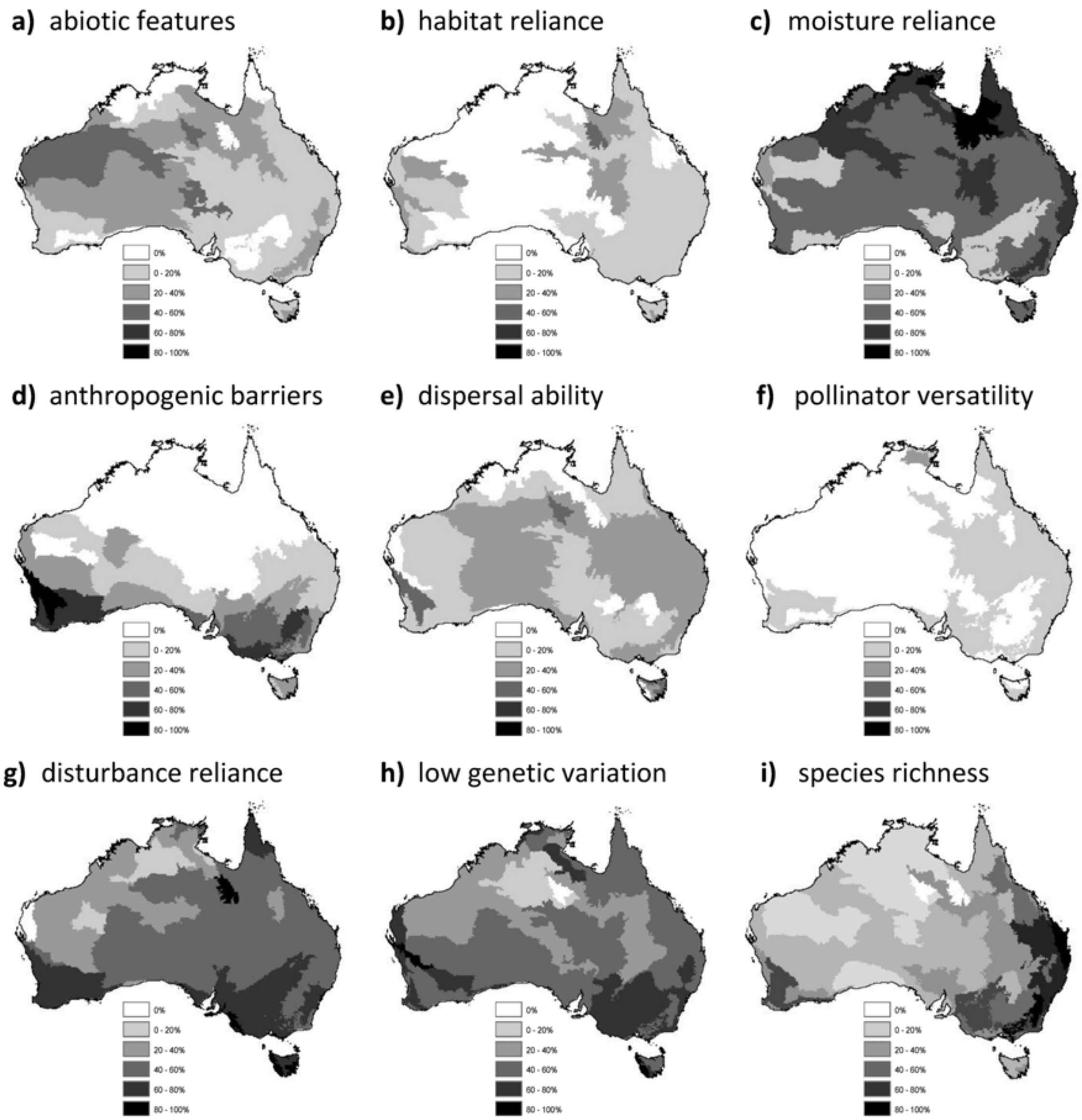

Fig 3. The spatial distributions of the species affected by the eight most important factors driving climate change vulnerability of threatened species in Australia. The shading darkens as the proportion of species occurring in the bioregion is affected by each factor; a) reliance on particular abiotic features or derivatives for habitat, b) reliance on other species for habitat, c) reliance on a particular moisture regime or habitat, d) proximity to anthropogenic barriers, e) poor dispersal ability, f) pollinator versatility, g) reliance on a particular disturbance regime, and h) low genetic variation. To aid in the interpretation of proportions, the distribution of threatened species richness is shown in i). The spatial distributions of species' vulnerability to seven supplementary factors is illustrated in (S1 Fig).

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strategy. Mapping the spatial distribution of the species affected by the various climate change vulnerability factors, as we have done here, is a crucial first step in designing effective actions. Our results revealed enormous variation in the spatial distribution of species affected by different climate change vulnerability factors, as well as substantial taxonomic heterogeneity in climate change vulnerability and its drivers.

Nearly half of the threatened species comprising our sample were vulnerable to climate change. The most vulnerable was the mountain pygmy possum, and consideration of its life history reveals a series of complex interacting factors. It is a specialist species, with low genetic variation in some populations, having undergone a significant range contraction since the last glacial maximum when it occurred throughout most of south-eastern Australia [39–40], and is now further threatened by habitat loss with the ongoing development of ski resorts, in addition to a variety of other threats. The only Australian mammal confined to the Australian Alps bioregion, the species is dependent on winter snow cover and cool temperatures [41]. Mountain pygmy possums are already responding to climate change by waking earlier from hibernation, which has led to food shortages through temporal uncoupling with the emergence of bogong moths (*Agrotis infusa*), a key post-winter food source [41]. Alpine species and habitats in general may be more at risk because of the limited options for adjustment of the geographic distribution in response to a changing climate [1, 14, 42]. Using bioclimatic modelling, Brereton et al. [1] predicted that the mountain pygmy possum would be driven extinct by a 1°C rise in temperature, and given the species current restricted distribution, it remains to be seen whether the species will survive the coming decades.

At the other end of the vulnerability scale was the western quoll, a generalist species in its dietary and habitat requirements. Despite a severe range contraction because of habitat clearance and predation from feral species, the western quoll has a high dispersal capacity and the greatest genetic variation of all quoll species [43–44].

Climate change vulnerability increases strongly as geographic range size declines. This could arise in part because threatened species that have already been heavily affected by habitat loss and fragmentation are now at increased climate change vulnerability through low genetic variation (due to population declines) or specific habitat requirements forcing the species into small fragments of their former range [45–47]. Another explanation is that some life history traits associated with high climate change vulnerability are also related to narrow geographic range size, for example habitat specialists that survive only in naturally uncommon landscapes or microhabitats [48]. Regardless of the mechanism, our finding that the most narrowly distributed species are also the most vulnerable to climate change suggests that urgent actions are needed to help these species in particular adapt to climate change.

In agreement with other studies [14,49], we found that amphibians were the most climate change vulnerable group, with heavy reliance on local moisture regimes and aquatic habitats that are likely to be negatively impacted by climate change. Altered interactions with chytrid fungus (*Batrachochytrium dendrobatidis*) and cane toads (*Bufo marinus*) due to rising temperatures are listed as key threats to Australian amphibians, where cane toads may further expand their range and the distribution of chytrid fungus may shift to new areas [14]. Plants were the second most vulnerable taxon out of the sample of species we assessed, often constrained in their distribution by physiological factors such as a reliance on a particular soil type, relatively poor dispersal ability and low genetic variation through small population size [14, 47, 50]. Unlike plants, many birds are excellent dispersers and often with less restrictive habitat requirements, rendering them the least vulnerable taxonomic group in this analysis.

Results revealed great spatial variation in the proportion of species affected by each of the major factors driving climate change vulnerability among our sample of threatened species. Species in each region were affected by different numbers and types of factors, and groups of factors appeared to operate in concert among species in different regions. The results from this study also suggest that the indices need to be decomposed into their constituent elements before they can usefully guide management actions. Comparing two different regions illustrates this point clearly. The predominant factors driving the climate change vulnerability of species along the south-east coastline of Australia are a reliance on particular disturbance regimes and low genetic variation, they are also exposed to sea level rise, anthropogenic barriers, and natural barriers comprising the ocean and the Great Dividing Range. In contrast, upper Northern Territory is predominantly impacted by reliance on particular disturbance regimes, low genetic variation, reliance on particular moisture regimes and reliance on other species for pollination. These regions will require a suite of actions that target different factors driving vulnerability to climate change. On a species level, management can become even more complicated, with some species having multiple factors contributing to their climate change vulnerability, highlighting the need to decompose vulnerability to explore the contributing factors. A good example of this is the Nielsen Park she-oak (*Allocasuarina portuensis*), which only exists as a tiny reintroduced population in Sydney's eastern suburbs. As well as by its extremely small global population size of only a few dozen individuals, this species is affected by five different climate change vulnerability factors: limited dispersal ability, reliance on a particular soil type, low genetic variation, is surrounded by natural and anthropogenic barriers and is an obligate seed regenerator, i.e. dependent on fire to kill the adult tree and release new seed, therefore careful management of all these factors is required [51].

Management can also be targeted towards specific factors. For example amphibian species richness is largely concentrated along the south-east coastline of Australia, which makes reliance on particular moisture regimes or habitats a significant vulnerability factor there. Species affected by low genetic variation or recent population bottlenecks are prevalent along the coastline of south and south-east Australia, in both fragmented and undisturbed areas (Fig 3h). Many species in these regions have undergone major range contractions through habitat destruction and the introduction of invasive species, though their distributions once extended much further north [14]. For example, the South Australian glossy black-cockatoo (*Calyptorhynchus lathami halmaturinus*) once occurred in mainland South Australia, but is now restricted to Kangaroo Island owing to mainland habitat clearance [52]. Numbers dropped to as low as 158 birds in 1995, though the population had recovered to around 320 birds in 2006, which is suggestive of a recent bottleneck [52] potentially increasing its vulnerability to climate change. More generally, dependence on a particular disturbance regime that is likely to change with climate (e.g. fire), is driving climate change vulnerability throughout eastern South Australia, Victoria, western New South Wales and the south coast of Western Australia. In Australia, many species are reliant on appropriate fire regimes for reproduction and habitat. For example, the abundance of the Pilliga mouse (*Pseudomys pilligaensis*) increases fivefold in fire-induced regrowth forest (18–24 months post fire) in comparison with mature forest (>20years) and 28-fold in the intermediate growth stage [53]. Studies have found that populations peak 20–24 months post fire and following an above average rainfall year, though as with many opportunistic breeders, the population then declines rapidly [54]. However, mature forest is required for breeding habitat [53]. Fires are expected to become more frequent, intense and erratic as a result of climate change in Australia [43, 55–57]. Reliance on specific moisture regimes is a major factor in north-eastern Queensland and in upper Western Australia and Northern Territory. For example, the western partridge pigeon (*Geophaps smithii blaauwi*) depends on a reliable water source for survival during the late dry season [58], and reductions in rainfall and increasing temperatures as a result of climate change could pose a serious risk.

Once the drivers of climate change vulnerability are known for species, management actions can be derived (S4 Table). Actions associated with reducing vulnerability for small bodied species such as amphibians include the installation of microhabitat refuges and restoration and manipulation of moisture levels at breeding sites [59]. Artificially changing the habitat and local microclimate to be more suitable for amphibians may give them the best chance of surviving climate change. Often dispersal limited, some species may be best assisted by translocation and, in the case of plants, by replanting of seedlings at new climatically suitable sites [60, 61]. In some cases, it may be most cost effective to establish captive populations, as has recently been attempted for orange-bellied parrots [62]. It is also important to consider whether these actions will take place in protected areas, where because of shelter from other threats, there is a stronger chance of success [63].

Our analysis has revealed multiple drivers of climate change vulnerability for many of Australia's threatened species and in many regions of Australia, suggesting that different actions will be needed in different areas and highlighting the need for a spatial prioritisation of conservation actions and focal areas. Though this sample provides a good reflection of many of Australia's threatened flora and fauna, a full assessment of all threatened species would be worth pursuing. It is critical that recovery and management plans for threatened species are updated to include climate change vulnerability and its implications. Spatially linking actions to climate change vulnerability factors is the most direct way to improve the chance of species surviving climate change, because understanding the spatial distribution of each factor helps to spatially prioritise actions to benefit the largest number of species, making it more cost effective than considering only single species. For example, introducing a specific pollinator will only help conserve a single dependent species and is likely to be expensive, could cause unintended side effects, and might have low feasibility. On the other hand, an action such as restoration of a major vegetation type could provide benefits for multiple species. Formal analyses based on decision science will be necessary to choose among the many possible climate adaptation actions, and it will be important to consider the costs and benefits of particular actions, and how human adaptation to climate change drives future habitat loss through land use change. Given the accelerating rate of climate change and habitat loss in the 21st century, no time should be spared in planning and implementing on-ground actions to get threatened species ready to face climate change.

Supporting Information

S1 Fig. The bioregional distribution of the species affected by seven supplementary factors contributing to climate change vulnerability of threatened species in Australia that were not included in Fig 3. The shading darkens as the proportion of species occurring in the bioregion is affected by each factor; a) exposure to sea level rise, b) proximity to natural barriers, c) reliance on cool temperatures, d) dependence on snow-cover habitats, e) dietary versatility, f) reliance on other species for propagule dispersal, and g) reliance on other species for other interspecific interactions. To aid in the interpretation of proportions, the distribution of threatened species richness is shown in h).
(TIF)

S1 Table. Reclassified direct exposure categories for mean annual temperature and mean annual moisture index.
(DOCX)

S2 Table. Scoring categories for natural and anthropogenic barriers and exposure to sea level rise.
(DOCX)

S3 Table. Climate change vulnerability index for 213 of Australia's threatened species.
(DOCX)

S4 Table. Factors affecting climate change vulnerability of threatened species in Australia and possible actions that could be used to reduce or manage vulnerability for that particular factor.
(DOCX)

S1 Dataset. Spreadsheet containing the scores for exposure and sensitivity factors for the 213 species assessed.
(XLSX)

S2 Dataset. Spreadsheet containing collated information used to score climate change vulnerability for the 213 species assessed.
(XLSX)

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Author Contributions

Conceived and designed the experiments: JRL RM MFJT RAF. Performed the experiments: JRL. Analyzed the data: JRL. Wrote the paper: JRL RM MFJT RAF.

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S1 Table Categories of direct exposure to climate change, namely the difference (absolute value) in mean annual temperature and difference in mean annual moisture index between the present time and 2050. Projections are made under the IPCC A1F scenario. Categories were based on the categories in Young *et al* (2011), but were adjusted for Australia.

Categories	Change in mean annual temperature	Change in mean annual moisture index
1	0 – 1.0º	0 – 0.03
2	1.0 – 1.5º	0.03 – 0.06
3	1.5 – 2.0º	0.06 -0.09
4	2.0 – 2.25º	0.09 – 0.12
5	> 2.25º	0.12 – 0.15
6		0.15 – 0.19

S2 Table Scoring categories for the factors natural and anthropogenic barriers and sea level rise, based upon those suggested by Young *et al.* 2011.

Categories	*Overlap between barrier and the species distribution enlarged by a 50 km buffer*	*Percentage of a species range occurring in an area expected to be subject to sea level rise*
GIV (Greatly Increase Vulnerability)	x ≥ 90%	x ≥ 90%
IV (Increase Vulnerability)	54% ≤ x < 90%	50% ≤ x < 90%
IV/SIV (Increase Vulnerability/ Somewhat Increase Vulnerability)	49% ≤ x < 54%	
SIV/IV (Somewhat Increase Vulnerability/ Increase Vulnerability)	46% ≤ x < 49%	
SIV (Somewhat Increase Vulnerability)	14 ≤ x < 46%	10 ≤ x < 49%
SIV/N (Somewhat Increase Vulnerability/ Neutral)	10% ≤ x < 14%	
N (Neutral)	x <10%	x <10%
SDV (Somewhat Decrease Vulnerability)	na	*Occurs in intertidal habitat, expected to increase in size with rising sea level*

S3 Table Climate change vulnerability index for 213 of Australia's threatened species, calculated according to NatureServe Guidelines (Young *et al.* 2011). Species are listed from most to least vulnerable.

Scientific Name	English Name	Final Index Value
Burramys parvus	Mountain Pygmy Possum	11.275
Myriophyllum lapidicola	Chiddarcooping myriophyllum	11.015
Epilobium brunnescens beaugleholei	Bog Willow-herb	10.903
Ranunculus anemoneus	Anemone Buttercup	10.880
Euphrasia bowdeniae	Euphrasia bowdeniae	10.667
Grevillea caleyi	Caley's Grevillea	10.633
Borya mirabilis	Grampians Pincushion-lily	9.703
Daviesia cunderdin	Cunderdin Daviesia	9.000
Acacia pharangites	Wongan Gully Wattle	9.000
Pseudophryne pengilleyi	Northern Corroboree Frog	8.857
Lagorchestes hirsutus bernieri	Rufous Hare-wallaby (Bernier Island)	8.810
Lagorchestes hirsutus dorreae	Rufous Hare-wallaby (Dorre Island)	8.810
Pseudophryne corroboree	Southern Corroboree Frog	8.686
Allocasuarina portuensis	Nielsen Park She-oak	8.367
Litoria olongburensis	Wallum Sedge Frog	8.100
Carex tasmanica	Curly Sedge	8.032
Pseudemydura umbrina	Western Swamp Tortoise	7.667
Eulamprus leuraensis	Blue Mountains water skink	7.633
Macrozamia occidua	Macrozamia occidua	7.460
Tetratheca juncea	Black-eyed Susan	7.052
Brachyscome muelleroides	Mueller Daisy	7.012
Gingidia montana	Mountain Angelica	6.987
Mixophyes balbus	Stuttering Frog	6.947
Logania insularis	Logania insularis	6.933
Kelleria laxa	Kelleria	6.825
Hemiandra rutilans	Sargents Snakebush	6.800
Wurmbea tubulosa	Long-flowered Nancy	6.667
Grevillea christineae	Christine's Grevillea	6.667
Persicaria elatior	Knotweed	6.575
Ballantinia antipoda	Southern Shepherd's Purse	6.390
Euphrasia semipicta	Peninsula Eyebright	6.367
Tasmannia glaucifolia	Fragrant Pepperbush	6.233
Eriocaulon carsonii	Salt Pipewort	6.190
Litoria verreauxii alpina	Alpine Tree Frog	6.140
Calyptorhynchus lathami halmaturinus	Glossy Black-cockatoo (Kangaroo Island)	6.133
Macropus robustus isabellinus	Barrow Island Wallaroo (Euro)	6.095
Centrolepis caespitosa	Matted Centrolepis	6.078
Grevillea infecunda	Anglesea Grevillea	6.037

Muehlenbeckia horrida abdita	Remote Thorny Lignum	5.967
Petrogale persephone	Proserpine Rock-wallaby	5.933
Villarsia calthifolia	Mountain Villarsia	5.900
Geocrinia alba	White-bellied Frog	5.880
Hypolepis distans	Scrambling Ground-fern	5.832
Eleocharis keigheryi	Keighery's Eleocharis	5.768
Senecio macrocarpus	Large-fruit Fireweed	5.725
Ctenotus angusticeps	Airlie Island Ctenotus	5.725
Cycas megacarpa	Cycas megacarpa	5.638
Petrogale lateralis lateralis	Black-flanked Rock-wallaby	5.605
Hoplocephalus bungaroides	Broad-headed snake	5.573
Philoria frosti	Baw Baw Frog	5.452
Epacris apsleyensis	Apsley Heath	5.372
Taudactylus rheophilus	Tinkling Frog	5.363
Sagina diemensis	Pearlwort	5.303
Vombatus ursinus ursinus	Common Wombat (Bass Strait)	5.260
Sminthopsis aitkeni	Kangaroo Island Dunnart	5.200
Cyphanthera odgersii occidentalis	Western Woolly Cyphanthera	5.100
Baloskion longipes	Baloskion longipes	5.060
Ctenophorus yinnietharra	Yinnietharra Rock Dragon	5.052
Eriocaulon australasicum	Southern Pipewort	5.033
Stylidium coroniforme	Wongan Hills Triggerplant	5.033
Tasmannia purpurascens	Broad-leaved Pepperbush	5.033
Aprasia parapulchella	Pink-tailed legless lizard	4.995
Allocasuarina glareicola	Allocasuarina glareicola	4.973
Acacia forrestiana	Forest's Wattle	4.973
Astrotricha roddii	Rod's Star Hair	4.973
Psophodes nigrogularis nigrogularis	Western Whipbird (Western Heath)	4.907
Litoria piperata	Peppered Tree Frog	4.905
Xerothamnella parvifolia	Ironstone Mulla Mulla	4.900
Notoryctes typhlops	Southern Marsupial Mole	4.872
Potorous gilbertii	Gilbert's Potoroo	4.848
Stylidium galioides	Yellow Mountain Triggerplant	4.833
Phebalium daviesii	Davies' Waxflower	4.783
Geocrinia vitellina	Orange-bellied Frog	4.745
Pseudomys fieldi	Shark Bay Mouse	4.558
Hensmania chapmanii	Chapman's Hensmania	4.533
Lasiorhinus krefftii	Northern Hairy-nosed Wombat	4.515
Notoryctes caurinus	Northern Marsupial Mole	4.495
Maireana cheelii	Chariot Wheels	4.467
Xanthorrhoea bracteata	Shiny Grasstree	4.467
Pardalotus quadragintus	Forty-spotted Pardalote	4.467
Pomaderris cotoneaster	Cotoneaster Pomaderris	4.438
Heleioporus australiacus	Giant Burrowing Frog	4.438
Epacris grandis	Grand Heath	4.409

Chordifex abortivus	Manypeaks Rush	4.407
Cadellia pentastylis	Ooline	4.400
Litoria booroolongensis	Booroolong Frog	4.395
Thesium australe	Austral Toadflax	4.395
Delma impar	Striped legless lizard	4.352
Notelaea lloydii	Lloyd's Olive	4.352
Lasiopetalum joyceae	Lasiopetalum joyceae	4.352
Tetratheca glandulosa	Glandular Pink-bell	4.352
Pterostylis cheraphila	Floodplain Rustyhood	4.333
Litoria spenceri	Spotted Tree Frog	4.252
Atrichornis clamosus	Noisy Scrub-bird	4.167
Pleurophascum occidentale	Western Giant-leaved Moss	4.107
Pseudantechinus mimulus	Carpentarian Antechinus	4.058
Alectryon ramiflorus	Isis Tamarind	3.967
Lasiopetalum rotundifolium	Round-leaf Lasiopetalum	3.967
Eremophila nivea	Silky Eremophila	3.967
Ipomoea sp. Stirling (P.K.Latz 10408)	Ipomoea polpha subsp. Latzii	3.938
Daviesia pseudaphylla	Stirling Range Daviesia	3.907
Cycas ophiolitica	Cycas ophiolitica	3.900
Callistemon kenmorrisonii	Betka Bottlebrush	3.900
Pseudocheirus occidentalis	Western Ringtail Possum	3.848
Correa calycina	Correa calycina	3.818
Clematis fawcettii	Stream Clematis	3.817
Pomaderris sericea	Bent Pomaderris	3.773
Hydrocharis dubia	Frogbit	3.700
Eucalyptus cadens	Warby Range Swamp Gum	3.700
Tylophora linearis	Tylophora linearis	3.685
Haloragis exalata exalata	Wingless Raspwort	3.667
Leporillus conditor	Greater Stick-nest Rat	3.623
Spicospina flammocaerulea	Sunset Frog	3.610
Litoria lorica	Armoured Mistfrog	3.563
Perameles bougainville bougainville	Western Barred Bandicoot (Shark Bay)	3.535
Dasyurus maculatus gracilis	Spotted-tailed Quoll (North QLD Subspecies)	3.482
Pseudomys fumeus	Smoky Mouse	3.367
Malurus leucopterus edouardi	White-winged Fairy-wren (Barrow Island)	3.320
Taudactylus eungellensis	Eungella Day Frog	3.267
Cynanchum elegans	White-flowered Wax Plant	3.152
Lathamus discolor	Swift Parrot	3.108
Callitris oblonga	Pygmy Cypress-pine	3.027
Amytornis barbatus	Grey Grasswren (Bulloo)	3.013
Centrolepis pedderensis	Pedder Centrolepis	2.982
Laxmannia jamesii	Jame's Paperlilly	2.940
Orthrosanthus muelleri	South Stirling Morning Iris	2.930
Geophaps smithii smithii	Partridge Pigeon (Eastern)	2.882

Livistona lanuginosa	Waxy Cabbage Palm	2.875
Zyzomys palatalis	Carpentarian Rock-rat	2.875
Petrogale xanthopus xanthopus	Yellow-footed Rock-wallaby (SA & NSW)	2.717
Ptilotus beckerianus	Xerothamnella parvifolia	2.683
Sminthopsis douglasi	Julia Creek Dunnart	2.683
Lichenostomus melanops cassidix	Helmeted Honeyeater	2.633
Apium prostratum phillipii	Fine Leaved Apium	2.618
Callitris oblonga oblonga	South Esk Pine	2.618
Pandanus spiralis var. flammeus	Edgar Range Pandanus	2.605
Pseudomys oralis	Hastings River Mouse	2.573
Litoria raniformis	Growling Grass Frog	2.567
Denisonia maculata	Ornamental Snake	2.567
Litoria aurea	Green and Golden Bell Frog	2.538
Pimelea curviflora var. curviflora	Pimelea curviflora var. curviflora	2.487
Perameles gunnii gunnii	Eastern Barred Bandicoot (Tasmania)	2.367
Cossinia australiana	Cossinia	2.267
Conostylis lepidospermoides	Sedge Conostylis	2.167
Eremophila denticulata denticulata	Fitzgerald Eremophila	2.167
Calyptorhynchus banksii graptogyne	Red-tailed Black-cockatoo (South-eastern)	2.167
Quassia sp. Mooney Creek (J.King s.n. 1949)	Samadera sp. Moonee Creek	2.133
Parsonsia dorrigoensis	Milky Silkpod	2.133
Quassia bidwillii	Samadera bidwillii	2.133
Colobanthus curtisiae	Curtis' Colobanth	2.100
Isoodon auratus auratus	Golden Bandicoot (mainland)	2.035
Tyto novaehollandiae melvillensis	Masked Owl (Tiwi Islands)	2.023
Potorous longipes	Long-footed Potoroo	2.000
Neophema chrysogaster	Orange-bellied Parrot	2.000
Perameles gunnii unnamed subsp.	Eastern Barred Bandicoot (Mainland)	1.995
Litoria castanea	Yellow-spotted Tree frog	1.952
Pseudomys shortridgei	Heath Rat/Mouse	1.733
Bettongia tropica	Northern Bettong	1.700
Psophodes nigrogularis oberon	Western Whipbird (Western Mallee)	1.700
Egernia stokesii badia	Western spiny-tailed skink	1.700
Arenga australasica	Australian Arenga Palm	1.693
Sauropus macranthus	Sauropus macranthus	1.693
Turnix melanogaster	Black-breasted Button-quail	1.567
Neochmia ruficauda ruficauda	Star Finch (Eastern)	1.567
Leipoa ocellata	Malleefowl	1.533
Parantechinus apicalis	Dibbler	1.367
Petaurus australis unnamed subsp.	Yellow-bellied Glider (Wet Tropics)	1.358
Psephotus chrysopterygius	Golden-shouldered Parrot	1.358
Solanum karsense	Menindee Nightshade	1.340

Sarcochilus hartmannii	Waxy Sarcochilus	1.243
Pseudomys pilligaensis	Pilliga Mouse	1.200
Geophaps smithii blaauwi	Partridge Pigeon (Western)	1.170
Isoodon obesulus obesulus	Southern Brown Bandicoot (Eastern)	1.133
Turnix olivii	Buff-breasted Button-quail	1.023
Gymnobelideus leadbeateri	Leadbeaters Possum	1.023
Pezoporus wallicus flaviventris	Western Ground Parrot	0.967
Rhinonicteris aurantius (Pilbara form)	Pilbara Leaf-nosed Bat	0.776
Lagorchestes hirsutus unnamed subsp.	Mala, Rufous Hare-Wallaby (central mainland form)	0.722
Erythrotriorchis radiatus	Red Goshawk	0.670
Xeromys myoides	False Water Rat	0.500
Emydura signata	Bellinger River Emydura	0.500
Dasyornis longirostris	Western Bristlebird	0.488
Cereopsis novaehollandiae grisea	Cape Barren Goose (South-western)	0.433
Aquila audax fleayi	Wedge-tailed Eagle (Tasmanian)	0.378
Dasycercus cristicauda	Mulgara	0.377
Calyptorhynchus latirostris	Carnaby's Black-cockatoo	0.367
Delma labialis	Striped-tailed delma	0.367
Poephila cincta cincta	Black-throated Finch (Southern)	0.158
Cyclopsitta diophthalma coxeni	Coxen's Fig-parrot	0.043
Manorina melanotis	Black-eared Miner	0.000
Egernia rugosa	Yakka skink	0.000
Neochmia phaeton evangelinae	Crimson Finch (White-bellied)	-0.125
Pseudomys australis	Plains Rat	-0.258
Pezoporus occidentalis	Night Parrot	-0.305
Falcunculus frontatus whitei	Crested Shrike-tit (Northern)	-0.512
Myrmecobius fasciatus	Numbat	-0.567
Stipiturus mallee	Mallee Emu-wren	-0.567
Pteropus poliocephalus	Grey-headed Flying-fox	-0.622
Paradelma orientalis	Brigalow Scaly-foot	-0.700
Casuarius casuarius johnsonii	Southern Cassowary	-0.767
Amytornis textilis modestus	Thick-billed Grasswren (Eastern)	-0.800
Calyptorhynchus baudinii	Baudin's Black-cockatoo	-0.843
Dasyornis brachypterus	Eastern Bristlebird	-1.243
Onychogalea fraenata	Bridled Nail-tail Wallaby	-1.535
Malurus coronatus coronatus	Purple-crowned Fairy-wren (Western)	-1.575
Geophaps scripta scripta	Squatter Pigeon (Southern)	-1.700
Pedionomus torquatus	Plains-wanderer	-1.700
Cacatua pastinator pastinator	Muir's Corella (Southern)	-1.733
Xanthomyza phrygia	Regent Honeyeater	-1.865
Polytelis swainsonii	Superb Parrot	-2.100
Acanthiza iredalei iredalei	Slender-billed Thornbill (Western)	-2.135

Pachycephala rufogularis	Red-lored Whistler	-2.833
Dasyurus geoffroii	Western Quoll	-5.000

S4 Table List of factors affecting climate vulnerability of threatened species in Australia and possible actions that could be used to reduce or manage species vulnerability for that particular factor.

Factor	Possible Actions
Sea level rise	- Protect and restore corridors for retreat upslope or where rate of change too great, translocation
Natural barriers	- Protect and restore corridors for range shifts or where rate of change too great, translocation
Anthropogenic barriers	- Protect and restore corridors for range shifts or where rate of change too great, translocation - Restore farm land
Dispersal ability	- Protect and restore corridors for range shifts or where rate of change too great, translocation
Dependence on cool temperatures	- Protect and restore corridors for retreat upslope to cooler habitats or where rate of change too great, translocation - Artificial shading / increase canopy cover (Mitchell *et al.* 2008) - Create microhabitats (e.g. rock bodies; Shoo *et al.* 2011) - Supplement habitat (logs, boards, PVC pipes; Shoo *et al.* 2011)
Dependence on moisture	- Protect and restore moist environments particularly, streamside forests and wetlands - Change land use and vegetation retention and restoration in catchments to reduce runoff and increase rainfall retention in soils and vegetation - Artificial water bodies - Portable irrigation frames or pumps (Mitchell 2001) - Artificial misting/ sprinklers - Employ water storage devices

Dependence on disturbance regime	- Control excessive wildfire (eg. controlled burns, decrease leaf litter) - Artificial moisture supplementation (refer above)
Dependence on snow cover	- Translocation to mountains with continuing snow cover - Create artificial snow
Restriction to geological features/ derivative	- Replicate habitat elsewhere (eg. boulder fields) - Restoration and translocation to suitable sites
Reliance on other species for habitat	- Protect and restore corridors for range shifts or where rate of change too great, translocation of both species - Restore degraded habitats/ breeding sites - Introduce the relied upon species - Artificial nests and burrows
Dietary versatility	- Introduce food sources to new areas - Supplement diet or find suitable replacement - Captively breed required food source and then release
Pollinator versatility	- Protect and restore corridors for range shifts or where rate of change too great, translocation of pollinators to suitable area - Captively breed required pollinator and then release - Find replacement pollinators
Reliance on other species for propagule dispersal	- Protect and restore corridors for range shifts or where rate of change too great, translocation of disperser species along with target species - Translocate seeds to suitable areas
Reliance on other interspecific interaction (eg. mycorrizzal symbiosis)	- Introduce required species (eg. fungi) to habitat or new suitable area

Low genetic diversity	- Increase population size (reduce threats, captively breed) - Increase meta-population connectivity by protecting and restoring corridors or where this is insufficient translocate/ swap individuals between populations - Increase patch size: increase size of protected areas, restore habitats and protect refugia

References;

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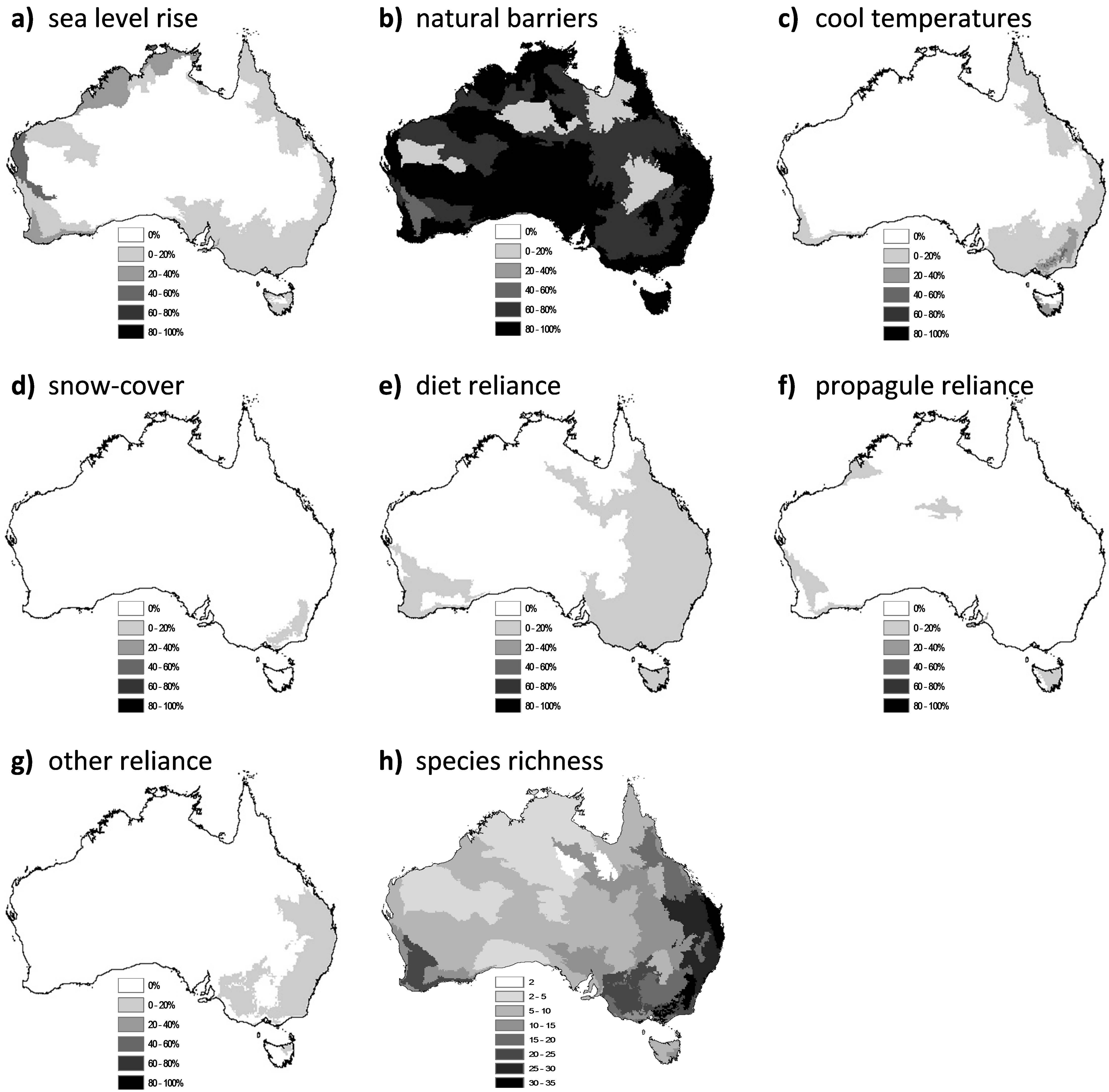
Shoo LP, Olson DH, McMenamin SK, Murray KA, Van Sluys M, et al. (2011) Engineering a future for amphibians under climate change. J Appl Ecol 48: 487-492.


a) sea level rise
b) natural barriers
c) cool temperatures
d) snow-cover
e) diet reliance
f) propagule reliance
g) other reliance
h) species richness
0%
0 - 20%
20 - 40%
40 - 60%
60 - 80%
80 - 100%
2
2 - 5
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35

			Percentage of species range that falls within each exposure category										
			Change in mean annual temperature (°C)					Change in mean annual moisture index					
Taxonomic Group	**Species**	**English Name**	**0 – 1.0º**	**1.0 – 1.5º**	**1.5 – 2.0º**	**2.0 – 2.25º**	**> 2.25º**	**0 – 0.03**	**0.03 – 0.06**	**0.06 -0.09**	**0.09 – 0.12**	**0.12 – 0.15**	**0.15 – 0.19**
Vascular Plant	*Grevillea caleyi*	Caley's Grevillea	0	0	100	0	0	0	9.0909091	78.787879	12.121212	0	0
Vascular Plant	*Xerothamnella parvifolia*	Ironstone Mulla Mulla	0	100	0	0	0	0	32.117465	67.882535	0	0	0
Vascular Plant	*Ptilotus beckerianus*	Xerothamnella parvifolia	0	0	0.2220704	80.184489	19.59344	93.406218	6.593782	0	0	0	0
Vascular Plant	*Borya mirabilis*	Grampians Pincushion-lily	0	0	100	0	0	0	72	28	0	0	0
Vascular Plant	*Laxmannia jamesii*	Jame's Paperlilly	0	100	0	0	0	0	100	0	0	0	0
Vascular Plant	*Apium prostratum phillipii*	Fine Leaved Apium	0	100	0	0	0	0	5.2631579	42.105263	52.631579	0	0
Vascular Plant	*Gingidia montana*	Mountain Angelica	0	0	100	0	0	0	100	0	0	0	0
Vascular Plant	*Parsonsia dorrigoensis*	Milky Silkpod	0	0	100	0	0	0.0195008	49.336973	28.607644	10.783931	11.232449	0.0195008
Vascular Plant	*Astrotricha roddii*	Rod's Star Hair	0	0	74.804324	25.195676	0	0	0	39.284383	60.715617	0	0
Vascular Plant	*Arenga australasica*	Australian Arenga Palm	0	0	100	0	0	29.58196	70.41804	0	0	0	0
Vascular Plant	*Livistona lanuginosa*	Waxy Cabbage Palm	0	0	100	0	0	0	98.765432	1.2345679	0	0	0
Vascular Plant	*Cynanchum elegans*	White-flowered Wax Plant	0	0	98.798849	1.2011511	0	0.0041707	22.725946	16.21554	25.920674	32.777245	2.3564249
Vascular Plant	*Tylophora linearis*	Tylophora linearis	0	0	27.653997	72.346003	0	0	0	18.807339	62.581913	18.610747	0
Vascular Plant	*Brachyscome muelleroides*	Mueller Daisy	0	0	100	0	0	0	0	0	61.721384	38.278616	0
Vascular Plant	*Senecio macrocarpus*	Large-fruit Fireweed	0	70.368199	29.631801	0	0	0	0	44.113508	47.127111	8.7593809	0
Vascular Plant	*Ballantinia antipoda*	Southern Shepherd's Purse	0	0	100	0	0	0	5.1724138	2.8735632	91.954023	0	0
Vascular Plant	*Colobanthus curtisiae*	Curtis' Colobanth	0	100	0	0	0	0.6400201	39.649871	27.150656	32.559453	0	0
Vascular Plant	*Sagina diemensis*	Pearlwort	0	100	0	0	0	100	0	0	0	0	0
Vascular Plant	*Allocasuarina glareicola*	Allocasuarina glareicola	0	0	100	0	0	0	0	0	100	0	0
Vascular Plant	*Allocasuarina portuensis*	Nielsen Park She-oak	0	100	0	0	0	0	0	100	0	0	0
Vascular Plant	*Centrolepis caespitosa*	Matted Centrolepis	0	93.617021	6.3829787	0	0	0	4.2553191	2.1276596	93.617021	0	0
Vascular Plant	*Centrolepis pedderensis*	Pedder Centrolepis	0	100	0	0	0	100	0	0	0	0	0
Vascular Plant	*Maireana cheelii*	Chariot Wheels	0	0	94.458576	5.5414237	0	2.8372402	2.7041835	82.264313	12.194263	0	0
Vascular Plant	*Ipomoea sp. Stirling (P.K.Latz 10*	Ipomoea polpha subsp. Latzii	0	0	0	0	100	100	0	0	0	0	0
Vascular Plant	*Callitris oblonga*	Pygmy Cypress-pine	0	0	100	0	0	0	3.4482759	6.8965517	5.1724138	84.482759	0
Vascular Plant	*Cycas megacarpa*	Cycas megacarpa	0	0	100	0	0	0	0	51.308007	47.807793	0.8842003	0
Vascular Plant	*Cycas ophiolitica*	Cycas ophiolitica	0	0	100	0	0	0	0	85.137318	14.701131	0.1615509	0
Vascular Plant	*Carex tasmanica*	Curly Sedge	0	84.609825	15.390175	0	0	0.4042297	11.454959	31.259537	51.952884	4.9283898	0
Vascular Plant	*Eleocharis keigheryi*	Keighery's Eleocharis	0	0	100	0	0	0	0	37.323944	62.676056	0	0
Vascular Plant	*Hypolepis distans*	Scrambling Ground-fern	0	100	0	0	0	0	100	0	0	0	0
Vascular Plant	*Epacris apsleyensis*	Apsley Heath	0	100	0	0	0	0	0	27.272727	72.727273	0	0
Vascular Plant	*Epacris grandis*	Grand Heath	0	100	0	0	0	0	0	48.076923	51.923077	0	0
Vascular Plant	*Eriocaulon australasicum*	Southern Pipewort	0	100	0	0	0	0	0	77	23	0	0
Vascular Plant	*Eriocaulon carsonii*	Salt Pipewort	0	0	20.980392	77.843137	1.1764706	32.156863	59.803922	8.0392157	0	0	0
Vascular Plant	*Sauropus macranthus*	Sauropus macranthus	0	0	100	0	0	1.1004127	98.899587	0	0	0	0
Vascular Plant	*Daviesia cunderdin*	Cunderdin Daviesia	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Daviesia pseudaphylla*	Stirling Range Daviesia	0	100	0	0	0	0	0	0	100	0	0
Vascular Plant	*Conostylis lepidospermoides*	Sedge Conostylis	0	78.990148	21.009852	0	0	0	8.3990148	91.600985	0	0	0
Vascular Plant	*Haloragis exalata exalata*	Wingless Raspwort	0	91.065292	8.9347079	0	0	0	60.996564	28.865979	10.137457	0	0
Vascular Plant	*Myriophyllum lapidicola*	Chiddarcooping myriophyllum	0	0	2.2857143	97.714286	0	0	100	0	0	0	0
Vascular Plant	*Hydrocharis dubia*	Frogbit	0	0	100	0	0	0	25	28.481013	18.670886	23.417722	4.4303797
Vascular Plant	*Orthrosanthus muelleri*	South Stirling Morning Iris	0	100	0	0	0	0	0	0	100	0	0
Vascular Plant	*Hemiandra rutilans*	Sargents Snakebush	0	0	100	0	0	0	0	94.516129	5.483871	0	0
Vascular Plant	*Hensmania chapmanii*	Chapman's Hensmania	0	0	100	0	0	0	0	100	0	0	0

Vascular Plant	*Wurmbea tubulosa*	Long-flowered Nancy	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Logania insularis*	Logania insularis	0	100	0	0	0	0	66.666667	33.333333	0	0	0
Vascular Plant	*Villarsia calthifolia*	Mountain Villarsia	0	100	0	0	0	0	5.2631579	49.122807	45.614035	0	0
Vascular Plant	*Acacia forrestiana*	Forest's Wattle	0	0	100	0	0	0	0	23.282443	76.717557	0	0
Vascular Plant	*Acacia pharangites*	Wongan Gully Wattle	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Eremophila denticulata denticula*	Fitzgerald Eremophila	0	66.532977	33.467023	0	0	0	0	100	0	0	0
Vascular Plant	*Eremophila nivea*	Silky Eremophila	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Callistemon kenmorrisonii*	Betka Bottlebrush	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Eucalyptus cadens*	Warby Range Swamp Gum	0	0	100	0	0	0	22.870662	41.167192	24.921136	11.041009	0
Vascular Plant	*Notelaea lloydii*	Lloyd's Olive	0	0	100	0	0	0	0.1904762	11.047619	86.285714	2.4761905	0
Vascular Plant	*Epilobium brunnescens beauglel*	Bog Willow-herb	0	0	100	0	0	0	100	0	0	0	0
Vascular Plant	*Pterostylis cheraphila*	Floodplain Rustyhood	0	0	100	0	0	0	0	98.109641	1.8903592	0	0
Vascular Plant	*Sarcochilus hartmannii*	Waxy Sarcochilus	0	0	100	0	0	3.7065637	20.656371	17.335907	28.571429	29.72973	0
Vascular Plant	*Pandanus spiralis var. flammeus*	Edgar Range Pandanus	0	0	0	100	0	0	100	0	0	0	0
Nonvascular Plant	*Pleurophascum occidentale*	Western Giant-leaved Moss	0	100	0	0	0	0	32.379072	16.189536	51.431392	0	0
Vascular Plant	*Muehlenbeckia horrida abdita*	Remote Thorny Lignum	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Persicaria elatior*	Knotweed	0	0	100	0	0	0	0.1451379	4.3541364	16.182874	79.317852	0
Vascular Plant	*Grevillea christineae*	Christine's Grevillea	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Grevillea infecunda*	Anglesea Grevillea	0	100	0	0	0	0	0	29.545455	70.454545	0	0
Vascular Plant	*Clematis fawcettii*	Stream Clematis	0	0	100	0	0	1.5812948	6.081903	38.424111	29.747263	24.165428	0
Vascular Plant	*Ranunculus anemoneus*	Anemone Buttercup	0	0	100	0	0	87.017544	12.982456	0	0	0	0
Vascular Plant	*Baloskion longipes*	Baloskion longipes	0	0	100	0	0	0	0	0	100	0	0
Vascular Plant	*Chordifex abortivus*	Manypeaks Rush	0	100	0	0	0	0	4.2816365	28.639391	67.078972	0	0
Vascular Plant	*Pomaderris cotoneaster*	Cotoneaster Pomaderris	0	0	100	0	0	0	0.7633588	4.4274809	94.80916	0	0
Vascular Plant	*Pomaderris sericea*	Bent Pomaderris	0	0	100	0	0	0	0	0.6849315	99.315068	0	0
Vascular Plant	*Correa calycina*	Correa calycina	0	100	0	0	0	0	74.390244	25.609756	0	0	0
Vascular Plant	*Phebalium daviesii*	Davies' Waxflower	0	100	0	0	0	0	0	33.333333	66.666667	0	0
Vascular Plant	*Thesium australe*	Austral Toadflax	0	0.0309896	85.71909	14.249921	0	0.3567096	12.120213	23.264585	53.657427	10.343259	0.2578067
Vascular Plant	*Alectryon ramiflorus*	Isis Tamarind	0	0	100	0	0	0	0	94.845361	5.1546392	0	0
Vascular Plant	*Cossinia australiana*	Cossinia	0	0	100	0	0	0	0.0472277	68.593558	31.274204	0.0850099	0
Vascular Plant	*Euphrasia bowdeniae*	Euphrasia bowdeniae	0	0	100	0	0	0	0	75	25	0	0
Vascular Plant	*Euphrasia semipicta*	Peninsula Eyebright	0	100	0	0	0	0	100	0	0	0	0
Vascular Plant	*Quassia bidwillii*	Samadera bidwillii	0	0	100	0	0	0	1.2184508	59.007833	31.853786	7.9199304	0
Vascular Plant	*Quassia sp. Mooney Creek (J.Ki*	Samadera sp. Moonee Creek	0	0	100	0	0	0	14.961726	37.091162	23.312457	24.634656	0
Vascular Plant	*Cyphanthera odgersii occidentali*	Western Woolly Cyphanthera	0	0	100	0	0	0	52.941176	47.058824	0	0	0
Vascular Plant	*Solanum karsense*	Menindee Nightshade	0	0	97.406045	2.5939549	0	24.746522	58.800576	16.452903	0	0	0
Vascular Plant	*Lasiopetalum joyceae*	Lasiopetalum joyceae	0	0	100	0	0	0	0	1.8726592	61.048689	37.078652	0
Vascular Plant	*Lasiopetalum rotundifolium*	Round-leaf Lasiopetalum	0	0	100	0	0	0	0	57.768924	42.231076	0	0
Vascular Plant	*Stylidium coroniforme*	Wongan Hills Triggerplant	0	0	100	0	0	0	0	100	0	0	0
Vascular Plant	*Stylidium galioides*	Yellow Mountain Triggerplant	0	100	0	0	0	0	0	98.958333	1.0416667	0	0
Vascular Plant	*Cadellia pentastylis*	Ooline	0	0	17.938038	82.061962	0	0	26.982396	70.655756	2.3569477	0.0049001	0
Vascular Plant	*Kelleria laxa*	Kelleria	0	0	100	0	0	100	0	0	0	0	0
Vascular Plant	*Pimelea curviflora var. curviflora*	Pimelea curviflora var. curviflora	0	0	100	0	0	0	0	36.842105	36.842105	26.315789	0
Vascular Plant	*Tetratheca glandulosa*	Glandular Pink-bell	0	0	100	0	0	0	0.5408063	13.028515	46.066863	40.363815	0
Vascular Plant	*Tetratheca juncea*	Black-eyed Susan	0	0	100	0	0	0	0.1298701	24.675325	58.376623	16.818182	0
Vascular Plant	*Tasmannia glaucifolia*	Fragrant Pepperbush	0	0	100	0	0	1.620162	41.314131	25.292529	13.051305	18.721872	0
Vascular Plant	*Tasmannia purpurascens*	Broad-leaved Pepperbush	0	0	100	0	0	3.1746032	39.506173	36.86067	19.753086	0.7054674	0

Vascular Plant	*Xanthorrhoea bracteata*	Shiny Grasstree	0	100	0	0	0	0	44.800951	38.146168	17.052882	0	0
Vascular Plant	*Callitris oblonga oblonga*	South Esk Pine	0	100	0	0	0	0	1.2987013	11.298701	87.402597	0	0
Vascular Plant	*Macrozamia occidua*	Macrozamia occidua	0	0	100	0	0	0	0	32.515337	67.484663	0	0
Mammal	*Bettongia tropica*	Northern Bettong	0	0	100	0	0	0	67.608137	31.088288	1.303575	0	0
Mammal	*Burramys parvus*	Mountain Pygmy Possum	0	0	100	0	0	65.006916	34.993084	0	0	0	0
Mammal	*Dasycercus cristicauda*	Mulgara	0	0.5264089	7.2325847	27.112757	65.128249	97.510495	2.4895052	0	0	0	0
Mammal	*Dasyurus geoffroii*	Western Quoll	0	42.102624	57.897376	0	0	0	27.481289	51.904923	20.613788	0	0
Mammal	*Dasyurus maculatus gracilis*	Spotted-tailed Quoll (North QLD	0	0	100	0	0	2	84.82	13.15	0.03	0	0
Mammal	*Parantechinus apicalis*	Dibbler	0	99.623292	0.376708	0	0	0	0.0127698	66.830545	33.156685	0	0
Mammal	*Pseudantechinus mimulus*	Carpentarian Antechinus	0	0	100	0	0	2.0833333	97.916667	0	0	0	0
Mammal	*Sminthopsis aitkeni*	Kangaroo Island Dunnart	0	100	0	0	0	0	37.065637	62.934363	0	0	0
Mammal	*Sminthopsis douglasi*	Julia Creek Dunnart	0	0	0	100	0	88.639088	11.360912	0	0	0	0
Mammal	*Rhinonicteris aurantius (Pilbara f*	Pilbara Leaf-nosed Bat	0	0	0.9640571	19.422617	79.613326	99.580078	0.4199221	0	0	0	0
Mammal	*Lagorchestes hirsutus bernieri*	Rufous Hare-wallaby (Bernier Is	0	0	100	0	0	0	100	0	0	0	0
Mammal	*Lagorchestes hirsutus dorreae*	Rufous Hare-wallaby (Dorre Isla	0	0	100	0	0	0	100	0	0	0	0
Mammal	*Lagorchestes hirsutus unnamed*	Mala, Rufous Hare-Wallaby (ce	0	0	0	0	100	100	0	0	0	0	0
Mammal	*Macropus robustus isabellinus*	Barrow Island Wallaroo (Euro)	0	0	100	0	0	100	0	0	0	0	0
Mammal	*Onychogalea fraenata*	Bridled Nail-tail Wallaby	0	0	59.428033	40.571967	0	0	91.106223	8.8937775	0	0	0
Mammal	*Petrogale lateralis lateralis*	Black-flanked Rock-wallaby	0	0.2126152	97.377746	0.1417434	2.2678951	72.997874	22.253721	4.7484054	0	0	0
Mammal	*Petrogale persephone*	Proserpine Rock-wallaby	0	0	100	0	0	0	72.89	26.51	0.6	0	0
Mammal	*Petrogale xanthopus xanthopus*	Yellow-footed Rock-wallaby (SA	0	0	76.842149	23.157851	0	63.37916	33.967642	2.5819432	0.0712549	0	0
Mammal	*Leporillus conditor*	Greater Stick-nest Rat	0	37.096774	62.903226	0	0	50.81	45.16	4.03	0	0	0
Mammal	*Pseudomys australis*	Plains Rat	0	0	5.2872235	94.712777	0	100	0	0	0	0	0
Mammal	*Pseudomys fieldi*	Shark Bay Mouse	0	0	100	0	0	8.3333333	91.666667	0	0	0	0
Mammal	*Pseudomys fumeus*	Smoky Mouse	0	25.867426	74.132574	0	0	0.06	28.3	24.6	31.73	10.1	5.21
Mammal	*Pseudomys oralis*	Hastings River Mouse	0	0	100	0	0	0	6.24	7.4	29.5	53.96	2.9
Mammal	*Pseudomys pilligaensis*	Pilliga Mouse	0	0	0	100	0	0	0	62.955167	37.002736	0.0420964	0
Mammal	*Pseudomys shortridgei*	Heath Rat/Mouse	0	75.764325	24.235675	0	0	0	25.470743	53.553351	20.975906	0	0
Mammal	*Xeromys myoides*	False Water Rat	0	0	100	0	0	25.31	42.6	19.53	10.16	2.4	0
Mammal	*Zyzomys palatalis*	Carpentarian Rock-rat	0	0	100	0	0	0	100	0	0	0	0
Mammal	*Myrmecobius fasciatus*	Numbat	0	31.386999	13.133031	55.47997	0	0	63.359788	10.676493	25.963719	0	0
Mammal	*Notoryctes caurinus*	Northern Marsupial Mole	0	0	0	4.2310701	95.76893	99.99974	0.0002599	0	0	0	0
Mammal	*Notoryctes typhlops*	Southern Marsupial Mole	0	0	11.12	36.99	51.89	99.1	0.9	0	0	0	0
Mammal	*Isoodon auratus auratus*	Golden Bandicoot (mainland)	0	0	92.484265	7.5157349	0	33.672714	66.327286	0	0	0	0
Mammal	*Isoodon obesulus obesulus*	Southern Brown Bandicoot (Eas	0	43.817922	56.182078	0	0	0	22.62	34.23	35.32	6.57	1.26
Mammal	*Perameles bougainville bougainv*	Western Barred Bandicoot (Sha	0	0	100	0	0	0	100	0	0	0	0
Mammal	*Perameles gunnii gunnii*	Eastern Barred Bandicoot (Tasr	0	100	0	0	0	0	38.196352	27.584347	34.219302	0	0
Mammal	*Perameles gunnii unnamed subs*	Eastern Barred Bandicoot (Mair	0	62.962963	37.037037	0	0	0	0	14.814815	74.074074	11.111111	0
Mammal	*Gymnobelideus leadbeateri*	Leadbeaters Possum	0	0	100	0	0	1.9461078	96.22006	1.8338323	0	0	0
Mammal	*Petaurus australis unnamed subs*	Yellow-bellied Glider (Wet Tropi	0	0	100	0	0	0.0168862	87.605539	11.837217	0.540358	0	0
Mammal	*Potorous gilbertii*	Gilbert's Potoroo	0	100	0	0	0	0	86.666667	13.333333	0	0	0
Mammal	*Potorous longipes*	Long-footed Potoroo	0	0	100	0	0	0	30.187057	39.13137	28.122984	2.5585896	0
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	0	97.208931	2.7910686	0	0	0	78.650138	12.128462	9.2214006	0	0
Mammal	*Pteropus poliocephalus*	Grey-headed Flying-fox	0	6.5593339	93.440666	0	0	0.08	7.11	27.28	41.23	21.39	2.91
Mammal	*Lasiorhinus krefftii*	Northern Hairy-nosed Wombat	0	0	0	100	0	0	100	0	0	0	0
Mammal	*Vombatus ursinus ursinus*	Common Wombat (Bass Strait)	0	100	0	0	0	0	4.6918768	30.252101	65.056022	0	0
Bird	*Aquila audax fleayi*	Wedge-tailed Eagle (Tasmaniar	0	100	0	0	0	29.866156	42.169535	14.314405	13.649904	0	0

Bird	*Erythrotriorchis radiatus*	Red Goshawk	0	0	79.579752	16.87525	3.5449972	20.155554	55.756307	19.80909	3.5285721	0.7504759	0
Bird	*Cereopsis novaehollandiae grise*	Cape Barren Goose (South-wes	0	90.850259	9.1497411	0	0	0	5.2270012	94.344883	0.4281163	0	0
Bird	*Atrichornis clamosus*	Noisy Scrub-bird	0	100	0	0	0	0	32	62	6	0	0
Bird	*Casuarius casuarius johnsonii*	Southern Cassowary	0	0	67.992812	0	32.007188	10.956396	54.088539	6.2909131	0.0110951	0	28.653057
Bird	*Psophodes nigrogularis nigrogula*	Western Whipbird (Western He	0	100	0	0	0	0	11.090573	23.844732	65.064695	0	0
Bird	*Psophodes nigrogularis oberon*	Western Whipbird (Western Ma	0	51.501963	48.498037	0	0	0	12.29	58.3	29.41	0	0
Bird	*Geophaps scripta scripta*	Squatter Pigeon (Southern)	0	0	46.98404	53.01596	0	0	43.57	50.88	4.7	0.85	0
Bird	*Geophaps smithii blaauwi*	Partridge Pigeon (Western)	0	0	79.540113	20.459887	0	22.009782	77.990218	0	0	0	0
Bird	*Geophaps smithii smithii*	Partridge Pigeon (Eastern)	0	0	98.22526	1.7747399	0	40.790539	59.209461	0	0	0	0
Bird	*Amytornis barbatus*	Grey Grasswren (Bulloo)	0	0	0	82.897456	17.102544	100	0	0	0	0	0
Bird	*Amytornis textilis modestus*	Thick-billed Grasswren (Eastern	0	0	37.57	51.89	10.54	84.3	11.99	3.71	0	0	0
Bird	*Malurus coronatus coronatus*	Purple-crowned Fairy-wren (We	0	0	8.5296136	85.921103	5.5492838	17.270108	82.729892	0	0	0	0
Bird	*Malurus leucopterus edouardi*	White-winged Fairy-wren (Barro	0	0	100	0	0	100	0	0	0	0	0
Bird	*Stipiturus mallee*	Mallee Emu-wren	0	0.2088389	99.791161	0	0	0	19.599029	80.400971	0	0	0
Bird	*Leipoa ocellata*	Malleefowl	0	11.190706	63.0809	21.179032	4.5493626	14.18637	39.856026	35.998369	9.7767195	0.1825156	0
Bird	*Lichenostomus melanops cassid*	Helmeted Honeyeater	0	0	100	0	0	0	0	100	0	0	0
Bird	*Manorina melanotis*	Black-eared Miner	0	0.0069507	99.993049	0	0	0.0590811	63.334955	36.605964	0	0	0
Bird	*Xanthomyza phrygia*	Regent Honeyeater	0	1.78	82.19	16.03	0	0	5.64	23.22	50.76	18.64	1.74
Bird	*Falcunculus frontatus whitei*	Crested Shrike-tit (Northern)	0	0	51.861706	48.138294	0	17.374128	82.625872	0	0	0	0
Bird	*Pachycephala rufogularis*	Red-lored Whistler	0	0.6818897	97.894884	1.4232262	0	0	48.08896	51.91104	0	0	0
Bird	*Acanthiza iredalei iredalei*	Slender-billed Thornbill (Wester	0	1.6420319	46.664682	28.919927	22.773359	62.740099	34.548248	2.7116523	0	0	0
Bird	*Dasyornis brachypterus*	Eastern Bristlebird	0	0	100	0	0	3.0021834	14.41048	29.912664	37.336245	15.338428	0
Bird	*Dasyornis longirostris*	Western Bristlebird	0	100	0	0	0	0	0.4197761	30.177239	69.402985	0	0
Bird	*Pardalotus quadragintus*	Forty-spotted Pardalote	0	100	0	0	0	0.3389831	50.508475	39.322034	9.8305085	0	0
Bird	*Neochmia phaeton evangelinae*	Crimson Finch (White-bellied)	0	0	100	0	0	99.765779	0.2342209	0	0	0	0
Bird	*Neochmia ruficauda ruficauda*	Star Finch (Eastern)	0	0	54.50594	45.49406	0	0	45.306347	53.214198	1.4246702	0.0547843	0
Bird	*Poephila cincta cincta*	Black-throated Finch (Southern)	0	0	61.159013	38.840987	0	0.1517794	73.059162	14.39482	10.040851	2.3533876	0
Bird	*Pedionomus torquatus*	Plains-wanderer	0	1.1162314	55.429742	17.402287	26.05174	47.446907	8.5533855	27.090922	15.5775	1.3312852	0
Bird	*Cacatua pastinator pastinator*	Muir's Corella (Southern)	0	100	0	0	0	0	42.209073	49.309665	8.4812623	0	0
Bird	*Calyptorhynchus banksii graptog*	Red-tailed Black-cockatoo (Sou	0	72.574211	27.425789	0	0	0	15.369531	72.608019	12.022449	0	0
Bird	*Calyptorhynchus baudinii*	Baudin's Black-cockatoo	0	68.37256	31.62744	0	0	0	70.079197	13.168991	16.751813	0	0
Bird	*Calyptorhynchus lathami halmatu*	Glossy Black-cockatoo (Kangar	0	100	0	0	0	0	37.356451	62.643549	0	0	0
Bird	*Calyptorhynchus latirostris*	Carnaby's Black-cockatoo	0	26.344809	70.031931	3.62326	0	0	24.550154	58.667933	16.781912	0	0
Bird	*Cyclopsitta diophthalma coxeni*	Coxen's Fig-parrot	0	0	100	0	0	0.5084792	11.094583	26.308387	37.15414	24.934412	0
Bird	*Lathamus discolor*	Swift Parrot	0	17.93051	73.063241	9.0062491	0	2.21	11.42	32.34	39.48	13.26	1.29
Bird	*Neophema chrysogaster*	Orange-bellied Parrot	0	66.168922	33.831078	0	0	14.83	27.06	28.93	17.46	9.09	2.63
Bird	*Pezoporus occidentalis*	Night Parrot	0	0	0	39.806667	60.193333	99.888889	0.1111111	0	0	0	0
Bird	*Pezoporus wallicus flaviventris*	Western Ground Parrot	0	100	0	0	0	0	12.642378	58.704257	28.653365	0	0
Bird	*Polytelis swainsonii*	Superb Parrot	0	0	37.516081	62.444433	0.0394863	0	24.475915	39.445052	28.321118	7.7579157	0
Bird	*Psephotus chrysopterygius*	Golden-shouldered Parrot	0	0	100	0	0	5.3868195	94.613181	0	0	0	0
Bird	*Turnix melanogaster*	Black-breasted Button-quail	0	0	93.089602	6.9103978	0	0.15	5.61	58.58	23.27	12.33	0.06
Bird	*Turnix olivii*	Buff-breasted Button-quail	0	0	100	0	0	5.9416916	94.058308	0	0	0	0
Bird	*Tyto novaehollandiae melvillensi*	Masked Owl (Tiwi Islands)	0	0	100	0	0	0	100	0	0	0	0
Amphibian	*Litoria aurea*	Green and Golden Bell Frog	0	0	100	0	0	0	9.85	17.35	45.55	22.35	4.9
Amphibian	*Litoria booroolongensis*	Booroolong Frog	0	0	82.66919	17.33081	0	0.02	8.75	16.44	52.61	21.62	0.56
Amphibian	*Litoria castanea*	Yellow-spotted Tree frog	0	0	100	0	0	0	0.014167	5.7848508	82.012656	12.188326	0
Amphibian	*Litoria lorica*	Armoured Mistfrog	0	0	100	0	0	13.636364	86.363636	0	0	0	0

Amphibian	*Litoria olongburensis*	Wallum Sedge Frog	0	0	100	0	0	0	30.233463	45.992218	21.750973	2.0233463	0
Amphibian	*Litoria piperata*	Peppered Tree Frog	0	0	100	0	0	0	0	0	30.61	69.37	0.02
Amphibian	*Litoria raniformis*	Growling Grass Frog	0	30.975456	69.024544	0	0	0.13	17.95	40.61	30.47	8.55	2.29
Amphibian	*Litoria spenceri*	Spotted Tree Frog	0	0	100	0	0	0.4784102	90.787537	7.2129539	1.5210991	0	0
Amphibian	*Litoria verreauxii alpina*	Alpine Tree Frog	0	0	100	0	0	31.364216	68.635784	0	0	0	0
Amphibian	*Geocrinia alba*	White-bellied Frog	0	100	0	0	0	0	100	0	0	0	0
Amphibian	*Geocrinia vitellina*	Orange-bellied Frog	0	100	0	0	0	0	100	0	0	0	0
Amphibian	*Heleioporus australiacus*	Giant Burrowing Frog	0	0	100	0	0	0.09	7.92	15.28	53.47	15.48	7.76
Amphibian	*Mixophyes balbus*	Stuttering Frog	0	0	100	0	0	0.0217344	13.357966	11.912628	34.483808	38.263421	1.9604434
Amphibian	*Philoria frosti*	Baw Baw Frog	0	0	100	0	0	53.125	46.875	0	0	0	0
Amphibian	*Pseudophryne corroboree*	Southern Corroboree Frog	0	0	100	0	0	25	72.690217	2.3097826	0	0	0
Amphibian	*Pseudophryne pengilleyi*	Northern Corroboree Frog	0	0	100	0	0	0	92.497626	7.5023742	0	0	0
Amphibian	*Spicospina flammocaerulea*	Sunset Frog	0	100	0	0	0	0	100	0	0	0	0
Amphibian	*Taudactylus eungellensis*	Eungella Day Frog	0	0	100	0	0	0	31.634653	49.117993	19.012152	0.2352019	0
Amphibian	*Taudactylus rheophilus*	Tinkling Frog	0	0	100	0	0	0	100	0	0	0	0
Reptile	*Ctenophorus yinnietharra*	Yinnietharra Rock Dragon	0	0	0	0	100	100	0	0	0	0	0
Reptile	*Emydura signata*	Bellinger River Emydura	0	0	100	0	0	0.0308928	52.455978	36.947791	9.2987334	1.2666049	0
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	0	0	100	0	0	0	25	75	0	0	0
Reptile	*Denisonia maculata*	Ornamental Snake	0	0	86.787387	13.212613	0	0	33.240032	60.519251	4.6041357	1.6365817	0
Reptile	*Hoplocephalus bungaroides*	Broad-headed snake	0	0	99.989967	0.0100331	0	0	1.1337413	6.0098324	79.913715	12.942711	0
Reptile	*Aprasia parapulchella*	Pink-tailed legless lizard	0	0	100	0	0	0	0	0	69.935508	30.064492	0
Reptile	*Delma impar*	Striped legless lizard	0	24.627023	75.372977	0	0	0	3.8	21.32	59.51	14.32	1.05
Reptile	*Delma labialis*	Striped-tailed delma	0	0	100	0	0	0	7.5706215	92.20339	0.2259887	0	0
Reptile	*Paradelma orientalis*	Brigalow Scaly-foot	0	0	37.45494	62.54506	0	0	40.788109	59.087735	0.1241561	0	0
Reptile	*Ctenotus angusticeps*	Airlie Island Ctenotus	0	0	0	100	0	0	100	0	0	0	0
Reptile	*Egernia rugosa*	Yakka skink	0	0	63.172835	36.827165	0	4.8713254	47.540939	45.527303	1.8643639	0.1960691	0
Reptile	*Egernia stokesii badia*	Western spiny-tailed skink	0	0	89.725436	10.274564	0	2.2613198	58.200807	39.537874	0	0	0
Reptile	*Eulamprus leuraensis*	Blue Mountains water skink	0	0	100	0	0	0	2.2727273	11.956522	55.928854	29.841897	0

			Indirect Exposure			Sensitivity Factors													
Taxonomic Group	Species	English Name	Exposure to sea level rise	Distribution relative to natural barriers	Distribution relative to anthropogenic barriers	Dispersal ability	Reliance on cool temperatures	Reliance on a particular moisture regime or habitat	Reliance on a particular disturbance regime	Dependence on snow-cover habitats	Reliance on a particular abiotic feature or derivatives	Reliance on other species for habitat	Dietary versatility (animals only)	Pollinator versatility (plants only)	Dependence on other species for propagule dispersal	Reliance on another species for other interspecific interaction	Measured genetic variation	Occurrence of bottlenecks in recent evolutionary history	Index
Vascular Plant	*Grevillea caleyi*	Caley's Grevillea	SI	SI	SI	GI-Inc	N	N	SI	N	SI	N	N/A	N	N	N	Inc	N/A	10.63333
Vascular Plant	*Xerothamnella parvifolia*	Ironstone Mulla Mulla	N	Inc	SI	SI-N	N	SI	SI	N	N-SD	N	N/A	SI-N	N	N	U	N	4.9
Vascular Plant	*Ptilotus beckerianus*	Xerothamnella parvif	N	N	N	Inc-SI	N	SI	N	N	N-SD	SI-N	N/A	SI-N	N	N	U	N	2.683333
Vascular Plant	*Borya mirabilis*	Grampians Pincushi	N	N	Inc	GI-Inc	N	Inc-SI	N	N	SI	N	N/A	SI	N	SI-N	Inc-SI	N/A	9.703333
Vascular Plant	*Laxmannia jamesii*	Jame's Paperlilly	N	Inc-SI	N	U	N	SI	SI	N	N	SI-N	N/A	N	N	N	U	N	2.94
Vascular Plant	*Apium prostratum phillipii*	Fine Leaved Apium	N	SI-N	SI	U	N	SI-N	SI-N	N	N	N	N/A	N	N	N	U	N	2.618333
Vascular Plant	*Gingidia montana*	Mountain Angelica	N	SI	N	U	SI	SI	N	N	SI	SI	N/A	SI-N	N	N	U	Inc-SI	6.986667
Vascular Plant	*Parsonsia dorrigoensis*	Milky Silkpod	N	SI	N	N	N	SI	N	N	N	N	N/A	U	N	N	U	N	2.133333
Vascular Plant	*Astrotricha roddii*	Rod's Star Hair	N	SI	N	U	N	N	SI-N	N	SI	N	N/A	SI-N	N	N	U	SI	4.973333
Vascular Plant	*Arenga australasica*	Australian Arenga Pa	N	Inc	N	U	SD	SI-N	SI-N	N	N-SD	N	N/A	SI-N	N	N	U	N	1.693333
Vascular Plant	*Livistona lanuginosa*	Waxy Cabbage Palm	N	N	N	SI-N	N	Inc	N	N	N	N	N/A	N	N	N	U	SI	2.875
Vascular Plant	*Cynanchum elegans*	White-flowered Wax	N	SI	N	SI-N	N	SI-N	SI	N	SD	N	N/A	SI-N	N	N	U	N	3.151667
Vascular Plant	*Tylophora linearis*	Tylophora linearis	N	N	SI	U	N	SI-N	N	N	N	N	N/A	N	N	N	U	SI	3.685
Vascular Plant	*Brachyscome muelleroides*	Mueller Daisy	N	N	Inc	U	N	Inc	SI	N	N-SD	N	N/A	N	N	N	U	SI	7.011667
Vascular Plant	*Senecio macrocarpus*	Large-fruit Fireweed	N	SI-N	Inc-SI	Inc	N	SI	SI	N	N-SD	N	N/A	N	N	N	U	N	5.725
Vascular Plant	*Ballantinia antipoda*	Southern Shepherd's	N	N	SI	N	N	Inc	SI-N	N	N	SI	N/A	N	N	N	U	SI-N	6.39
Vascular Plant	*Colobanthus curtisiae*	Curtis' Colobanth	N	SI	N	SI-N	U	N	N	N	N-SD	N	N/A	N	SI-N	N	U	N	2.1
Vascular Plant	*Sagina diemensis*	Pearlwort	N	SI	N	U	Inc	SI-N	Inc-SI	N	SI	N	N/A	SI-N	N	N	U	Inc-SI	5.303333
Vascular Plant	*Allocasuarina glareicola*	Allocasuarina glareic	N	N	SI	Inc	N	N	N	N	SI-N	N	N/A	N	N	N	U	SI-N	4.973333
Vascular Plant	*Allocasuarina portuensis*	Nielsen Park She-oa	SI	Inc	SI	Inc-SI	N	N	SI	N	SI	N	N/A	N	N	N	U	Inc	8.366667
Vascular Plant	*Centrolepis caespitosa*	Matted Centrolepis	N	SI	SI	U	N	Inc	N	N	N	N	N/A	SI-N	N	N	U	SI	6.078333
Vascular Plant	*Centrolepis pedderensis*	Pedder Centrolepis	N	SI	N	N	SI-N	SI	SI-N	N	N	N	N/A	U	N	N	U	Inc	2.981667
Vascular Plant	*Maireana cheelii*	Chariot Wheels	N	N	Inc	SI	N	SI-N	N	N	N	N	N/A	N	N	N	U	SI-N	4.466667
Vascular Plant	*Ipomoea sp. Stirling (P.K.La*	Ipomoea polpha subs	N	N	N	U	N	SI	SI-N	N	N	SI	N/A	N	SI-N	N	U	SI-N	3.938333
Vascular Plant	*Callitris oblonga*	Pygmy Cypress-pine	N	SI	N	SI-N	N	SI	SI-N	N	SD	N	N/A	N	N	N	U	N	3.026667
Vascular Plant	*Cycas megacarpa*	Cycas megacarpa	N	SI	N	Inc-SI	N	SI-N	N	N	N	N	N/A	SI	N	SI-N	U	N	5.638333
Vascular Plant	*Cycas ophiolitica*	Cycas ophiolitica	N	SI	N	SI	N	SI-N	SI-N	N	N-SD	N	N/A	SI	N	N	U	N	3.9
Vascular Plant	*Carex tasmanica*	Curly Sedge	N	SI	SI	Inc	N	Inc	SI	N	SI-N	N	N/A	N	N	N	U	N	8.031667
Vascular Plant	*Eleocharis keigheryi*	Keighery's Eleocharis	N	SI	SI	U	N	Inc	SI-N	N	N	N	N/A	N	N	N	U	N	5.768333
Vascular Plant	*Hypolepis distans*	Scrambling Ground-f	SI	Inc	N	Inc-SI	N	SI	SI-N	N	N	N	N/A	U	N	SI-N	U	SI	5.831667
Vascular Plant	*Epacris apsleyensis*	Apsley Heath	N	Inc-SI	N	Inc	N	N	SI	N	SI-N	N	N/A	SI-N	N	N	U	N	5.371667
Vascular Plant	*Epacris grandis*	Grand Heath	N	SI	N	Inc-N-SD	N	SI-N	SI	N	SI-N	N	N/A	SI-N	N	N	U	SI-N	4.408889
Vascular Plant	*Eriocaulon australasicum*	Southern Pipewort	N	N	Inc	U	N	Inc	SI-N	N	N	N	N/A	SI-N	N	N	U	SI-N	5.033333
Vascular Plant	*Eriocaulon carsonii*	Salt Pipewort	N	SI	N	N	N	GI-Inc	SI-N	N	Inc	N	N/A	U	N	N	U	N	6.19
Vascular Plant	*Sauropus macranthus*	Sauropus macranthu	N	Inc-SI	N	N-SD	N	SI	N	N	N	N	N/A	U	N	N	U	N	1.693333
Vascular Plant	*Daviesia cunderdin*	Cunderdin Daviesia	N	N	GI	SI	N	SI-N	SI	N	N	N	N/A	N	SI-N	N	U	Inc	9
Vascular Plant	*Daviesia pseudaphylla*	Stirling Range Davie	N	N	SI	SI	N	N	SI	N	SI-N	N	N/A	N	SI-N	N	U	N	3.906667
Vascular Plant	*Conostylis lepidospermoide*	Sedge Conostylis	N	SI	SI-N	U	N	N	SI-N	N	N	N	N/A	N	N	N	U	SI-N	2.166667
Vascular Plant	*Haloragis exalata exalata*	Wingless Raspwort	N	SI	SI	N-SD	N	Inc-SI	SI	N	N-SD	N	N/A	N	N	N	U	SI-N	3.666667
Vascular Plant	*Myriophyllum lapidicola*	Chiddarcooping myri	N	N	SI	Inc	N	Inc	SI	N	Inc	N	N/A	SI-N	N	N	U	SI	11.015
Vascular Plant	*Hydrocharis dubia*	Frogbit	N	SI	N	SI-N	N	Inc	N	N	N	N	N/A	N	N	N	U	N	3.7
Vascular Plant	*Orthrosanthus muelleri*	South Stirling Mornin	N	N	Inc-SI	U	N	N	SI	N	N	SI-N	N/A	N	N	N	U	N	2.93
Vascular Plant	*Hemiandra rutilans*	Sargents Snakebush	N	N	Inc	Inc-SI	N	N	SI-N	N	N	SI-N	N/A	N	N	N	U	Inc-SI	6.8
Vascular Plant	*Hensmania chapmanii*	Chapman's Hensma	N	N	Inc	SI	N	N	SI-N	N	N	N	N/A	U	SI-N	N	U	N	4.533333
Vascular Plant	*Wurmbea tubulosa*	Long-flowered Nancy	N	SI	Inc	SI	N	SI	SI	N	N-SD	N	N/A	N	N	N	U	SI-N	6.666667
Vascular Plant	*Logania insularis*	Logania insularis	N	Inc	N	Inc	N	N	SI-N	N	Inc-SI	N	N/A	U	SI-N	N	U	Inc-SI	6.933333
Vascular Plant	*Villarsia calthifolia*	Mountain Villarsia	N	SI-N	SI	U	N	Inc	SI	N	SI	N	N/A	N	N	N	U	SI	5.9
Vascular Plant	*Acacia forrestiana*	Forest's Wattle	N	SI	SI	SI	N	N	SI-N	N	SI-N	N	N/A	N	N	N	U	N	4.973333
Vascular Plant	*Acacia pharangites*	Wongan Gully Wattle	N	N	GI	SI	N	SI-N	SI	N	Inc-SI	N	N/A	N	N	N	U	Inc-N	9
Vascular Plant	*Eremophila denticulata den*	Fitzgerald Eremophil	N	SI	SI-N	U	N	N	SI	N	N-SD	N	N/A	N	N	N	U	SI-N	2.166667
Vascular Plant	*Eremophila nivea*	Silky Eremophila	N	N	Inc	U	N	N	SI	N	N-SD	N	N/A	N	N	N	U	SI	3.966667
Vascular Plant	*Callistemon kenmorrisonii*	Betka Bottlebrush	N	SI	N	U	N	SI-N	N	N	SI	N	N/A	N	N	N	U	Inc-N	3.9
Vascular Plant	*Eucalyptus cadens*	Warby Range Swam	N	N	SI	U	N	Inc	SI-N	N	N	N	N/A	N	N	N	U	N	3.7
Vascular Plant	*Notelaea lloydii*	Lloyd's Olive	N	SI-N	N	Inc-SI	N	N	SI-N	N	N	N	N/A	N	N	N	U	SI	4.351667
Vascular Plant	*Epilobium brunnescens bea*	Bog Willow-herb	N	Inc	N	N	GI	GI-Inc	SI-N	N	N	SI	N/A	N	N	N	U	Inc	10.90333
Vascular Plant	*Pterostylis cheraphila*	Floodplain Rustyhoo	N	N	Inc	Dec	N	Inc-SI	N	N	N	SI-N	N/A	SI-N	N	SI	U	SI-N	4.333333
Vascular Plant	*Sarcochilus hartmannii*	Waxy Sarcochilus	N	SI	N	Dec	N	N	SI-N	N	SI	N	N/A	N	N	SI-N	U	N	1.243333
Vascular Plant	*Pandanus spiralis var. flam*	Edgar Range Pandar	N	N	N	N-SD	N	SI	N	N	SI-N	N	N/A	N	SI-N	N	U	SI	2.605
Nonvascular Plant	*Pleurophascum occidentale*	Western Giant-leave	SI	Inc-SI	SI-N	SI-N	N	SI-N	N	N	SD-Dec	SI-N	N/A	U	N	N	U	SI	4.106667
Vascular Plant	*Muehlenbeckia horrida abd*	Remote Thorny Lign	N	N	Inc	SI-N	N	Inc	SI	N	N	N	N/A	N	N	N	U	N	5.966667
Vascular Plant	*Persicaria elatior*	Knotweed	N	SI	N	SI-N	N	Inc-SI	SI-N	N	N	SI-N	N/A	N	N	N	U	SI-N	6.575
Vascular Plant	*Grevillea christineae*	Christine's Grevillea	N	N	Inc	Inc-SI	N	SI	SI	N	SD	SI-N	N/A	N	N	N	U	SI	6.666667
Vascular Plant	*Grevillea infecunda*	Anglesea Grevillea	N	SI	SI	GI-Inc	N	SI-N	SI-N	N	N-SD	N	N/A	N	N	N	U	SI	6.036667
Vascular Plant	*Clematis fawcettii*	Stream Clematis	N	SI-N	N	SI-N	N	SI	SI-N	N	N	N	N/A	SI-N	N	N	U	N	3.816667
Vascular Plant	*Ranunculus anemoneus*	Anemone Buttercup	N	Inc	N	GI	GI	N	N	Inc	N	N	N/A	N	N	N	U	SI	10.88
Vascular Plant	*Baloskion longipes*	Baloskion longipes	N	SI	N	SI	N	SI	N	N	N	N	N/A	N	N	N	U	SI	5.06
Vascular Plant	*Chordifex abortivus*	Manypeaks Rush	SI-N	Inc-SI	SI	U	N	N	SI	N	N	N	N/A	N	N	N	U	SI-N	4.406667
Vascular Plant	*Pomaderris cotoneaster*	Cotoneaster Pomade	N	SI	N	U	N	SI	SI	N	N	N	N/A	SI-N	N	N	U	N	4.438333
Vascular Plant	*Pomaderris sericea*	Bent Pomaderris	N	N	N	U	N	SI-N	SI	N	N	N	N/A	SI-N	N	N	U	SI	3.773333
Vascular Plant	*Correa calycina*	Correa calycina	SI-N	Inc	SI	U	N	SI	N	N	N-SD	N	N/A	N	SI	N	U	N	3.818333
Vascular Plant	*Phebalium daviesii*	Davies' Waxflower	Inc-SI	Inc-SI	N	SI-N-SD	N	SI	SI	N	N	N	N/A	N	N	N	N-SD	N/A	4.783333
Vascular Plant	*Thesium australe*	Austral Toadflax	N	SI	N	U	N	SI-N	SI	N	SD	N	N/A	N	N	SI	U	SI	4.395
Vascular Plant	*Alectryon ramiflorus*	Isis Tamarind	N	N	N	Inc-SI	N	N	SI	N	N-SD	N	N/A	U	N	N	U	Inc-SI	3.966667
Vascular Plant	*Cossinia australiana*	Cossinia	N	N	N	Inc	N	N	N	N	N	N	N/A	N	N	N	U	U	2.266667
Vascular Plant	*Euphrasia bowdeniae*	Euphrasia bowdenia	N	SI	N	GI	SI-N	SI	Inc-SI	N	SI	N	N/A	N	N	N	U	Inc-SI	10.66667
Vascular Plant	*Euphrasia semipicta*	Peninsula Eyebright	N	Inc	N	GI	SI-N	SI	Inc-SI	N	N	N	N/A	N	N	N	U	SI-N	6.366667
Vascular Plant	*Quassia bidwillii*	Samadera bidwillii	N	SI	N	SI-N	N	SI	SI-N	N	SD	N	N/A	N	N	N	U	N	2.133333
Vascular Plant	*Quassia sp. Mooney Creek*	Samadera sp. Moone	SI-N	SI	N	SI-N	N	SI-N	N	N	N-SD	N	N/A	N	N	N	U	N	2.133333
Vascular Plant	*Cyphanthera odgersii occic*	Western Woolly Cyp	N	N	Inc	U	N	N	SI	N	SD	N	N/A	SI-N	N	N	U	Inc	5.1
Vascular Plant	*Solanum karsense*	Menindee Nightshad	N	N	SI	SD	N	Inc	SI	N	SD	N	N/A	N	N	N	U	N	1.34
Vascular Plant	*Lasiopetalum joyceae*	Lasiopetalum joycea	N	SI	SI-N	SI	N	N	SI-N	N	SI-N	N	N/A	N	N	N	U	N	4.351667
Vascular Plant	*Lasiopetalum rotundifolium*	Round-leaf Lasiopeta	N	N	Inc	SI	N	N	SI-N	N	N	N	N/A	N	N	N	U	N	3.966667
Vascular Plant	*Stylidium coroniforme*	Wongan Hills Trigge	N	N	Inc	Inc-SI	N	SI-N	SI	N	N	N	N/A	N	N	N	N-SD	N/A	5.033333
Vascular Plant	*Stylidium galioides*	Yellow Mountain Trig	N	SI	N	Inc-SI	N	SI-N	SI	N	SI-N	N	N/A	N	N	N	U	SI	4.833333
Vascular Plant	*Cadellia pentastylis*	Ooline	N	SI	N	Inc-N	N	N-SD	SI-N	N	SI	N	N/A	U	N	N	U	N	4.4
Vascular Plant	*Kelleria laxa*	Kelleria	N	Inc	N	Inc-N	Inc	SI	SI	N	N	N	N/A	U	N	N	U	SI-N	6.825
Vascular Plant	*Pimelea curviflora var. curv*	Pimelea curviflora va	N	SI	SI-N	SI	N	N	N	N	N-SD	N	N/A	N	N	N	U	N	2.486667
Vascular Plant	*Tetratheca glandulosa*	Glandular Pink-bell	N	SI	N	U	N	N	Inc-SI	N	N	N	N/A	SI	N	N	U	N	4.351667
Vascular Plant	*Tetratheca juncea*	Black-eyed Susan	Inc-SI	SI	N	SI-N	SI	N	Inc-SI	N	N-SD	N	N/A	SI	N	N	U	N	7.051667
Vascular Plant	*Tasmannia glaucifolia*	Fragrant Pepperbush	N	SI	N	SI-SD	SI	SI-N	SI-N	N	SI	SI-N	N/A	N	N	N	U	SI	6.233333
Vascular Plant	*Tasmannia purpurascens*	Broad-leaved Pepper	N	SI	N	SI-SD	SI	SI	N	N	SI	SI-N	N/A	N	N	N	U	N	5.033333
Vascular Plant	*Xanthorrhoea bracteata*	Shiny Grasstree	SI	Inc	N	SI-N	N	N	SI	N	N	N	N/A	N	N	N	U	SI-N	4.466667
Vascular Plant	*Callitris oblonga oblonga*	South Esk Pine	N	SI	SI-N	SI-N	N	SI-N	SI	N	SD	N	N/A	N	N	N	U	N	2.618333
Vascular Plant	*Macrozamia occidua*	Macrozamia occidua	N	Inc-SI	N	Inc-SI	N	N	SI-N	N	SI-N	N	N/A	Inc-SI	N	N	SI-N	N/A	7.46
Mammal	*Bettongia tropica*	Northern Bettong	N	SI	N	N	N	N	SI-N	N	SD	SI-N	SI-N	N/A	N	N	N	N/A	1.7
Mammal	*Burramys parvus*	Mountain Pygmy Pos	N	Inc	N	SD	GI	N	SI-N	GI	Inc-SI	SI-N	SI	N/A	N	N	N	N/A	11.275
Mammal	*Dasycercus cristicauda*	Mulgara	N	SI	N	N	N-SD	N	N	N	N	N	N	N/A	N	N	U	U	0.3766667
Mammal	*Dasyurus geoffroii*	Western Quoll	N	Inc-SI	SI	Dec	N-SD	SD	SI-N	N	Dec	N	SD	N/A	N	N	SD	N/A	-5
Mammal	*Dasyurus maculatus gracili*	Spotted-tailed Quoll (	SI-N	SI	N	SD	Inc-SI	SI	SI	N	SD	N	N	N/A	N	N	SI-N	N/A	3.481667
Mammal	*Parantechinus apicalis*	Dibbler	SI-N	SI	SI	N-SD	N	N	SI	N	N-SD	N	SD	N/A	N	N	N	N/A	1.3666667
Mammal	*Pseudantechinus mimulus*	Carpentarian Antech	Inc-SI	Inc	N	N-SD	N	N	N	N	SI-N	N	N	N/A	N	N	U	SI-N	4.058333
Mammal	*Sminthopsis aitkeni*	Kangaroo Island Dun	N	GI	N	N	N	N	SI	N	N	SI	N	N/A	N	N	U	SI	5.2
Mammal	*Sminthopsis douglasi*	Julia Creek Dunnart	N	N	N	N	N	SI	SI	N	N	SI	N	N/A	N	N	N	N/A	2.683333
Mammal	*Rhinonicteris aurantius (Pilb*	Pilbara Leaf-nosed B	N	Inc-SI	N	SD-Dec	N	SI	N	N	Inc	N	N	N/A	N	N	U	N	0.775926
Mammal	*Lagorchestes hirsutus bern*	Rufous Hare-wallaby	Inc	GI	N	N-SD	N	SI	SI	N	SI-N	N	N	N/A	N	N	Inc	N/A	8.81
Mammal	*Lagorchestes hirsutus dorr*	Rufous Hare-wallaby	Inc	GI	N	N-SD	N	SI	SI	N	SI-N	N	N	N/A	N	N	Inc	N/A	8.81
Mammal	*Lagorchestes hirsutus unna*	Mala, Rufous Hare-W	N	N	N	N-SD	N	N	SI	N	N	N	N	N/A	N	N	N	N/A	0.721667
Mammal	*Macropus robustus isabellii*	Barrow Island Wallar	Inc	GI	N	SD-Dec	N	N	N	N	SI	N	N	N/A	N	N	Inc	N/A	6.095
Mammal	*Onychogalea fraenata*	Bridled Nail-tail Walla	N	N	N	N-SD	N	N	N	N	SD	N	N	N/A	N	N	N	N/A	-1.535
Mammal	*Petrogale lateralis lateralis*	Black-flanked Rock-v	SI	Inc-SI	SI	N-SD	N	N	N	N	SI	N	N	N/A	N	N	Inc-SI	N/A	5.605
Mammal	*Petrogale persephone*	Proserpine Rock-wal	SI-N	Inc	N	SD	N	Inc	SI-N	N	SI	N	N	N/A	N	N	Inc-SI	N/A	5.933333
Mammal	*Petrogale xanthopus xanth*	Yellow-footed Rock-v	N	SI	N	N	N	SI	N	N	SI	N	N	N/A	N	N	N	N/A	2.716667
Mammal	*Leporillus conditor*	Greater Stick-nest R	Inc	Inc	SI-N	N	N-SD	N-SD	N	N	SD	SI-N	N	N/A	N	N	U	SI-N	3.623333
Mammal	*Pseudomys australis*	Plains Rat	N	Inc-SI	N	SD	N	SI	SI	N	SD-Dec	N	N-SD	N/A	N	N	N	N/A	-0.25833
Mammal	*Pseudomys fieldi*	Shark Bay Mouse	Inc	Inc	N	N	N	N	N	N	SI	N	SD	N/A	N	N	U	SI-N	4.558333
Mammal	*Pseudomys fumeus*	Smoky Mouse	SI-N	Inc-SI	SI	N-SD	SI-N	N	SI-N	N	SD	N	N	N/A	N	N	U	SI-N	3.366667
Mammal	*Pseudomys oralis*	Hastings River Mous	N	SI	N	N	N	SI	SI-N	N	SD	N	N-SD	N/A	N	N	SI	N/A	2.573333
Mammal	*Pseudomys pilligaensis*	Pilliga Mouse	N	N	SI-N	SI-N	N	SI-N	SI-N	N	SD	N	N	N/A	N	N	U	N	1.2

Mammal	*Pseudomys shortridgei*	Heath Rat/Mouse	N	SI	Inc-SI	N	N	N	SI	N	SD	N	N	N/A	N	N	N-SD	N/A	1.733333
Mammal	*Xeromys myoides*	False Water Rat	SD	Inc	N	SD	N	Inc-SI	N	N	SD	N	N	N/A	N	N	U	N	0.5
Mammal	*Zyzomys palatalis*	Carpentarian Rock-ra	N	N	N	SD	N	Inc	SI	N	SI	N	N	N/A	N	N	U	SI-N	2.875
Mammal	*Myrmecobius fasciatus*	Numbat	N	N	SI	Dec	N	N	SI-N	N	SD	N	SI	N/A	N	N	N	N/A	-0.56667
Mammal	*Notoryctes caurinus*	Northern Marsupial M	N	N	N	SI	N	SI-N	SI-N	N	Inc-SI	N	N	N/A	N	N	U	N	4.495
Mammal	*Notoryctes typhlops*	Southern Marsupial M	N	SI	N	SI	N	SI-N	SI-N	N	Inc-SI	N	N	N/A	N	N	U	N	4.871667
Mammal	*Isoodon auratus auratus*	Golden Bandicoot (m	SI-N	Inc	N	SD	N	N	SI	N	N	N	SD	N/A	N	N	SI-N	N/A	2.035
Mammal	*Isoodon obesulus obesulus*	Southern Brown Ban	N	Inc-SI	SI	SD	N	N	SI	N	SD	N	SD	N/A	N	N	SI-N	N/A	1.133333
Mammal	*Perameles bougainville bou*	Western Barred Ban	Inc	Inc	N	SD	N	N	SI-N	N	N	N	SD	N/A	N	N	SI	N/A	3.535
Mammal	*Perameles gunnii gunnii*	Eastern Barred Band	N	Inc	N	SD	N	Inc-SI	SI	N	SD	N	SD	N/A	N	N	SI	N/A	2.366667
Mammal	*Perameles gunnii unnamed*	Eastern Barred Band	N	N	Inc	SD	N	Inc-SI	SI	N	SD	N	SD	N/A	N	N	N	N/A	1.995
Mammal	*Gymnobelideus leadbeater*	Leadbeaters Possum	N	SI-N	SI	N-SD	N	N	SI	N	SD	N	N	N/A	N	N	N	N/A	1.023333
Mammal	*Petaurus australis unname*	Yellow-bellied Glider	N	SI	N	SD	N	SI-N	SI-N	N	SD	SI	SI-N	N/A	N	N	N	N/A	1.358333
Mammal	*Potorous gilbertii*	Gilbert's Potoroo	GI	Inc	SI-N	SD	N	SI-N	SI-N	N	SD	N	N	N/A	N	N	SI	N/A	4.848333
Mammal	*Potorous longipes*	Long-footed Potoroo	N	Inc-SI	N	SD	N	Inc	N	N	SD	N	N	N/A	N	N	SI-N	N/A	2
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Pos	N	SI	SI	N	Inc-SI	N	SI-N	N	SD	SI	SI	N/A	N	N	N	N/A	3.848333
Mammal	*Pteropus poliocephalus*	Grey-headed Flying-f	N	Inc	N	Dec	N	N	N	N	SD-Dec	N	N	N/A	N	N	SI	N/A	-0.62167
Mammal	*Lasiorhinus krefftii*	Northern Hairy-nosed	N	N	N	N-SD	N	N	SI-N	N	Inc-SI	N	N	N/A	N	N	Inc	N/A	4.515
Mammal	*Vombatus ursinus ursinus*	Common Wombat (B	SI	GI	N	SD	N	SI	N	N	N	N	N	N/A	N	N	U	SI	5.26
Bird	*Aquila audax fleayi*	Wedge-tailed Eagle (	N	GI	N	Dec	N	N	N	N	SD	N	N	N/A	N	N	SI-N	N/A	0.378333
Bird	*Erythrotriorchis radiatus*	Red Goshawk	N	Inc	N	Dec	N	SI	N	N	SD	N	N	N/A	N	N	U	SI	0.67
Bird	*Cereopsis novaehollandiae*	Cape Barren Goose	N	Inc	N	SD-Dec	N	N	SI	N	SD	N	N	N/A	N	N	U	N	0.433333
Bird	*Atrichornis clamosus*	Noisy Scrub-bird	SI	Inc	SI	SD	N	SI	SI	N	SD	N	N-SD	N/A	N	N	U	SI	4.166667
Bird	*Casuarius casuarius johnsc*	Southern Cassowary	N	Inc-SI	N	Dec	N	Inc-SI	SI	N	SD-Dec	N	SD	N/A	N	N	U	N	-0.76667
Bird	*Psophodes nigrogularis nig*	Western Whipbird (V	SI	Inc-SI	SI	SD	N	N	SI	N	N-SD	N	N	N/A	N	N	U	Inc	4.906667
Bird	*Psophodes nigrogularis obe*	Western Whipbird (V	N	SI	SI	SD	N	N	SI	N	N-SD	N	N	N/A	N	N	U	N	1.7
Bird	*Geophaps scripta scripta*	Squatter Pigeon (Sou	N	SI	N	SD	N	N	N	N	SD	N	SD	N/A	N	N	U	SI-N	-1.7
Bird	*Geophaps smithii blaauwi*	Partridge Pigeon (W	SI-N	Inc	N	SD	N	SI	SI	N	SD	N	SD	N/A	N	N	U	N	1.17
Bird	*Geophaps smithii smithii*	Partridge Pigeon (Ea	SI-N	Inc	N	SD	N	SI-N	SI	N	SD	N	N	N/A	N	N	U	SI	2.881667
Bird	*Amytornis barbatus*	Grey Grasswren (Bu	N	SI	N	N	N	Inc	SI	N	N	N	SD	N/A	N	N	SI	N/A	3.013333
Bird	*Amytornis textilis modestus*	Thick-billed Grasswr	N	SI	N	N	N-SD	N	N	N	SD	N	SD	N/A	N	N	U	SI	-0.8
Bird	*Malurus coronatus coronat*	Purple-crowned Fairy	N	SI	N	N-SD	N	Inc-SI	N	N	SD	N	SD	N/A	N	N	N-SD	N/A	-1.575
Bird	*Malurus leucopterus edoua*	White-winged Fairy-v	Inc-SI	GI	N	N-SD	N	N	N	N	SD	N	N	N/A	N	N	SI-N	N/A	3.32
Bird	*Stipiturus mallee*	Mallee Emu-wren	N	N	N	SD-Dec	N	N	SI	N	N	N	SD	N/A	N	N	U	SI	-0.56667
Bird	*Leipoa ocellata*	Malleefowl	N	SI	SI	Dec	N-SD	SI	SI	N	N	N	SD	N/A	N	N	U	SI	1.533333
Bird	*Lichenostomus melanops c*	Helmeted Honeyeate	N	SI-N	SI	SD	N	Inc-SI	SI-N	N	SD	N	SD	N/A	N	N	U	Inc	2.633333
Bird	*Manorina melanotis*	Black-eared Miner	N	N	N	Dec	N	N	SI	N	N	N	N	N/A	N	N	U	SI	0
Bird	*Xanthomyza phrygia*	Regent Honeyeater	N	Inc-SI	N	Dec	N	N	N	N	SD	N	SD	N/A	N	N	U	SI	-1.865
Bird	*Falcunculus frontatus white*	Crested Shrike-tit (N	N	SI	N	N-SD	N	N	N	N	SD	N	N	N/A	N	N	U	N	-0.51167
Bird	*Pachycephala rufogularis*	Red-lored Whistler	N	N	N	Dec	N	N	SI	N	SD	N	N-SD	N/A	N	N	U	N	-2.83333
Bird	*Acanthiza iredalei iredalei*	Slender-billed Thornb	N	SI	N	SD	N-SD	N	N	N	SD	N	SD	N/A	N	N	U	SI-N	-2.135
Bird	*Dasyornis brachypterus*	Eastern Bristlebird	N	SI	N	SD	N	N	Inc-SI	N	SD-Dec	N	SD	N/A	N	N	N	N/A	-1.24333
Bird	*Dasyornis longirostris*	Western Bristlebird	N	SI	SI	SD	N	N	SI	N	SD	N	SD	N/A	N	N	U	SI-N	0.488333
Bird	*Pardalotus quadragintus*	Forty-spotted Pardal	SI	Inc	N	N-SD	N	N	SI-N	N	N-SD	GI-Inc	SD	N/A	N	N	U	SI	4.466667
Bird	*Neochmia phaeton evange*	Crimson Finch (Whit	N	SI	N	N-SD	N	SI	N	N	SD	N	SD	N/A	N	N	U	SI	-0.125
Bird	*Neochmia ruficauda ruficau*	Star Finch (Eastern)	N	SI	N	N-SD	N	SI	SI-N	N	SD	N	SD	N/A	N	N	U	Inc-SI	1.566667
Bird	*Poephila cincta cincta*	Black-throated Finch	N	SI	N	N-SD	N	SI	N	N	SD	N	SD	N/A	N	N	U	SI	0.158333
Bird	*Pedionomus torquatus*	Plains-wanderer	N	SI	N	Dec	N	N	N	N	N	N	SD	N/A	N	N	U	SI-N	-1.7
Bird	*Cacatua pastinator pastina*	Muir's Corella (South	N	N	N	Dec	N	N	N	N	SD	N	SD	N/A	N	N	U	Inc	-1.73333
Bird	*Calyptorhynchus banksii gr*	Red-tailed Black-coc	N	SI	N	Dec	N	N	SI	N	N	SI	SI	N/A	N	N	U	SI-N	2.166667
Bird	*Calyptorhynchus baudinii*	Baudin's Black-cock	N	Inc-SI	N	Dec	N	SI	N	N	SD	SI-N	SD	N/A	N	N	N	N/A	-0.84333
Bird	*Calyptorhynchus lathami ha*	Glossy Black-cockat	N	Inc	N	Dec	N	SI-N	SI	N	N	Inc-SI	Inc	N/A	N	N	U	Inc	6.133333
Bird	*Calyptorhynchus latirostris*	Carnaby's Black-coc	N	Inc	N	Dec	N	Inc-SI	N	N	SD	N	SD	N/A	N	N	U	SI	0.366667
Bird	*Cyclopsitta diophthalma co*	Coxen's Fig-parrot	N	Inc-SI	N	Dec	N	SI-N	N	N	SD	N	N-SD	N/A	N	N	U	Inc-SI	0.043333
Bird	*Lathamus discolor*	Swift Parrot	N	Inc	N	Dec	N	N	SI-N	N	SD	SI	SI	N/A	N	N	U	SI	3.108333
Bird	*Neophema chrysogaster*	Orange-bellied Parro	Inc	Inc-SI	N	Dec	N	N	SI-N	N	SD-Dec	N	N	N/A	N	N	U	Inc-SI	2
Bird	*Pezoporus occidentalis*	Night Parrot	N	SI	N	Dec	N-SD	Inc-SI	SI-N	N	SD	N	N	N/A	N	N	U	Inc-SI	-0.305
Bird	*Pezoporus wallicus flaviver*	Western Ground Par	SI-N	Inc-SI	N	Dec	N-SD	N	SI	N	SD	N	N	N/A	N	N	U	Inc-SI	0.966667
Bird	*Polytelis swainsonii*	Superb Parrot	N	SI	N	Dec	N	N	SI-N	N	SD	N	N	N/A	N	N	U	N	-2.1
Bird	*Psephotus chrysopterygius*	Golden-shouldered P	N	N	N	Dec	N	SI-N	SI	N	N	Inc	N	N/A	N	N	U	N	1.358333
Bird	*Turnix melanogaster*	Black-breasted Butto	N	Inc-SI	N	N-SD	N	SI	SI-N	N	SD	N	N-SD	N/A	N	N	U	SI-N	1.566667
Bird	*Turnix olivii*	Buff-breasted Button	N	SI	N	N-SD	N	N	SI-N	N	N	N	N-SD	N/A	N	N	U	SI-N	1.023333
Bird	*Tyto novaehollandiae melvi*	Masked Owl (Tiwi Isl	SI	GI	N	Dec	N	N	SI	N	SD	N	N	N/A	N	N	U	N	2.023333
Amphibian	*Litoria aurea*	Green and Golden B	SI-N	Inc	N	SD	N	Inc	SI-N	N	SD	N	N	N/A	N	N	SD	N/A	2.538333
Amphibian	*Litoria booroolongensis*	Booroolong Frog	N	SI	SI	N	N	SI-N	N	N	N	N	N	N/A	N	N	U	SI	4.395
Amphibian	*Litoria castanea*	Yellow-spotted Tree	N	SI	N	N	N	SI	N	N	SD	N	N	N/A	N	N	U	SI-N	1.951667
Amphibian	*Litoria lorica*	Armoured Mistfrog	N	Inc	N	SI-N	N	Inc-SI	N	N	N-SD	N	N	N/A	N	N	U	SI-N	3.563333
Amphibian	*Litoria olongburensis*	Wallum Sedge Frog	SI	Inc	N	N	N	Inc	SI	N	N	N	SI-N	N/A	N	N	U	SI	8.1
Amphibian	*Litoria piperata*	Peppered Tree Frog	N	Inc	N	N	N	SI-N	N	N	N	N	N	N/A	N	N	U	SI	4.905
Amphibian	*Litoria raniformis*	Growling Grass Frog	N	Inc	SI	SD	N	Inc	SI	N	SD	N	N-SD	N/A	N	N	SD	N/A	2.566667
Amphibian	*Litoria spenceri*	Spotted Tree Frog	N	SI	SI-N	SI	N	SI	N	N	SI	N	N	N/A	N	N	U	N	4.251667
Amphibian	*Litoria verreauxii alpina*	Alpine Tree Frog	N	Inc	N	N	Inc	SI	SI	N	SD	N	N	N/A	N	N	U	SI	6.14
Amphibian	*Geocrinia alba*	White-bellied Frog	N	Inc	N	Inc-SI	N	Inc	SI-N	N	SI-N	N	U	N/A	N	N	Inc-SI	N/A	5.88
Amphibian	*Geocrinia vitellina*	Orange-bellied Frog	N	SI	N	Inc-SI	N	Inc	SI-N	N	N	N	U	N/A	N	N	Inc-SI	N/A	4.745
Amphibian	*Heleioporus australiacus*	Giant Burrowing Frog	N	Inc	N	N	N	SI	N	N	SI-N	N	N	N/A	N	N	U	N	4.438333
Amphibian	*Mixophyes balbus*	Stuttering Frog	N	Inc-SI	N	N	SI-N	Inc-SI	SI	N	SI-N	N	U	N/A	N	N	U	SI-N	6.946667
Amphibian	*Philoria frosti*	Baw Baw Frog	N	SI	SI	SI-N	Inc	Inc-SI	N	N	SI-N	N	N	N/A	N	N	SD	N/A	5.451667
Amphibian	*Pseudophryne corroboree*	Southern Corroboree	N	Inc	N	N	Inc	Inc	SI	SI	SI-N	N	N	N/A	N	N	Inc-N-SD	N/A	8.686111
Amphibian	*Pseudophryne pengilleyi*	Northern Corroboree	N	SI	SI	N	Inc	Inc	SI	SI	SI	N	N	N/A	N	N	SI-SD	N/A	8.856667
Amphibian	*Spicospina flammocaerulea*	Sunset Frog	N	SI	N	SD	N	Inc	SI	N	SI	N	U	N/A	N	N	SI	N/A	3.61
Amphibian	*Taudactylus eungellensis*	Eungella Day Frog	N	SI	N	SI	N	SI	N	N	SD	N	U	N/A	N	N	U	SI	3.266667
Amphibian	*Taudactylus rheophilus*	Tinkling Frog	N	SI	N	SI	SI-N	SI	N	N	SI-N	N	U	N/A	N	N	U	Inc-SI	5.363333
Reptile	*Ctenophorus yinnietharra*	Yinnietharra Rock Dr	N	N	N	N-SD	N	N	SI-N	N	Inc	SI-N	N	N/A	N	N	U	SI	5.051667
Reptile	*Emydura signata*	Bellinger River Emyd	N	Inc	N	SD-Dec	N	SI-N	N	N	SD	N	SD	N/A	N	N	U	Inc-SI	0.5
Reptile	*Pseudemydura umbrina*	Western Swamp Tor	N	SI-N	SI	SD	N	Inc	SI	N	Inc-SI	N	N	N/A	N	N	U	Inc	7.666667
Reptile	*Denisonia maculata*	Ornamental Snake	N	SI	N	N-SD	SD	Inc-SI	SI	N	N	N	SI-N	N/A	N	N	U	N	2.566667
Reptile	*Hoplocephalus bungaroides*	Broad-headed snake	N	SI	SI	N	SI-N	N	N	N	SI	N	SI	N/A	N	N	U	N	5.573333
Reptile	*Aprasia parapulchella*	Pink-tailed legless liz	N	SI-N	Inc-SI	U	SI-N	SI-N	N	N	N	N	SI	N/A	N	N	U	N	4.995
Reptile	*Delma impar*	Striped legless lizard	N	SI	SI	SI	N	N	N	N	N-SD	N	N	N/A	N	N	U	SI	4.351667
Reptile	*Delma labialis*	Striped-tailed delma	SI	SI	N	U	SD	N	SI-N	N	SD	N	N	N/A	N	N	U	N	0.366667
Reptile	*Paradelma orientalis*	Brigalow Scaly-foot	N	N	N	U	N	N	N	N	SD	N	SI-N	N/A	N	N	U	N	-0.7
Reptile	*Ctenotus angusticeps*	Airlie Island Ctenotus	GI-Inc	Inc	N	U	N	N	N	N	SD	N	N	N/A	N	N	U	Inc-SI	5.725
Reptile	*Egernia rugosa*	Yakka skink	N	SI	N	SI	N	N	N	N	SD	N	SD	N/A	N	N	U	N	0
Reptile	*Egernia stokesii badia*	Western spiny-tailed	N	SI	SI	N	N	N	N	N	N-SD	SI-N	SD	N/A	N	N	U	SI-N	1.7
Reptile	*Eulamprus leuraensis*	Blue Mountains wate	N	SI	N	N	N	Inc	N	N	SI	SI	N	N/A	N	N	SI	N/A	7.633333

The first spreadsheet (Exposure %) gives the direct exposure data for each of the 213 species assessed. The percentages represent the percentage of the species range (SNES 2008) that falls within each climate exposure category. Categories represent the difference (absolute value) in mean annual temperature and difference in mean annual moisture index between the present time and 2050. Projections are made under the IPCC A1F scenario. Categories were based on the categories in Young et al (2011), but were adjusted for Australia. Percentages must sum to 100 for change in mean annual temperature and 100 for changes in mean annual moisture index. Climatic layers were generated using the Australian National University climate software package ANUCLIM (v6.1), based on a 9-second digital elevation model for Australia

The second spreadsheet (Sensitivity) gives the indirect exposure and sensitivity scores for each of the 213 species assessed. The scores are as follows: GI - greatly increased vulnerability; Inc - increased vulnerability; SI - somewhat increased vulnerability; N - neutral; SD - somewhat decreased vulnerability; Dec - decreased vulnerability. A score of U represents unknown, and N/A means that this factor cannot be scored for this species (eg. pollinator versatility cannot be scored for a animal). Not all scores are possible for each category. If a cell has multiple scores in it separated by a dash (eg. N-SIV), then the species was scored in multiple categories for this factor, which represents uncertainty. The final index value (calculated using direct and indirect exposure and sensitivity factors) is included.

						Movement		Potentially climate affected factors					Habitat			Interspecific Interactions				Genetic Factors		Phenological Response			
ID	Taxon	Common Name	Scientific Name	Conservation Status	Data status	Dispersal barrierers	Dispersal ability	Reliance on particular temperatures		Reliance on particular moisture		Reliance on disturbance regimes	Reliance on ice/snow-cover	Abiotic habitat	Reliance on other species for habitat	Dietary versatility	Pollinator versatility	Reliance on other species for propagule	Reliance on other species for other	Measured genetic variation	Signs of recent bottlenecks	Signs of phenological respone to climate change	Map ID	Data sources	Notes
1	Mammal	Northern Bettong	Bettongia tropica	Endangered	Good		Low dispersal between sub populations. normally stay		Can assess based on info in other		Can assess based on info in other columns (habitat	Food sources depend on association with fire	NA	Tall and medium open eucalypt forest with grassy	Requires eucalypt forest for primary food source	Hypogenous fungi (ie. truffles) are the	NA	Can assess based on info in other columns	Feral pigs compete for food source	mtDNA allele frequencies			214	http://w ww.envir	
2	Mammal	Mountain Pygmy Possu	Burramys parvus	Endangered	Good	When Mountain Pygmy possums cross	Mountain Pygmy-possums are largely restricted to discrete	It is physiologically	Can assess based on info in other		Can assess based on info in other columns (habitat	Increased fire frequency linked to climate change could also lead to the	The Mountain Pygmy-possum is	The total area of occupancy is estimated to be less than 7	The shrubby heathland associated with Mountain	The boulderfields are also used as	NA	Can assess based on info in other columns	In the Kosciuszko National Park	The populations exhibit high levels		Increased temperatures can affect Mountain Pygmy-	267	http://w ww.envir	
3	Mammal	Mulgara	Dasycercus cristicaud	Vulnerable	Good		Particularly in resource-poor sand country, many small	Numbers fluctuate	Can assess based on info in other		Can assess based on info in other columns (habitat	Finally, there is contrasting evidence regarding the impact of the fire age of	NA	During the day - shelter in burrows around 0.5m deep,		Both insectivorous and carnivorous	NA	Can assess based on info in other columns	Both species are threatened by fox				328	http://w ww.mreta	Originally only one species of
4	Mammal	Western Quoll	Dasyurus geoffroii	Vulnerable	Good		Juvenile female Chuditch remain close to the maternal home	Pouliquen-Young (1999) predicted	Can assess based on info in other		Can assess based on info in other columns (habitat	Chuditch are capable of surviving the current prescribed burning regimes	NA	Now known only from Western Australia where it		The diet of Chuditch is predominantly	NA	Can assess based on info in other columns	Threatened by predation by foxes	Despite severe range contraction,			330	http://w ww.envir	
5	Mammal	Spotted-tailed Quoll (N	Dasyurus maculatus g	Endangered	Good	Habitat loss, modification and	The Spotted-tailed Quoll (North Queensland subspecies) are		Can assess based on info in other		Can assess based on info in other columns (habitat	Habitat loss, modification and fragmentation are serious threats to	NA	Historically, the Spotted-tailed Quoll (North Queensland		The Spotted-tailed Quoll (North	NA	Can assess based on info in other columns	Threatened by predation and	Genetic studies have been			64475	http://w ww.envir	Subspecies may be a result of
6	Mammal	Dibbler	Parantechinus apicalis	Endangered	Good		Radio-tracking of Dibblers in Fitzgerald River National Park		Can assess based on info in other		Can assess based on info in other columns (habitat	The Dibbler's need for long-unburnt vegetation may be related to high	NA	Dibblers have been recorded over an extensive area and it		Analysis of Dibbler scats from	NA	Can assess based on info in other columns	Introduced predators, such as	while large dasyurids,			313	http://on linelibrar	
7	Mammal	Carpentarian Antechin	Pseudantechinus mim	Vulnerable	Good		Info from paper on dispersal in antechinus spp. (not this		Can assess based on info in other		Can assess based on info in other columns (habitat	However, there is little or no specific information about the response of the	NA	The carpentarian antechinus is known from three broadly-		Considered fairly solitary, and	NA	Can assess based on info in other columns		A much broader morphological and	The carpentarian antechinus is known		59283	http://on linelibrar	Lack of information on
8	Mammal	Kangaroo Island Dunn	Sminthopsis aitkeni	Endangered	Good		As with other dunnarts (Kitchener et al. 1984), the		Can assess based on info in other		Can assess based on info in other columns (habitat	The Kangaroo Island Dunnart is threatened by severe isolation of its	NA	This species is found in the western half of Kangaroo	Limited radio-tracking data showed that a range of	Ground-dwelling invertebrates are	NA	Can assess based on info in other columns	The first records of this species were	* Not available	If a catastrophic event should occur on		300	http://w ww.envir	
9	Mammal	Julia Creek Dunnart	Sminthopsis douglasi	Endangered	Good		The species appears to be highly mobile, although it occupies		Can assess based on info in other		Can assess based on info in other columns (habitat	Unpredictable events such as heavy, prolonged rainfall which can cause	NA	The habitat for this species is predominantly Mitchell Grass	The habitat requirements of S. douglasi ensure that	It is a carnivorous species that feeds	NA	Can assess based on info in other columns	Prickly acacia threatens the	Here we characterize seven	Population status, size and trend are		305	http://on linelibrar	
10	Mammal	Pilbara Leaf-nosed Bat	Rhinonicteris aurantiu	Vulnerable	Good	Two flat areas devoid of the deep caves that	More recently, several occurrences of the Pilbara Leaf-		Can assess based on info in other		Can assess based on info in other columns (habitat		NA	The Pilbara Leaf-nosed Bat, however, is restricted to the		Foraging habitat is diverse owing to the	NA	Can assess based on info in other columns		The genetic difference	There is evidence for a small decline in area		66887	http://w ww.envir	Recently diverged,
11	Mammal	Rufous Hare-wallaby (B	Lagorchestes hirsutus	Vulnerable	Good		The seasonal patterns of local L. hirsutus dispersion, therefore,		Can assess based on info in other		Can assess based on info in other columns (habitat	The patchiness of habitat was found to be important for the captive	NA	On Bernier Island, the subspecies is found in dune		The Rufous Hare-wallaby has a diet	NA	Can assess based on info in other columns		Values of He and A were significantly	The main identified threats to the Rufous	This ability to recognise and respond to change within	66662	http://on linelibrar	Subspecies of Rufous hare-
12	Mammal	Rufous Hare-wallaby (Dorre Island)	Lagorchestes hirsutus	Vulnerable	Good		The seasonal patterns of local L. hirsutus dispersion, therefore,		Can assess based on info in other		Can assess based on info in other columns (habitat	The patchiness of habitat was found to be important for the captive	NA	On Dorre Island, the subspecies is found in dune		The Rufous Hare-wallaby has a diet	NA	Can assess based on info in other columns		Values of He and A were significantly	The main identified threats to the Rufous	This ability to recognise and respond to change within	66663	http://on linelibrar	
13	Mammal	Mala, Rufous Hare-Wallaby (central	Lagorchestes hirsutus	Vulnerable	Good		The seasonal patterns of local L. hirsutus dispersion, therefore,		Can assess based on info in other		Can assess based on info in other columns (habitat	The patchiness of habitat was found to be important for the captive	NA	On Bernier and Dorre Islands the rufous hare-wallaby is	These studies show that mala are dependent upon	The diet is flexible and allows the	NA	Can assess based on info in other columns		Values of He and A were significantly	The main identified threats to the Rufous		66640	http://on linelibrar	The mala now survives on
14	Mammal	Barrow Island Wallaro	Macropus robustus is	Vulnerable	Good		COMMON WALLAROO DATA - A single dispersal event was		Can assess based on info in other		Can assess based on info in other columns (habitat	Threats The main identified threats to the	NA	The Barrow Island is a small, limestone island dominated		The Barrow Island Wallaroo is	NA	Can assess based on info in other columns		Eldridge M.D.B, Kine, J.M.	It occurs on the island at densities of 8		26196	http://w ww.esaio	The Barrow Island Wallaroo
15	Mammal	Bridled Nail-tail Wallab	Onychogalea fraenata	Endangered	Good		Bridled Nail-tail Wallabies are solitary in behaviour (Evans		Can assess based on info in other		Can assess based on info in other columns (habitat		NA	The Bridled Nail-tail Wallaby previously occupied Acacia		A study at Taunton NP found diet to be	NA	Can assess based on info in other columns		Combinations of primers developed	At the time of European settlement,		239	http://w ww.sprin	
16	Mammal	Black-flanked Rock-wa	Petrogale lateralis late	Vulnerable	Good	Migration is unlikely since Barrow Island is	The local resource competition hypothesis predicts that the sex		Can assess based on info in other		Can assess based on info in other columns (habitat	Changes in fire regimes have been implicated in the demise of some	NA	The habitat of this subspecies varies in detail from colony to		Grasses, herbs, leaves and fruits.	NA	Can assess based on info in other columns	P. l. lateralis. Subspecies with	Our results indicate that the	Subspecies with largest range decline.		66647	http://w ww.publi	Subspecies of Black-footed
17	Mammal	Proserpine Rock-wallal	Petrogale persephone	Endangered	Good		Proserpine Rock-wallabies are essentiallly nocturnal. and do		Can assess based on info in other		Can assess based on info in other columns (habitat	Although the Proserpine Rock-wallaby inhabits rainforest. wildfires could	NA	The Proserpine Rock-wallaby is the only species of Rock-		The Proserpine Rock-wallaby is	NA	Can assess based on info in other columns	Anthropogenic climate change is	A diminished breeding pool	The Proserpine Rock-wallaby has the		226	http://w ww.envir	
18	Mammal	Yellow-footed Rock-wa	Petrogale xanthopus x	Vulnerable	Good		Home ranges measured by radio telemetry at Middle Gorge,		Can assess based on info in other	Evidence is emerging to suggest that both resource	Can assess based on info in other columns (habitat	No mention of large problems with fire, though fire management is	NA	The Yellow-footed Rock-wallaby inhabits rocky		In a detailed study at Middle Gorge,	NA	Can assess based on info in other columns		Genetic studies confirm the close	Based upon these figures, the current		66646	http://w ww.publi	
19	Mammal	Greater Stick-nest Rat	Leporillus conditor	Vulnerable	Good		The two heaviest females exhibited no home range		Can assess based on info in other	Fire has never had as pervasive an influence across	Can assess based on info in other columns (habitat	Habitat destruction, initially by sheep and later compounded by rabbits.	NA	The Greater Stick-nest Rat inhabits perennial shrublands.		The greater stick-nest rat is	NA	Can assess based on info in other columns	Threats include foxes and	Animals from the Franklin Island	Endangered: N<2500 individuals: <5		137	http://w ww.publi	
20	Mammal	Plains Rat	Pseudomys australis	Vulnerable	Good		Home ranges of radio-collared animals averaged 1850 m² in		Can assess based on info in other		Can assess based on info in other columns (habitat	All reported sightings of the species since the 1930s have followed	NA	The Plains Rat is primarily found in gibber (stone-		The major component of the	NA	Can assess based on info in other columns		These genetic-distance values fall	The current distribution of the		108	http://w ww.publi	
21	Mammal	Shark Bay Mouse	Pseudomys fieldi	Vulnerable	Good		Home range of 3.8 (7.0)ha [P. Speldewinde, unpublished data]		Can assess based on info in other		Can assess based on info in other columns (habitat	The advent of the pastoral industry is closely associated with the date of last	NA	On Bernier Island, the Shark Bay mouse inhabits coastal		Little is known of the diet of the Shark	NA	Can assess based on info in other columns	easons for the decline of the	Lack of Info	Prior to June 1993, P. fieldi was known to be		113	http://w ww.publi	
22	Mammal	Smoky Mouse	Pseudomys fumeus	Endangered	Good		A dietary dependence on fruit and seed provided by relatively		Can assess based on info in other		Can assess based on info in other columns (habitat	Major threats to the species include predation by introduced carnivores.		The Smoky Mouse occurs in a variety of vegetation	Dieback of susceptible heath species caused by	Seed and fungi were the dominant food	NA	Can assess based on info in other columns		The Smoky Mouse occurs in small.	The species has a relatively wide but		88	http://w ww.envir	
23	Mammal	Hastings River Mouse	Pseudomys oralis	Endangered	Good		Genetic data indicate that long range movement and		Can assess based on info in other		Can assess based on info in other columns (habitat	High frequency fire is listed as a KTP under the TSC Act and is considered to	NA	The Hastings River Mouse inhabits open forests and		The diet of the Hastings River	NA	Can assess based on info in other columns		Genetic studies using	Evidence from fossil and sub-fossil		98	http://w ww.publi	
24	Mammal	Pilliga Mouse	Pseudomys pilligaensi	Vulnerable	Good		Tokushima and Jarman (2008) measured average movement		Can assess based on info in other		Can assess based on info in other columns (habitat	The preferences of the Pilliga Mouse in four post-fire successional stages of	NA	No specific habitat type has been identified for the Pilliga		Seed is the main food of the Pilliga	NA	Can assess based on info in other columns		Lack of info	The Pilliga Mouse is known only from the		99	http://se arch.infor	Recent genetic work suggests
25	Mammal	Heath Rat/Mouse	Pseudomys shortridge	Vulnerable	Good		In Victoria, the heath mouse prefers areas of recently burnt		Can assess based on info in other		Can assess based on info in other columns (habitat	The heath rat, Pseudomys shortridgei (Thomas). has been shown to prefer	NA	The preferred habitat of this species is variable. In Western		Dietary information exists for animals	NA	Can assess based on info in other columns		Genetic studies from the two			77	http://w ww.publi	
26	Mammal	False Water Rat	Xeromys myoides	Vulnerable	Good		The Water Mouse has been observed to travel relatively		Can assess based on info in other		Can assess based on info in other columns (habitat	The discovery of a nest mound exposed by fire on an island in the	NA	Although the Water Mouse had been documented in		The diet of the Water Mouse has	NA	Can assess based on info in other columns		Lack of info.	The population size of water mouse in		66	http://w ww.envir	
27	Mammal	Carpentarian Rock-rat	Zyzomys palatalis	Endangered	Good		There is no significant difference in the size of the		Can assess based on info in other		Can assess based on info in other columns (habitat	Annual and more frequent fires are considered a threat to the monsoonal	NA	The Carpentarian Rock-rat is a nocturnal rodent. sheltering		The species has been recorded	NA	Can assess based on info in other columns		Lack of info.	The Carpentarian Rock-rat is known from just		25907	http://w	
28	Mammal	Numbat	Myrmecobius fasciatu	Vulnerable	Good		Females occupy exclusive home ranges but overlap with those of		Can assess based on info in other		Can assess based on info in other columns (habitat	Factors contributing to the species decline include altered fire regime,	NA	The remaining populations of the Numbat are in eucalypt		The Numbat feeds exclusively on	NA	Can assess based on info in other columns		Total haplotype diversity (Nei	The Numbat was originally widespread		294	http://w ww.publi	
29	Mammal	Northern Marsupial M	Notoryctes caurinus	Endangered	Good	Continuity of suitable habitat is also likely to	Marsupial moles are not capable of travelling far across		Can assess based on info in other		Can assess based on info in other columns (habitat	Other concerns include changed fire regimes. and trampling and habitat	NA	The Marsupial Mole is a blind marsupial which is adapted to		Information on the diet of marsupial	NA	Can assess based on info in other columns		Recent genetic (S Donnellan and S	Specimens of N. caurinus have been		295	http://w ww.envir	
30	Mammal	Southern Marsupial M	Notoryctes typhlops	Endangered	Good	Continuity of suitable habitat is also likely to	Marsupial moles are not capable of travelling far across		Can assess based on info in other		Can assess based on info in other columns (habitat	Other concerns include changed fire regimes. and trampling and habitat	NA	Very little is known about the habitat requirements of either		Information on the diet of marsupial	NA	Can assess based on info in other columns		Recent genetic (S Donnellan and S	Notoryctids have also been recorded from		296	http://w ww.envir	
31	Mammal	Golden Bandicoot (ma	Isoodon auratus aurat	Vulnerable	Good		On Marchinbar Island, home ranges vary from 4.4 ha to 35		Can assess based on info in other		Can assess based on info in other columns (habitat	Recently, the Northern Brown Bandicoot has been reported to be	NA	Until the 1930s this species was widespread throughout a		Based on scat analysis of Golden	NA	Can assess based on info in other columns		The two subspecies of	The approximate area of occupancy of the		66665	http://w ww.sprin	*Isoodon* is currently
32	Mammal	Southern Brown Bandi	Isoodon obesulus obe	Endangered	Good		Southern Brown Bandicoots demonstrate a high level of		Can assess based on info in other		Can assess based on info in other columns (habitat	Many of the habitats occupied by Southern Brown Bandicoots (eastern)	NA	Southern Brown Bandicoots (eastern) are known to inhabit		The Southern Brown Bandicoot	NA	Can assess based on info in other columns		Isoodon obesulus had heterozygosity	The southern brown bandicoot (Isoodon		68050	http://w ww.envir	The Southern Brown
33	Mammal	Western Barred Bandic	Perameles bougainvill	Endangered	Good		Males occupy larger home ranges (2.5 to 14.2 hectares)		Can assess based on info in other		Can assess based on info in other columns (habitat	Maxwell et al. (1996) list predation by cats and foxes, modification of	NA	An inhabitant of semi-arid and arid areas, mainland		Invertebrates, seeds, roots and	NA	Can assess based on info in other columns		He estimates for different	Populations were once distributed from		66631	http://w ww.sprin	
34	Mammal	Eastern Barred Bandic	Perameles gunnii guni	Vulnerable	Good		Heinsohn (1966) found home ranges of females averaged 3.24		Can assess based on info in other		Can assess based on info in other columns (habitat	The effect of drought on Eastern Barred Bandicoot populations is not	NA	The Eastern Barred Bandicoot (Tasmania) occurs in open		The main food items of the Eastern	NA	Can assess based on info in other columns		Although it appears that	The Eastern Barred Bandicoot (Tasmania)		66651	http://on linelibrar	The justification for considering
35	Mammal	Eastern Barred Bandic	Perameles gunnii unn	Endangered	Good		Limited data on dispersal of the Eastern Barred Bandicoot would		Can assess based on info in other		Can assess based on info in other columns (habitat	The effect of drought on Eastern Barred Bandicoot populations is not	NA	On mainland Australia the original habitat of the Eastern		The Eastern Barred Bandicoot feeds	NA	Can assess based on info in other columns		Although it appears that	The original wild population is now		66641	http://w ww.envir	The justification for considering
36	Mammal	Leadbeaters Possum	Gymnobelideus leadb	Endangered	Good		Leadbeater's Possum is a communally-nesting species and		Can assess based on info in other		Can assess based on info in other columns (habitat	Wildfires were predicted to have a major negative effect on the	NA	Optimum habitat of Leadbeater's Possum is young	The occurrence of large wildfires is also a key	The food requirements of	NA	Can assess based on info in other columns		He estimates of leadbeaters	No bottleneck scenario reproduced		273	http://on linelibrar	
37	Mammal	Yellow-bellied Glider (\	Petaurus australis unr	Vulnerable	Good		Home range size was estimated to be over 30 ha (Russell 1984)		Can assess based on info in other		Can assess based on info in other columns (habitat	Therefore, the conservation of the yellow-bellied glider in north	NA	The Yellow-bellied Glider inhabits tall open forest on	While sap from Eucalyptus resinifera is the most	There are two detailed studies of	NA	Can assess based on info in other columns		It is difficult to make direct	Estimates of population density are		66668	http://w ww.publi	This subspecies occurs in
38	Mammal	Gilbert's Potoroo	Potorous gilbertii	Critically Endangered	Good		Gilbert's Potoroo is nocturnal, emerging at dusk from their		Can assess based on info in other		Can assess based on info in other columns (habitat	The only known wild population of Gilbert's Potoroo exists in dense, long	NA	The captive colony was established at least partly to		Gilbert's Potoroo diet is unusual for a	NA	Can assess based on info in other columns	It digs for fruiting bodies of	Mean heterozygosity at	The extent of occurrence for		66642	http://w ww.sprin	
39	Mammal	Long-footed Potoroo	Potorous longipes	Endangered	Good		The home range of the Long-footed Potoroo is between 22		Can assess based on info in other		Can assess based on info in other columns (habitat	Wildfires and prescribed burning are likely to be detrimental to Long-footed	NA	The habitat of the Long-footed Potoroo includes		The Long-footed Potoroo needs a	NA	Can assess based on info in other columns	The diversity of fungal species in	The three populations of	The three main populations of the		217	http://on linelibrar	
40	Mammal	Western Ringtail Possu	Pseudocheirus occide	Vulnerable	Good		The home range of the Western Ringtail Possum is considered	DEWHA (2009) note that	Can assess based on info in other	South-west Western Australia is one of the most	Can assess based on info in other columns (habitat	Fires and their intensity, extent, frequency and seasonality differed	NA	Western Ringtail Possums occur in and near coastal	Western Ringtail Possums have been significantly	The diet of the Western Ringtail	NA	Can assess based on info in other columns		We report on the development of 14	Population numbers are unknown (there		25911	http://w ww.sprin	
41	Mammal	Grey-headed Flying-fo	Pteropus poliocephalu	Vulnerable	Good		The Grey-headed Flying-fox is highly mobile (Menkhorst 1995;		Can assess based on info in other		Can assess based on info in other columns (habitat	Research on black flying fox: We propose that the initial colonization of	NA	The Grey-headed Flying-fox requires foraging resources		The Grey-headed Flying-Fox has a	NA	Can assess based on info in other columns		The national population of the	Population numbers last estimated in 2005		186	http://jo urnals.ca	
42	Mammal	Northern Hairy-nosed	Lasiorhinus krefftii	Endangered	Good		It has been reported that at least 50% of adult females		Can assess based on info in other		Can assess based on info in other columns (habitat	Epping Forest National Park receives low rainfall and is regularly subjected	NA	The Northern Hairy-nosed Wombat occurs in semi-arid		The diet of the Northern Hairy-	NA	Can assess based on info in other columns		Analysis of genetic variability	Fossil records show this species was once		198	http://w ww.envir	
43	Mammal	Common Wombat (Ba	Vombatus ursinus urs	Vulnerable	Good		Genetic analyses presented here provide convincing evidence of		Can assess based on info in other		Can assess based on info in other columns (habitat	The immediate impact of the fire varied across animal groups (Fig. 4).	In 2003, wombats survived bushfires	The Common Wombat (Bass Strait) inhabits heath. grassy		The diet of the wombat is	NA	Can assess based on info in other columns		No genetic studies of this subspecies	The Common Wombat (Bass Strait) is		66644	http://on linelibrar	
44	Reptile	Yinnietharra Rock Drag	Ctenophorus yinnieth	Vulnerable	Good				Can assess based on info in other		Can assess based on info in other columns (habitat	The main identified threats to the Yinnietharra Rock-dragon include	NA	Generally occurs in tall open shrubland. Inhabits granite			N/A	N/A			Occurs within an area of approximately 35		1603	http://w ww.envir	
45	Reptile	Bellinger River Emydur	Emydura signata	Vulnerable	Good		A honours study done on Emydura macquarrie suggested		Can assess based on info in other		Honours work on Emydura macquarie said: more	The three major threats to the Bellinger River Emydura have been	NA	The turtles near Thora occupy several long, deep pools along	Riparian vegetation is a significant component of	This is an omnivorous turtle,	N/A	N/A			Population in Bellinger River, north-eastern		1785	http://w ww.canb	
46	Reptile	Western Swamp Tortoi	Pseudemydura umbri	Critically Endangered	Good		Homing behaviour suggests the tortoises do have home ranges,		Feeding only occurs when		The Western Swamp Tortoise is restricted to feeding in	The decline of the Western Swamp Tortoise is believed to be due to a	NA	clay-based swamps that the recovery team considered to		The inspection of one dead female	N/A	N/A	Predation of eggs by European Red		The Western Swamp Tortoise has a very		1760	http://w ww.envir	
47	Reptile	Ornamental Snake	Denisonia maculata	Vulnerable	Good				The optimal climatic		The Ornamental Snake is most likely to be	The Ornamental Snake is most likely to be encountered by searching in and	NA	The Ornamental Snake's preferred habitat is within, or	Ornamental Snake habitat is likely to be found in	The diet of this species consists	N/A	N/A	As the Ornamental Snake has a diet		The species is known only from the		1193	http://w ww.envir	
48	Reptile	Broad-headed snake	Hoplocephalus bunga	Vulnerable	Good		In rocky habitat, snakes moved on 16% of days (n = 30) and		Snakes prefer sites with a west				NA	The Broad-headed Snake is often found in rocky outcrops	In woodland, snakes shelter in hollows in a	The Broad-Headed snake is an ambush	N/A	N/A	The presence of beak marks on the		Clearance of habitat has resulted in		1182	http://w ww.envir	
49	Reptile	Border Thick-tailed gec	Underwoodisaurus sp	Vulnerable	DATA DEFICIENT							The main identified threats to the Border Thick-tailed Gecko include	NA	Occurs in dry sclerophyll open forest and woodland			N/A	N/A			Known populations occur in Mount		1660	http://w ww.envir	
50	Reptile	Pink-tailed legless lizar	Aprasia parapulchella	Vulnerable	Good		Lack of info.				The activity of the lizards is apparently affected by	Very little is known about the influence of fire on populations of A.	NA	In general, lizards occur in open grassland habitats that	Some specimens have been collected from	A dietary specialist, consuming adults,	N/A	N/A		These two loci had alleles that	This lizard is known from four sites in		1665	http://w ww.tams.	
51	Reptile	Striped legless lizard	Delma impar	Vulnerable	Good		Individuals have been recorded moving at least 20 m in one day					Burning is not necessarily negative for the species and in most situations a	NA	Striped Legless Lizards may use refuges within or	Delma impar is a grassland specialist, being found	Studies of the diet of the Striped	N/A	N/A	It is assumed that a range of native	Lack of info.	The Striped Legless Lizard was formerly		1649	http://w ww.tams.	
52	Reptile	Striped-tailed delma	Delma labialis	Vulnerable	Good		The species is considered wary and difficult to detect		The species is more likely to be			Inappropriate fire regimes are listed as a key threatening process.	NA	The Striped-tailed Delma has been found in a variety of	The Striped-tailed Delma has been recorded in	Active during the day, the species	N/A	N/A		Lack of info.	The Striped-tailed Delma has been found		25930	http://w ww.iucnr	
53	Reptile	Brigalow Scaly-foot Liz	Paradelma orientalis	Vulnerable	Good		The Brigalow Scaly-foot is a nocturnal species. Tremul		On Boyne Island, lizards are active			Fire frequency, intensity, season, type and extent over time influence	NA	The species occurs within the following Queensland	The species is known to persist in highly disturbed	Sap from Hickory Wattle forms a	N/A	N/A	The Brigalow Scaly-foot is vulnerable	Lack of info.	The known distribution of the		59134	http://w ww.envir	
54	Reptile	Airlie Island Ctenotus	Ctenotus angusticeps	Vulnerable	Good				On Airlie Island, the species was			The main identified threats to the Airlie Island Ctenotus include invasion	NA	The Airlie Island Ctenotus is found in shrubland (Browne-	The Airlie Island Ctenotus is found in Acacia coriacea	The Airlie Island Ctenotus feeds on	N/A	N/A		The genetic status of the	The Airlie Island Ctenotus is known		25937	http://w ww.envir	
55	Reptile	Yakka skink	Egernia rugosa	Vulnerable	Good		These skinks exhibit high site-fidelity and are limited in their					The Yakka Skink exhibits high site-fidelity, low fecundity and are long-	NA	The Yakka Skink is known to occur in open dry sclerophyll	Brigalow (Acacia harpophylla), Mulga (A.	The Yakka Skink is omnivorous,	N/A	N/A	Feral animal impacts include		The known distribution of the		1420	http://w ww.ehp.q	
56	Reptile	Western spiny-tailed sl	Egernia stokesii badia	Endangered	Good		Info from the species (not the subspecies): " The study					As much of the distribution of the subspecies occurs in the wheatbelt,	NA	Populations persist in woodland patches as small as	Most of the brown form of the Western Spiny-tailed	The diet of the Western Spiny-	N/A	N/A			Prior to 1960, the Western Spiny-tailed		64483	http://w ww.envir	The Western Spiny-tailed
57	Reptile	Blue Mountains water	Eulamprus leuraensis	Endangered	Good	owever, E. leuraensis is a specialized semi-	The Blue Mountains Water Skink is semi-aquatic (Wells and				The species is restricted to isolated and naturally	The small number, and apparent isolation of populations in conjunction	NA	Wells & Wellington 1984). In the Blue Mountains the skink	Increased numbers of Blue Mountains Water Skinks	The diet of the Blue Mountains Water	N/A	N/A	Predation from cats (LeBreton in	However, it is not known whether	Thirty populations of the Blue Mountains		59199	http://on linelibrar	
58	Bird	Wedge-tailed Eagle (Ta	Aquila audax fleayi	Endangered	Good	There have been no records of eagles	No specific figures are available on the size of home ranges					The Wedge-tailed Eagle (Tasmanian) is unlikely to be severely affected by any	N/A		The Wedge-tailed Eagle (Tasmanian) inhabits	The Wedge-tailed Eagle is				Adults are resident all year although	The extent of occurrence is		64435	http://w ww.envir	
59	Bird	Red Goshawk	Erythrotriorchis radiat	Vulnerable	Good		Interestingly, multiplying the estimated 1000 breeding Red				The Red Goshawk breeds solitarily, in forested or	fire, and changed burning regimes have the potential to impact breeding	N/A		The Red Goshawk occurs in coastal and sub-coastal	he Red Goshawk's diet is 95% birds. An				Apparent lack of info.	There appears to have been a recent coastal		942	http://w ww.envir	
60	Bird	Cape Barren Goose (Sc	Cereopsis novaehollar	Vulnerable	Good		Tasmania - O b s e r v a t i o n s h a v e b e e n m a d e o n t h		The population size declined			The population size declined considerably in 1991 during a period	N/A		The Cape Barren Goose (south-western) is most	In Tasmania: The Cape Barren Goose				Lack of info.	The total population is estimated at 650		25978	http://w ww.publi	

61	Bird	Noisy Scrub-bird	Atrichornis clamosus	Vulnerable	Good	The Noisy Scrub-bird is incapable of	The Noisy Scrub-bird is sedentary (Higgins et al. 2001).	Climate change is a potential threat to the Noisy Scrub-	Post-fire age appears to be an important determinant of habitat	N/A		The Noisy Scrub-bird inhabits ecological	The diet of the Noisy Scrub-bird is				Possibly availiable in: "Cowen S	The Noisy Scrub-bird occurs at two	654	http://sc holar.goo	
62	Bird	Southern Cassowary	Casuarius casuarius jc	Endangered	Good		Southern Cassowaries are considered to be sedentary	The distribution of the species is constrained by the	Climatic conditions can threaten Southern Cassowaries, for example, by	N/A		The Southern Cassowary generally requires dense	Southern Cassowaries forage				While no genetic data has been	The extent of occurrence of the	25986	Degnan, S. and C.	
63	Bird	Western Whipbird (We	Psophodes nigrogular	Endangered	Good		The Western Whipbird (western mallee) is probably sedentary.		The main threats to the Western Whipbird (western mallee) are habitat	N/A	Parker & Reid (1979) summarised the habitat in	The preferred habitat is thicket, a two to three	The Western Whipbird (western				Information lacking.	The Western Whipbird Psophodes	64449	http://lap too.deh.g	
64	Bird	Western Whipbird (We	Psophodes nigrogular	Vulnerable	Good		The Western Whipbird (western mallee) is probably sedentary.		The main threats to the Western Whipbird (western mallee) are habitat	N/A	Parker & Reid (1979) summarised the habitat in	The Western Whipbird (western mallee), occurs in	The Western Whipbird (western				Information lacking.	In a detailed survey in south-west Western	64686	http://w ww.publi	
65	Bird	Squatter Pigeon (South	Geophaps scripta scri	Vulnerable	Good		The Squatter Pigeon (southern) is said to be resident around the		It has been suggested that drought and bushfires may exacerbate the	N/A		The Squatter Pigeon (southern) occurs mainly	The Squatter Pigeon (southern) feeds on				Lack of info.	Historically, the extent of occurrence appears	64440	http://w ww.envir	
66	Bird	Partridge Pigeon (Wes	Geophaps smithii bla	Vulnerable	Good		The movements of the Partridge Pigeon (western) are essentially	The Partridge Pigeon (western) is also dependent	The only threats to the Partridge Pigeon (western) that have been	N/A		The Partridge Pigeon (western) occurs primarily	The Partridge Pigeon (western)				Lack of info.	The extent of occurrence is	66501	http://w ww.envir	
67	Bird	Partridge Pigeon (East	Geophaps smithii smi	Vulnerable	Good		The Partridge Pigeon is relatively sedentary. If there is		Land use activities such as vegetation clearing, overgrazing and particularly	N/A		The eastern subspecies of the Partridge Pigeon lives	he eastern subspecies of the				Lack of info.	There are no reliable estimates of the size	64441	http://w ww.envir	
68	Bird	Grey Grasswren (Bullo	Amytornis barbatus	Vulnerable	Good		The Grey Grasswren is described, at the species level,	The Grey Grasswren (Bulloo) occurs on floodplains in the	Drought exacerbates the extent of habitat loss and degradation (Hardy	N/A		The Grey Grasswren (Bulloo) occurs on	The diet of the Gray Grasswren (Bulloo)				Differentiation is not evident in	The extent of occurrence is	67065	http://w ww.publi	
69	Bird	Thick-billed Grasswren	Amytornis textilis mod	Vulnerable	Good		The eastern subspecies of the Thick-billed Grasswren is		In Western Australia, A .t. textilis occupies successional habitats at least	N/A		The eastern subspecies of the Thick-billed Grasswren	The eastern subspecies of the				lack of info.	The eastern subspecies of the	59460	http://14 1.243.32.	
70	Bird	Purple-crowned Fairy-	Malurus coronatus co	Vulnerable	Good	As populations of Purple-crowned Fairy-	As populations of Purple-crowned Fairy-wren (western)	The Purple-crowned Fairy-wren (western) occurs along	There is some potential for extensive flooding or a large fire, especially at	N/A		The Purple-crowned Fairy-wren (western) inhabits	The Purple-crowned Fairy-wren				Microsatellite heterozygosity was	he extent of occurrence is	64442	http://w ww.rug.n	
71	Bird	White-winged Fairy-wr	Malurus leucopterus	Vulnerable	Good		The White-winged Fairy-wren (Barrow Island) is considered to		There are no clear immediate threats to the White-winged Fairy-wren	N/A		The White-winged Fairy-wren (Barrow Island)	The diet of the White-winged Fairy-				Birds on Barrow Island were the	The area of occupancy is estimated, with high	26194	http://w ww.publi	
72	Bird	Mallee Emu-wren	Stipiturus mallee	Endangered	Good		The Mallee Emu-wren is considered to be resident		The evidence that is available suggests that the total population size of the	N/A		The Mallee Emu-wren mostly inhabits Triodia	The Mallee Emu-wren is said to feed				Lack of info.	The extent of occurrence is	59459	http://w ww.envir	
73	Bird	Malleefowl	Leipoa ocellata	Vulnerable	Good	The dispersal of Malleefowl is	The Malleefowl is a sedentary species. Established pairs and		Fire (including both wildfire and prescribed burning) is a major threat	N/A		The Malleefowl occurs in semi-arid and arid zones	he Malleefowl is a generalist forager				Inbreeding is a potential threat to	The area of occupancy is estimated to be 40	934	http://w ww.envir	
74	Bird	Helmeted Honeyeater	Lichenostomus melan	Endangered	Good	A shortage of high quality breeding	The Helmeted Honeyeater is sedentary, and usually occurs in	The pressures associated with changes to the natural	Helmeted Honeyeaters are threatened by the rapidly spreading dieback of	N/A		During winter, the Helmeted Honeyeater	The Helmeted Honeyeater feeds				Genetic problems associated with	The Helmeted Honeyeater is	26011	http://w ww.scien	The Helmeted Honeyeater is a
75	Bird	Black-eared Miner	Manorina melanotis	Endangered	Good		When breeding, adult Black-eared Miners typically forage		Black-eared Miners are restricted to mature mallee eucalypt woodland, in	N/A		Black-eared Miners are restricted to mature	The Black-eared Miner eats mainly				One of the major causes of decline	Black-eared Miners are restricted to small,	449	http://w ww.envir	
76	Bird	Regent Honeyeater	Xanthomyza phrygia	Endangered	Good	The impact and occurrence of	he Regent Honeyeater undertakes a complex series of		The impact and occurrence of catastrophic threats are unknown. The	N/A		Regent Honeyeaters mostly occur in dry box-	The diet of the Regent Honeyeater				Although genetic (L. Christidis and J.	The extent of occurrence is	430	http://w ww.publi	
77	Bird	Crested Shrike-tit (Nor	Falcunculus frontatus	Vulnerable	Good		Dispersal threshold (refers to the distance (km) for which the		The Northern subspecies of the Crested Shrike-tit is probably	N/A		The Northern subspecies of the Crested Shrike-tit	Prey eaten by the Northern Shrike-tit				Lack of info.	The only available estimate of the	26013	http://w ww.gbcm	
78	Bird	Red-lored Whistler	Pachycephala rufogul	Vulnerable	Good		he Red-lored Whistler is probably a resident or sedentary		The current major threat to the Red-lored Whistler is fire. Fire could	N/A		he Red-lored Whistler inhabits low mallee	The Red-lored Whistler mainly				However, there have not been any	The extent of occurrence is	601	http://w ww.birds	
79	Bird	Slender-billed Thornbil	Acanthiza iredalei irec	Vulnerable	Good		The Slender-billed Thornbill (western) is a resident or		However, the population decline may also have been exacerbated by	N/A		The Slender-billed Thornbill (western) usually	The Slender-billed Thornbill (western)				Lack of info.	The Slender-billed Thornbill (western)	25967	http://w ww.birds	
80	Bird	Eastern Bristlebird	Dasyornis brachypteru	Endangered	Good		Eastern Bristlebirds are a sedentary (Blakers et al. 1984;		The areas inhabited by the Eastern Bristlebird are prone to wildfire or	N/A		The Eastern Bristlebird inhabits low dense	Eastern Bristlebirds mainly feed on				The small size and isolated nature of	The Eastern Bristlebird is endemic to	533	http://w ww.sprin	
81	Bird	Western Bristlebird	Dasyornis longirostris	Vulnerable	Good		The Western Bristlebird is sedentary. It lives in pairs within		Recovery of its habitat after fire may take longer in relatively dry areas such	N/A		The Western Bristlebird is restricted to floristically	The diet of the Western Bristlebird				Lack of info.	The Western Bristlebird is	515	http://w ww.envir	
82	Bird	Forty-spotted Pardalot	Pardalotus quadragint	Endangered	Good	Many authors have emphasised the limited	The Forty-spotted Pardalote is sedentary (Brown 1986; Higgins		Extensive bushfires on Flinders Island in 2002–2003 could have had severe	N/A	In eastern Tasmania, these communities occur at low	The key component of habitat used by the Forty-	he Forty-spotted Pardalote feeds on				Lack of info.	The extent of occurrence is	418	http://w ww.publi	It is conventionally
83	Bird	Crimson Finch (White-l	Neochmia phaeton ev	Vulnerable	Good		The Crimson Finch (white-bellied) is described as a		The preferred habitat of the Crimson Finch (white-bellied) is regularly burnt	N/A		The Crimson Finch (white-bellied) occurs in rank	he Crimson Finch (white-bellied)				Lack of info.	In Australia, the Crimson Finch (white-	64443	http://w ww.envir	
84	Bird	Star Finch (Eastern)	Neochmia ruficauda r	Endangered	Good		The Star Finch (eastern) is considered to be sedentary	Prolonged drought is likely to have been a major factor in	The current identified threats include the continued degradation of habitat	N/A		he Star Finch (eastern) occurs mainly in	The Star Finch (eastern) feeds on				Lack of info.	The area of occupancy is estimated to be 20	26027	http://on linelibrar	
85	Bird	Black-throated Finch (S	Poephila cincta cincta	Endangered	Good		The Black-throated Finch (southern) may undertake some	The Black-throated Finch (southern) occurs mainly in	Alteration of habitat by changes in fire regimes (BTF Recovery Team 2004;	N/A		The Black-throated Finch (southern) occurs mainly	Black-throated Finches (southern)				Lack of info.	The Black-throated Finch (southern)	64447	http://w ww.envir	
86	Bird	Plains-wanderer	Pedionomus torquatu	Vulnerable	Good		The Plains-wanderer is a sedentary species that may		Drought and prolonged dry spells can exacerbate the impacts of overgrazing	N/A	These grasslands usually occur on hard, red-brown clay	The Plains-wanderer inhabits sparse, treeless,	The Plains-wanderer feeds on				Lack of info.	The extent of occurrence is	906	http://w ww.publi	
87	Bird	Muir's Corella (Southe	Cacatua pastinator pa	Vulnerable	Good		The movement of Muir's Corella appears to be only local as there		The conservation of the feeding and breeding habitat of Muir's Corella	N/A		Muir's Corella occurs in eucalyptus woodlands that	Muir's Corella (southern) feeds					The extent of occurrence is	25981	http://w ww.envir	
88	Bird	Red-tailed Black-cocka	Calyptorhynchus bank	Endangered	Good		Red-tailed Black-Cockatoos (south-eastern) do not make		Impacts of fire on food: The stringybark forests of	N/A		The Red-tailed Black-Cockatoo (south-eastern)	The diet of the Red-tailed Black-				Lack of info.	The Red-tailed Black-Cockatoo (south-	25982	http://w ww.envir	
89	Bird	Baudin's Black-cockato	Calyptorhynchus bauc	Vulnerable	Good		Baudin's Black-Cockatoo is described as resident at many		No mention of fire as a threat.	N/A		Baudin's Black-Cockatoo occurs in high-rainfall	The diet of Baudin's Black-Cockatoo				To examine the effects of severe	The extent of occurrence is	769	http://w ww.envir	
90	Bird	Glossy Black-cockatoo	Calyptorhynchus latha	Endangered	Good		For example, Southgate (2002) reported that 27% of individuals	GBCs are known to fly up to 14 km between feeding and	Wildfire is a major threat to the habitat of the Glossy Black-Cockatoo	N/A		The Glossy Black-Cockatoo (Kangaroo Island) inhabits	he Glossy Black-Cockatoo (Kangaroo				The small population size	he extent of occurrence of the	64436	http://w ww.envir	
91	Bird	Carnaby's Black-cockat	Calyptorhynchus latir	Endangered	Good		Carnaby's black-cockatoos will traverse open space but may	Carnaby's Black-Cockatoo is endemic to, and widespread	There appears to be little risk to Carnaby's Black-Cockatoo from	N/A		Carnaby's Black-Cockatoo occurs in uncleared or	Carnaby's Black-Cockatoo feeds				He measures for 19 allese ranged	Carnaby's Black-Cockatoo is endemic	59523	http://res earchreo	
92	Bird	Coxen's Fig-parrot	Cyclopsitta diophthalr	Endangered	Good		Coxen's Fig-Parrot is known to undertake some local		Stochastic events, such as drought, which may have severe impacts upon	N/A		Coxen's Fig-Parrot occupies habitats that	Coxen's Fig-Parrot feeds on seeds and,				Lack of info.	The extent of occurrence is	59714	http://w ww.envir	
93	Bird	Swift Parrot	Lathamus discolor	Endangered	Good		The Swift Parrot is endemic to south-eastern Australia. It		The Swift Parrot is limited in extent by the availability of breeding habitat,	N/A		he breeding range is always within 8 km of the	The Swift Parrot feeds mostly on				Lack of info.	Extent of occurrence, as estimated from	744	http://w ww.envir	
94	Bird	Orange-bellied Parrot	Neophema chrysogast	Critically Endangered	Good		Orange-bellied Parrots migrate yearly from the breeding site in		As the entire known Orange-bellied Parrot population exists as one small	N/A		Throughout the year Orange-bellied Parrots are	The Orange-bellied Parrot feeds almost				Lack of info.	The extent of occurrence for the	747	http://w ww.publi	
95	Bird	Night Parrot	Pezoporus occidentali	Endangered	Good		The small number of confirmed or verifiable reports makes	The three early observers all reported the birds flying to	The paucity of information available on the Night Parrot makes it difficult	N/A		The Night Parrot inhabits arid and semi-arid areas	The diet of the Night Parrot is				Lack of info.	The distribution of the Night Parrot is very	59350	http://w ww.dec.	
96	Bird	Western Ground Parro	Pezoporus wallicus fla	Endangered	Good		Following post-natal dispersal, Ground Parrots can occur away		Two major factors have been implicated in the decline of Western	N/A		The vegetation types used by Ground Parrots can be	The Ground Parrot is a granivore, but				For eastern ground parrot: "The	However, recent reappraisals of the	26024	http://w ww.sprin	
97	Bird	Superb Parrot	Polytelis swainsonii	Vulnerable	Good	In NSW, it mostly occurs west of the	At least part of the population of the Superb Parrot undertakes	Hydrological Changes The exploitation and	Fire may also cause the degradation of breeding and foraging habitats (ACT	N/A		The Superb Parrot mainly inhabits forests and	The Superb Parrot forages on many				Lack of info.	The extent of occurrence of the	738	http://w ww.envir	
98	Bird	Golden-shouldered Pa	Psephotus chrysopter	Endangered	Good		The Golden-shouldered Parrot usually occurs in pairs or family	Golden-shouldered Parrots inhabit open, wet or dry	The species tends to favour habitats that have recently been burnt, since	N/A		Golden-shouldered Parrots inhabit open, wet or dry	The Golden-shouldered Parrot is			This species nests in tunnels	Appears to be an article that may be	The Golden-shouldered Parrot	720	http://w ww.envir	
99	Bird	Black-breasted Button-	Turnix melanogaster	Vulnerable	Good		The dispersion patterns of this species are poorly known. It is		Frequent fire eliminates shrubby understorey in dry rainforest	N/A		The Black-breasted Button-quail is restricted to	The diet is mostly invertebrates, taken				Although moderately well	It is restricted to coastal and near-	923	http://w ww.envir	
100	Bird	Buff-breasted Button-c	Turnix olivii	Endangered	Good		The movements of the species are essentially unknown. It has		The lack of information on the Buff-breasted Button-quail makes it	N/A		The Buff-breasted Button-quail occurs in patches of	The diet of the Buff-breasted Button-				Lack of info.	The extent of occurrence is	59293	http://w ww.birdli	
101	Bird	Masked Owl (Tiwi Islar	Tyto novaehollandiae	Endangered	Good	There is probably some dispersion of the	There is probably some dispersion of the Masked Owl	The Masked Owl (Tiwi Islands) is endemic to	The Masked Owl (Tiwi Islands) is unlikely to undergo extreme natural	N/A		The Masked Owl (Tiwi Islands) occurs mostly in	The Masked Owl (Tiwi Islands) is				The small size and restricted	The extent of occurrence of the	26049	http://w ww.envir	
102	Amphibiar	Green and Golden Bell	Litoria aurea	Vulnerable	Good		Goldingay and Lewis (1999) suggest that the Green and	In NSW, the species commonly occupies	Possible threats to the Green and Golden Bell Frog include the artificial	N/A	In Victoria, the green and golden bell frog has been	Green and Golden Bell Frogs have been found in	The green and golden bell frog				An initial genetic analysis of some of	The extent of occurrence of the	1870	http://on linelibrar	
103	Amphibiar	Booroolong Frog	Litoria booroolongens	Endangered	Good		Lack of info. No info - score as N (likely to be able to disperse	The species is predominantly found along the western-	The modification of hydrological regimes as a result of irrigation and		The Booroolong Frog is restricted to the tablelands	The Booroolong Frog is present along permanent	Not stated. (Assume inverterbrates -				Lack of info.	The Booroolong Frog has disappeared from	1844	http://w ww.namo	
104	Amphibiar	Yellow-spotted Tree fr	Litoria castanea	Endangered	Good		Lack of info. No info - score as N/SDV (likely to be able to	The northern population of the Yellow-spotted Bell Frog	The cause(s) of the apparent declines observed in populations of all taxa		The Yellow-spotted Bell Frog occupies similar habitat to	The habitat of the Yellow-spotted Bell Frog	Not stated. (Assume inverterbrates -				No genetic study of the Yellow-	The northern population of the	1848	http://w ww.envir	
105	Amphibiar	Armoured Mistfrog	Litoria lorica	Critically Endangered	Good		There is little information available on the species. (only	The Armoured Mistfrog is a rainforest species endemic to			The Armoured Mistfrog is a rainforest species endemic to		Not stated. (Assume inverterbrates -				No information is available on	The Armoured Mistfrog was first	1841	http://w ww.publi	
106	Amphibiar	Wallum Sedge Frog	Litoria olongburensis	Vulnerable	Good		The home range of the Wallum Sedge Frog is yet to be	The Wallum Sedge Frog is found in ephemeral, semi-	Changes in hydrology may impact negatively on the Wallum Sedge Frog		The Wallum Sedge Frog is found in ephemeral, semi-	In general, vegetation types where the species	Wallum Sedge Frog tadpoles forage on				The Wallum Sedge Frog exhibits	The Wallum Sedge Frog has been	1821	http://w ww.envir	
107	Amphibiar	Peppered Tree Frog	Litoria piperata	Vulnerable	Good		Peppered Tree Frog adults are active in bushes or on rocks at		Nothing mentioned in threats.		The Peppered Tree Frog occupies rocky streams in						Lack of info.	The Peppered Tree Frog was formerly	1827	http://w ww.envir	Resource/infor mation poor for
108	Amphibiar	Growling Grass Frog	Litoria raniformis	Vulnerable	Good		The Growling Grass Frog is a highly mobile species, capable	The Growling Grass Frog can also inhabit agricultural and	Altered flooding regimes The number of potential breeding		The Growling Grass Frog can also inhabit agricultural and	This species is found mostly amongst emergent	Growling Grass Frogs feed mainly				Here we describe nine polymorphic	In the past, the Growling Grass Frog	1828	http://w ww.sprin	
109	Amphibiar	Spotted Tree Frog	Litoria spenceri	Endangered	Good	The Spotted Tree Frog is restricted	The Spotted Tree Frog is highly sedentary, and does not venture	Spotted Tree Frogs inhabit naturally-vegetated, rocky,	Disturbances to streams, such as gold dredging, forestry, forest roads and		Spotted Tree Frogs occur in swift-flowing remote	Most populations of the Spotted Tree Frog	Adult Spotted Tree Frogs appear to be				A population genetic study,	The extent of occurrence of the	25959	http://w ww.envir	
110	Amphibiar	Alpine Tree Frog	Litoria verreauxii alpir	Vulnerable	Good		Lack of lots of info for this species.		Stochastic (chance) events may lead to the extinction of the Alpine Tree Frog	The Alpine Tree Frog occurs		The Alpine Tree Frog occurs mainly in	Not stated.				Lack of info.	Museum and field note records indicate	66669	http://w ww.natur	The Alpine Tree Frog is a
111	Amphibiar	White-bellied Frog	Geocrinia alba	Endangered	Good		Geocrinia alba and G. vitellina occur north and west of the	The White-bellied Frog occurs in permanently moist	A dramatic reduction in population size at one location has been			The White-bellied Frog occurs in permanently	Not stated.				Genetic studies (allozyme	The distribution of the White-bellied Frog is	26181	http://w ww.envir	
112	Amphibiar	Orange-bellied Frog	Geocrinia vitellina	Vulnerable	Good		Genetic structuring of Orange-bellied Frog populations	The Orange-bellied Frog occurs in permanently moist	The breeding biology of the G. rosea complex makes this group particularly			The two species occur in close proximity to one	Not stated.				In this s tudy I use allozyme	The Orange-bellied Frog has an area of	26172	http://w ww.envir	
113	Amphibiar	Giant Burrowing Frog	Heleioporus australia	Vulnerable	Good	The Giant Burrowing Frog is confined to the	The activity patterns of the species are strongly climate	In these locations the frog is associated with small	Penman and colleagues (2004) provide a review of the current known		The species has been found from near sea level up to	Across its range, the Giant Burrowing Frog appears to	The species is considered to be a				The taxonomic status of the Giant	The species has been found from near sea	1973	http://w ww.int-	
114	Amphibiar	Stuttering Frog	Mixophyes balbus	Vulnerable	Good		On several occasions during rainfall events individuals have	The Stuttering Frog is typically found in association	The precise causes of the decline of the Stuttering Frog are unknown, but		he Stuttering Frog is restricted to the eastern slopes of the	In north-east New South Wales, statistical modeling	Lack of info.				Research is currently being	The species has only been found in Victoria	1942	http://w ww.envir	
115	Amphibiar	Baw Baw Frog	Philoria frosti	Endangered	Good		A radio-tracking study conducted over six months	The duration of the breeding season appears closely linked	Bushfires on the Baw Baw Plateau are uncommon due to its wet climate	The lack of information	The Baw Baw Frog is a habitat specialist. During the breeding	Habitat utilised by the Baw Baw Frog includes distinct	Examination of the stomach contents				We isolated 15 polymorphic	The Baw Baw Frog is restricted entirely to	1934	http://en. scientific	
116	Amphibiar	Southern Corroboree F	Pseudophryne corrob	Endangered	Good		After breeding, adults can disperse up to 300 metres from		The Southern Corroboree Frog is one of a number of Australian alpine	The Southern Corroboree Frog	The Southern Corroboree Frogs is a habitat specialist,	Occurs at high altitudes (1300–1760m) in	The diet of juveniles and adults consists				A low degree of genetic diversity	Prior to a detailed survey undertaken in	1915	http://on linelibrar	North and South
117	Amphibiar	Northern Corroboree F	Pseudophryne pengill	Vulnerable	Good		A two year program of pitfall trapping was conducted at		The Northern Coroboree Frog is one of a number of Australian alpine	Northern Coroboree adult		The Northern Coroboree Frog is restricted to	Assume it is very similar to Southern				Reproductive compatibility and	The Northern Corroboree Frog occurs	66670	http://on linelibrar	North and South
118	Amphibiar	Sunset Frog	Spicospina flammocae	Endangered	Good	Habitat is unlikely to be available to allow	We show here the preservation of catchment processes will not	Spicospina is a conventional aquatic breeder. Amplexus is	An extremely small geographic range makes the Sunset Frog particularly		The Sunset Frog is a habitat specialist. The region from		Lack of info.				Spicospina flammocaerulea	he Sunset Frog was discovered in 1994.	64782	http://w ww.publi	
119	Amphibiar	Eungella Day Frog	Taudactylus eungeller	Endangered	Good		The Eungella Day Frog is active during day and night (Liem &		The cause(s) of the decline in the Eungella Day Frog populations		The Eungella Day Frog is a stream dwelling/stream	The Eungella Day Frog occurs along small creeks	Experiments on the tadpoles of the				The Eungella Day Frog is active	The Eungella Day Frog is restricted to the	1887	http://w ww.iucnr	
120	Amphibiar	Tinkling Frog	Taudactylus rheophilu	Endangered	Good		Lack of info. Yet can probably score the same as Eungella Day		The cause(s) of the decline of the Tinkling Frog population remains		The Tinkling Frog is a montane specialist, endemic						Lack of info.	The Tinkling Frog was restricted to four	1890	http://w ww.envir	
121	Plant	Caley's Grevillea	Grevillea caleyi	Endangered	Good		Primary seed dispersal occurs at dehiscence of the fruit and is		Grevillea caleyi is killed by fire and relies entirely on seed that is stored in	N/A	Occurs on laterite soils in open forests or low open	The structure of the community is	N/A	Casual observations indicate that	Seed dispersal is minimal, as upon	Seed predation is high and occurs at	Currently, G. caleyi consists of a	That several populations or	9683	http://w ww.envir	
122	Plant	Ironstone Mulla Mulla	Ptilotus beckerianus	Vulnerable	LOW DATA		Seed structure indicates that seeds are wind dispersed and	Ironstone Mulla Mulla inhabits the 450-500 mm	Known to proliferate after fire until mid to upperstorey species	N/A	Occurs on KI and the Eyre Peninsula, on gently sloping	Allocasuarina verticillata Low woodland. Associated	N/A	Pollination, germination, seed	Flowering occurs between August and			Ironstone Mulla Mulla is ENDEMIC to South	3787	http://w ww.envir	

123	Plant	Xerothamnella parvifol	Xerothamnella parvifo	Vulnerable	Good		Could find no measure of dispersal ability		Flowering time may be opportunistic and dependent	Xerothamnella parvifolia flowers are recorded in January, February, April,	N/A	Xerothamnella parvifolia occurs on stony ridges and	In Queensland, the species is reported growing in	N/A	The fruit is a 7–9 mm long capsule which	The fruit is a capsule 7–8.5 mm long.			Xerothamnella parvifolia is endemic		3141	http://www.envir	Very little information
124	Plant	Grampians Pincushion	Borya mirabilis	Endangered	Good		Reproduction is thought to be solely vegetative, presumably by		The species is a xeromorphic and desiccation-tolerant	Major threats include disturbance to habitat and plants from erosion and	N/A	The Grampians Pincushion-lily (Borya mirabilis) is a small	Dominant plant species at the site include Grevillea	N/A	Borya mirabilis is likely to be fly-	Reproduction is thought to be solely	Borya mirabilis has an association	The species also fails to produce	Only two populations are known: a single		16564	http://researchban	
125	Plant	James' Paperlily	Laxmannia jamesii	Vulnerable	DATA DEFICIENT		There are two types of inflorescences (flower clusters).			The main potential threats to the species include grazing, livestock	N/A	James' Paperlily grows in seasonally damp, grey sandy	James' Paperlily grows in seasonally damp, grey	N/A		There are two types of inflorescences (flower			James' Paperlily is endemic to Western		21699	http://www.envir	DATA DEFICIENT
126	Plant	Fine Leaved Apium	Apium prostratum ph	Vulnerable	DATA DEFCIENT (not just subspecies level,		The Fine-leaved Apium has finely divided leaves that are 40			The main identified threat to Fine-leaved Apium is competition and	N/A	The Fine-leaved Apium typically favours creek lines in		N/A		The Fine-leaved Apium has finely divided			Fine-leaved Apium is known from the		67363	http://www.envir	
127	Plant	Mountain Angelica	Gingidia montana	Endangered	Good		flowers are followed by deeply ribbed fruits. The subspecies is		Gingidia includes 8 species, distributed between	The extremely small size of Mountain Angelica's populations is of concern	N/A	In New Zealand this species is found in moist, open sites	Associated vegetation includes Snow Gum	N/A	A few morphs, notably the females		In addition, the moth,	The second line of evidence for	Mountain Angelica is restricted to a small		12096	http://www.tandf	
128	Plant	Milky Silkpod	Parsonsia dorrigoensi	Endangered	Good		The flowers are relatively small, cream or yellowish and in			The species has a well developed root stock and responds to fire by	N/A	It has a preference for more open areas and forest	Milky Silkpod grows in tall eucalypt forests and in	N/A	The flowers are relatively small.				Richards (1999) lists nine populations with		64684	http://www.envir	Not a great deal of info on this
129	Plant	Rod's Star Hair	Astrotricha roddii	Endangered	LOW DATA		Flowers appear during October to February and are dull purple			The main identified threats to A. roddii are risk of local extinction because of	N/A	Astrotricha roddii usually grows in low dry woodland	Surrounding woodland is often dominated by	N/A	Flowers appear during October to	ON A RELATED SPECIES: "Resprouting			Astrotricha roddii is known from the		56312	http://www.rbgsv	Lacking Info
130	Plant	Australian Arenga Paln	Arenga australasica	Vulnerable	LOW DATA		Flowers are yellow and about 1 cm across. The ripe fruits are	This species tolerates a range	This species is found from sea level to 300 m, favouring	Threats to this species are degradation and destruction of habitat (BRI Rare	N/A	The Australian Arenga Palm grows in littoral and near-	The species occurs as a minor component in	N/A	Flowers are yellow and about 1 cm	The seeds contain an irritant composed of			The Australian Arenga Palm is endemic to		4067	http://www.istor.	
131	Plant	Waxy Cabbage Palm	Livistona lanuginosa	Vulnerable	Good		Inflorescences (flower clusters) are densely woolly, multi-		The climate of the Burdekin River system is strongly	Fruit are mainly dispersed by flood water and settle in stream banks	N/A	The Waxy Cabbage Palm forms colonies along	Associated tree species are Corymbia brachycarpa,	N/A	Bisexual flowers, yellow to about 3 mm	Flowering occurs in the driest part of the year		About half of the studied	The Waxy Cabbage Palm is endemic to		64581	http://www.tlandinfo.	
132	Plant	White-flowered Wax P	Cynanchum elegans	Endangered	Good		Pollen vectors and the distance that wind-dispersed seed is		This species occurs from near sea level to about 600	White-flowered Wax Plant is a clonal species and is capable of suckering in	N/A	White-flowered Wax Plant occurs on a variety of	White-flowered Wax Plant occurs mainly at the	N/A	Flowers are white, tubular, up to 4 mm	The seeds of White-flowered Wax Plant			It has been recorded from 86 locations		12533	http://www.envir	
133	Plant	Tylophora linearis	Tylophora linearis	Endangered	LOW DATA				It is thought that T. linearis has the ability to survive fires	It is thought that T. linearis has the ability to survive fires as it has been	N/A	Most populations occur on the western slopes of NSW	Tylophora linearis grows in dry scrub, open forest and	N/A	Flowers are clustered in radiating groups of				Tylophora linearis has rarely been collected		55231	http://www.publi	
134	Plant	Mueller Daisy	Brachyscome mueller	Vulnerable	LOW DATA				It appears that sufficient autumn rainfall that results	Altered hydrological regimes, especially the reduction in flooding,	N/A	Brachyscome muelleroides occurs in seasonally damp	Where trees are present, these are typically River	N/A	The stem bears a single white-petalled				Brachyscome muelleroides is		15572	http://www.envir	
135	Plant	Large-fruit Fireweed	Senecio macrocarpus	Vulnerable	Good		Each plant has 6–8 large yellowish flower-heads that are		Climate change As S. macrocarpus appears to	From this survey, concerns were raised over long term threats to Large-	N/A	In Victoria, Large-fruit Fireweed occurs most	In South Australia, Large-fruit Fireweed occurs most	N/A	Large-fruit Fireweed flowers in Spring,				The Large-fruit Groundsel Senecio		16333	http://www.publi	
136	Plant	Southern Shepherd's P	Ballantinia antipoda	Endangered	Good		The dry wind-dispersed seeds of B. antipoda were observed	It is a small, cool-season annual	It appears that the plants may not germinate every	Animal grazing and disturbance Grazing by introduced herbivores and	N/A	Previous Habitat Previous records indicate the	Southern Shepherd's Purse shares this moss mat	N/A	They grow to 5 cm high with small	The dry wind-dispersed seeds of B.			The Southern Shepherd's Purse was		16173	http://archimedes	
137	Plant	Erect Pepper-cress	Lepidium pseudopapil	Vulnerable	DATA DEFICIENT					The main identified threats to Erect Pepper-cress are stochastic events	N/A		The species grows in grassy woodlands of Black	N/A	The leafless, flowering part of the				The Erect Pepper-cress occurs near Mt		11548	http://www.envir	No dedicated searches have
138	Plant	Western Water-starwc	Callitriche cyclocarpa	Vulnerable	DATA DEFICIENT				Callitriche cyclocarpa, Family Callitrichaceae, also known	Changed flooding patterns have affected regeneration in some cases	N/A		Habitat information for Western Water Starwort is	N/A	Flowers are tiny, green and				Western Water Starwort has been		7477	http://www.envir	C. cyclocarpa seems most
139	Plant	Curtis' Colobanth	Colobanthus curtisiae	Vulnerable	Good		The capsules are oval and seeds are red-brown, 0.5 mm long and	The mean ofthe warmest month	Mean annual rainfall varies from 530 mm in the lowland	It requires bare ground for recruitment from seed and responds	N/A	It is commonly found on gentle slopes with elevations	Curtis' Colobanth is found in grassland and grassy	N/A	The species flowers from November to				Curtis' Colobanth is endemic to Tasmania;		23961	http://www.tandf	The dicotyledonous
140	Plant	Pearlwort	Sagina diemensis	Critically Endangered	Good		Monitoring known populations of Oreoporanthera petalifera	The impact of the changing global		The ability of the species to re-establish after fire is unknown	N/A	Pearlwort has been recorded from cracks and crevices on	Plants at the Mt Anne subpopulation grow on	N/A	The flowers have 4 petals and 4 sepals (4-				Pearlwort is endemic to southwestern		64974	http://www.envir	
141	Plant	Allocasuarina glareicol	Allocasuarina glareico	Endangered	Good		Since pollination is by wind, the distance between individuals		The median annual rainfall is 803 mm (measured at the	Allocasuarina glareicola is found in open Castlereagh woodland, growing	N/A	This species grows on tertiary alluvial gravels, with yellow	It is found in the Castlereagh open	N/A	Since pollination is by wind, the distance	This species is dioecious or		It is likely that genetic diversity is	This species is restricted to a few		21932	http://www.envir	
142	Plant	Nielson Park She-oak	Allocasuarina portuen	Endangered	Good		As most of the seeds of Allocasuarina species are stored	Climate is generally warm,		Plants of the family Casuarinaceae are generally obligate seed regenerators.	N/A	The only site where the species occurs naturally is on	The species grows in tall shrubland dominated by	N/A	The species is generally dioecious	The species is generally dioecious but some			This species has only been recorded from		21937	http://www.envir	
143	Plant	Apatophyllum constab	Apatophyllum constat	Endangered	DATA DEFICIENT					There are no identified current threats that would result in continuing	N/A	Occurs in dry sclerophyll forest on slopes with a north		N/A	The foliage is diffuse. The flowers are				Central tablelands and central coast regions		17341	http://www.envir	
144	Plant	Matted Centrolepis	Centrolepis caespitos	Vulnerable	LOW DATA			Very little is known about	The species generally occurs on swampy loam in low-lying	The main threats are weed invasion, changed hydrology/salinity, road	N/A	Centrolepis caespitosa occurs in winter-wet clay pans	Habitat is Cyathochaeta avenacea, Pericalymma	N/A	Typically, the inflorescence	Propagation - Unknown and not			. However, as one population contains		6393	http://www.envir	
145	Plant	Pedder Centrolepis	Centrolepis pedderen	Vulnerable	Good		Fragments of the plant have been observed to break away	The impact of the changing global		Inundation and regulated river flows Two of the three recorded Pedder	N/A	edder Centrolepis has been recorded from the sandy	Associated plant species at Sanctuary Lake include the	N/A	Nothing is known of the species'	Fragments of the plant have been observed to			Pedder Centrolepis is endemic to south-		12647	http://www.envir	
146	Plant	Atriplex infrequens	Atriplex infrequens	Vulnerable	DATA DEFICIENT				Atriplex infrequens occurs in western NSW, within the	The main potential threats to A. infrequens include habitat loss;	N/A	The known habitat of A. infrequens is associated with		N/A	Flowers occur in the leaf axil (the angle						4143	http://www.envir	
147	Plant	Chariot Wheels	Maireana cheelii	Vulnerable	LOW DATA					The species is not adequately reserved, with very few, small	N/A	The Chariot Wheels Maireana cheelii is a small, tufted	The Chariot Wheels is usually found in chenopod	N/A	The Chariot Wheels flowers and fruits in	The wheel-shaped woolly fruit is 5-10 mm			The species was once widely distributed		8008	http://www.dse.vi	
148	Plant	Ipomoea polpha subsp	Ipomoea sp. Stirling (F	Vulnerable	LOW DATA				Successful recruitment may depend on large rainfall	Past threats include Severe wildfire, disturbance to hydrological regimes,	N/A	Grows in Acacia shrublands, particularly A.aneura (Mulga).		N/A	Perennial vine up to 4 m in length, with al				Endemic to the Burt Plain Region of the		56693	http://davesgarde	Ipomoea polpha has
149	Plant	Acrophyllum australe	Acrophyllum australe	Vulnerable	LOW DATA				It requires a protected position in moist soils.	The main identified threats to A. australe are landslip (particularly due	N/A	Acrophyllum australe inhabits damp crevices and rock faces.		N/A	The species flowers in November to			A potential threat to A. australe is	Acrophyllum australe has a very restricted		3983	http://anosa.org.a	
150	Plant	Pygmy Cypress-pine	Callitris oblonga	Vulnerable	Good		The furthest seedling from any of the fire-killed trees was 16-	Frost Resistance: Most individuals	At room temperature (12-25OC) seed of both species	Species under threat from high frequency fires. The main identified	N/A	In NSW the species occurs along sandy watercourses,	Both species of Callitris occur in a wide variety of	N/A	Wind is the most likely pollination	The closed cones can persist for decades			Pygmy Cypress-pine is limited to a number of		66687	http://www.dpiw.	
151	Plant	South Esk Pine	Callitris oblonga oblor	Endangered	Good		The furthest seedling from any of the fire-killed trees was 16-	Frost Resistance: Most individuals	At room temperature (12-25OC) seed of both species	Callitris oblonga ssp. oblonga is sensitive to fire, but holds persistent	N/A	The only situation in which the two species were found	Both species of Callitris occur in a wide variety of	N/A	Seed: The cones open to shed numerous	The closed cones can persist for decades			Key sites include Aspley River (below		64864	http://www.dpiw.	
152	Plant	Cycas megacarpa	Cycas megacarpa	Endangered	Good		Cycad species are known to have little genetic flow between		Climate change Cycads are confined to	Periodic fires of different intensities are a natural part of the habitat of	N/A	This species often grows on undulating to hilly terrain at	Cycas megacarpa is found in woodland, open	N/A	The seeds are ovoid 38–50 mm long and	Seeds generally do not disperse far from the		Many populations of Cycas	The extent of occurrence for Cycas		55794	http://www.envir	
153	Plant	Cycas ophiolitica	Cycas ophiolitica	Endangered	Good		Seed dispersal can be limited for this species, as for other cycads.			C. ophiolitica occur in habitats that are subjected to periodic fires of varying	N/A	Cycas ophiolitica grows on hills and slopes in sparse.	Cycas ophiolitica is endemic to Queensland.	N/A	It is likely that this species is pollinated	Seeds may be dispersed by mammals		Queensland Herbarium (1997.	The species has an estimated area of		55797	http://www.envir	
154	Plant	Curly Sedge	Carex tasmanica	Vulnerable	Good		Persistence of populations at some sites may be mainly via	Virtually all of the range of the Curly	In Tasmania, Carex tasmanica occurs in soaks	This species requires disturbance for its regeneration. Regeneration is	N/A	In Victoria, Curly Sedge occurs in seasonally wet, fertile.	The Curly Sedge grows in seasonally damp sites in	N/A	The seed is brownish-black under a very	Persistence of populations at some			On the mainland this species occurs in the		9101	http://eprints.utas	
155	Plant	Keighery's Eleocharis	Eleocharis keigheryi	Vulnerable	DATA DEFICIENT				When this species grows in water, there are numerous	The main identified threats to Keighery's Eleocharis are invasive	N/A	Keighery's Eleocharis grows in small clumps in a substrate of	Associated species include Melaleuca glateritia and	N/A	Flowers consist of three stamens and a	sedge species (wind?)			Keighery's Eleocharis is endemic to Western		64893	http://www.envir	
156	Plant	Scrambling Ground-fer	Hypolepis distans	Endangered	Good					Threats to Hypolepis distans in Tasmania include land clearance and	N/A	Hypolepis distans is a terrestrial fern in the	Hypolepis distans has been recorded in Tasmania from	N/A		Ferns may reproduce from spores or via a	The future of Hypolepis distans		The species is restricted in Australia		2148	http://www.tandf	
157	Plant	Euroa Guinea-flower	Hibbertia humifusa er	Vulnerable	LOW DATA					The taxon is endemic to north-eastern Victoria, where about 16 populations	N/A	The plant has mostly been recorded from disturbed sites	The Euroa Guinea-flower is occurs in Eucalyptus	N/A	Flowers are produced from September to				The taxon is endemic to north-eastern		64918	http://www.envir	
158	Plant	Apsley Heath	Epacris apsleyensis	Endangered	Good		The timing of seed release varies between taxa. In most			Although the first seed crop is likely to be produced in the fourth fruiting	N/A	This species grows in dry sclerophyll forest on	dry sclerophyll forest	N/A	Flowering commences in	Fruit: The fruit is a small capsule about			This species is restricted to the		15428	http://www.envir	
159	Plant	Grand Heath	Epacris grandis	Endangered	Good					Although the first seed crop is likely to be produced in the fourth fruiting	N/A	This species grows on sheltered upper and mid		N/A	The known pollinators of Epacris	Fruits are capsules up to 2 mm long and			The Grand Heath is highly localised and		18719	http://www.dpiw.	
160	Plant	Southern Pipewort	Eriocaulon australasic	Endangered	Good				Little is known of its biology and ecology. The Austral	Major current threats to the Austral Pipewort are:	N/A	The Austral Pipewort grows in shallow, seasonally-inundated	Commonly associated species include Black	N/A	The Austral Pipewort Eriocaulon				The Austral Pipewort Eriocaulon		7649	http://www.envir	
161	Plant	Salt Pipewort	Eriocaulon carsonii	Endangered	Good		The salt pipewort produces abundant tiny seeds that		The mound spring habitat of Eriocaulon carsonii at Peery	Fire/ climate disturbance not mentioned/ considered a threat to this	N/A	The water chemistry of the discharge springs is variable.	In some situations the springs can support dense	N/A	Inflorescences globose, 3-4mm in	The salt pipewort produces abundant			There is some evidence of change in		10584	http://www.envir	
162	Plant	Bertya granitica	Bertya granitica	Endangered	LOW DATA					There appears to be a close relationship between seedling	N/A	This species grows in shallow, sandy soils on exposed	Surrounding vegetation is predominantly open forest	N/A	Flowers have been recorded from August			The species has low genetic	This species is restricted to a small		64661	http://www.envir	
163	Plant	Sauropus macranthus	Sauropus macranthus	Vulnerable	LOW DATA		S-DIVA shows almost the same optimisation for the root of			The main identified threats to Sauropus macranthus in Australia	N/A	Occurs in NEQ. Altitudinal range from 700-800 m.	Sauropus macranthus has been collected in complex	N/A	Flowers are blackish-red, solitary or	The four widespread species can thrive			Sauropus macranthus occurs in a small area		13189	https://openacces	
164	Plant	Cunderdin Daviesia	Daviesia cunderdin	Endangered	Good					Seed from Daviesia cunderdin requires fire to stimulate germination, however	N/A	: Daviesia cunderdin occurs on lateritic sandy clay.	Other native species associated with Daviesia	N/A	D. cunderdin produces large red	Daviesia seeds have an elaisome (a small			Daviesia cunderdin is known from two		64882	http://www.dec.	
165	Plant	Stirling Range Daviesia	Daviesia pseudaphylla	Endangered	LOW DATA					The main identified threat to Stirling Range Daviesia is inappropriate fire	N/A	Stirling Range Daviesia inhabits gently sloping areas	This species can be seen growing with Jarrah	N/A	Inflorescences are comprised of two or	No info for this species. But could			Stirling Range Daviesia is endemic to Western		56747	www.dec.wa.gov.a	
166	Plant	Frankenia plicata	Frankenia plicata	Endangered	DATA DEFICIENT					The main threat to this species is trampling and habitat degradation	N/A	Frankenia plicata grows in a range of habitats, including		N/A	Flowers occur on 1–4 nodes of the upper		Of the plant species surveyed.		Frankenia plicata occurs in South		4225	http://www.publi	
167	Plant	Mauve Coopernookia	Coopernookia georgei	Endangered	LOW DATA					The main potential threats to Mauve Coopernookia include inappropriate	N/A	Mauve Coopernookia is found growing among thick scrub in	Plant species that are found growing nearby	N/A	This species has solitary, mauve, pink				Mauve Coopernookia is endemic to Western		21218	http://www.envir	
168	Plant	Gypsum Goodenia	Goodenia integerrima	Vulnerable	DATA DEFICIENT					Inappropriate fire regimes may affect the viability of populations of	N/A	Goodenia integerrima is endemic to Western Australia		N/A	Better knowledge of the biology and				Goodenia integerrima is currently known		55983	http://www.envir	
169	Plant	Sedge Conostylis	Conostylis lepidosperr	Endangered	LOW DATA					The response of C. micrantha to fire is unknown, however, it is predicted	N/A	This species occurs in flat or gently undulating plains, in	It inhabits low heath and sedge communities with	N/A	Flowers are lemon yellow, occurring				This species is found mostly in the southern		9254	http://www.dec.	
170	Plant	Granite Pink	Tribonanthes purpure	Vulnerable	DATA DEFICIENT					The main identified threat to Granite Pink is grazing by rabbits (Oryctolagus	N/A	This species grows in moss swards and herbfields in		N/A	s. The flowers are enclosed in two				Granite Pink is endemic to Western		16244	http://www.envir	
171	Plant	Wingless Raspwort	Haloragis exalata exal	Vulnerable	Good		Seed appears to be transported by water and fruits have been			Through 2001-06 the authors have also observed H. exalata subsp.	N/A	Its habitat has been described as "damp riparian habitat"		N/A	In common with many Australian	Seed appears to be transported by water			historically recorded from a single location		24636	http://www.rbgsv	
172	Plant	Chiddarcooping myrio	Myriophyllum lapidicc	Endangered	LOW DATA			It is an annual, surviving the hot	The first collection of Myriophyllum lapidicola was	The main threats are limited habitat (known from just 6 rock pools).	N/A	where it grows in ephemeral pools 20 to 50 cm deep on	Associated species include Kunzea pulchella.	N/A	The flowers of M. lapidicola float on the			The main threats are limited habitat	Myriophyllum lapidicola is known	Associated species include Kunzea pulchella. Melaleuca	55940	http://books.googl	
173	Plant	Frogbit	Hydrocharis dubia	Vulnerable	Good				Hydrocharis dubia, Family Hydrocharitaceae, also	There are no known threats to Frogbit. Potential threats include hydrological	N/A	Frogbit grows in small, shallow freshwater bodies or		N/A	The female flowers arise singularly on a	The berry-like fruits are 5-10mm long and			Frogbit is known from north of Kempsey, in		3650	http://www.sprin	This species has been placed
174	Plant	South Stirling Morning	Orthrosanthus muelle	Endangered	Good					The main identified threats to South Stirling Morning Iris are weeds.	N/A	Soils are shallow brown to grey gravelly loams.	South Stirling Morning Iris grows under open	N/A	Orthrosanthus species have delicate,	Orthrosanthus muelleri. Family			South Stirling Morning Iris is endemic to		21478	http://www.dec.	
175	Plant	Sargents Snakebush	Hemiandra rutilans	Endangered	LOW DATA					Very little is known about the ecology of the species. However, as species in	N/A	The soil type is deep grey sand. There are about 10	The most recent confirmed location was south of	N/A	Hemiandra rutilans is a small, low growing	The fruit of both Hemiandra and			Hemiandra rutilans is historically known		17932	http://www.publi	
176	Plant	Westringia kydrensis	Westringia kydrensis	Endangered	DATA DEFICIENT					Burning of Allocasuarina nana heathland and inappropriate fire	N/A	Grows on shallow rocky granite or quartzite soils	Occurs in heathland with larger shrubs of	N/A					Westringia kydrensis is endemic to NSW		56456	http://www.envir	
177	Plant	Chapman's Hensmania	Hensmania chapmani	Vulnerable	LOW DATA					The main potential threats to Chapman's Hensmania include	N/A	Chapman's Hensmania grows in yellow-grey or lateritic sand	Associated species include Acorn Banksia (Banksia	N/A	Fruit are produced in February and March.	Other hensmania species known to be			Chapman's Hensmania is endemic		10481	http://www.scien	
178	Plant	Long-flowered Nancy	Wurmbea tubulosa	Endangered	Good		W. latifolia "Seed may be shaken from dry capsules by		This species appears to be variable in the number of	Response to Disturbance: Unknown. Plants at population 6 were growing	N/A	W. tubulosa grows in clay and sandy clay, clay loam or		N/A	There are six stamens in the maleflowers	W. latifolia "Seed may be shaken from dry			This species is known from six populations		12739	http://www.dpiw.	
179	Plant	Logania insularis	Logania insularis	Vulnerable	DATA DEFICIENT		Cannot even find info for other species in the family "Of the		Mean annual rainfall in the vicinity of the known	Overton (1998) observed the regeneration of L. insularis seedlings	N/A	Logania insularis has been observed growing in sand	Logania insularis has been found in Eucalyptus	N/A		Cannot even find info for other species in the		Small genetic diversity listed as a	Logania insularis is endemic to Kangaroo		13105	http://www.envir	
180	Plant	Arrow-head Vine	Tinospora tinosporoid	Vulnerable	DATA DEFICIENT					The main identified threats to Arrow-head Vine are:	N/A	Arrow-head Vine is locally common in rainforest on		N/A	Flowers are 4 mm in diameter, green,				Arrow-head Vine occurs near the coast		5128	http://www.envir	This species was formerly
181	Plant	Mountain Villarsia	Villarsia calthifolia	Endangered	Good				Soil ranges from wet in winter to moist in summer	The main threats are weeds, drought, inappropriate fire regimes and	N/A	Habitat requirements: Villarsia calthifolia is		N/A	Species of the genus Villarsia display a	he two flower forms Villarsia calthifolia			It currently meets World Conservation		10886	http://www.envir	
182	Plant	Forest's Wattle	Acacia forrestiana	Vulnerable	Good					Plants are killed by fire. Regeneration is via seed (Patrick & Brown 2001).	N/A	The species inhabits gullies and slopes of lateritic hills	The vegetation is heath or low woodland (Brown et	N/A	Other acacias bird or insect pollinated.	The globular pale yellow flower heads			The species grows in two localities - near		17235	http://www.dec.	
183	Plant	Wongan Gully Wattle	Acacia pharangites	Endangered	Good					The species is presumed to be insect pollinated. Plants produce fruits but	N/A	This species grows mostly on the lower slopes of sheltered	The species forms part of a dense shrub layer to 5 m	N/A	The slightly oblong golden flower heads	Acacias: "The arils attract birds and ants,		• Low genetic diversity. There	This species is restricted to the		20281	http://www.publi	
184	Plant	Fitzgerald Eremophila	Eremophila denticulat	Vulnerable	Good					The main potential threat to Fitzgerald Eremophila is a lack of recruitment	N/A	This subspecies has been observed growing in alluvial	Fitzgerald Eremophila occurs in tall open	N/A	Flowers are tubular, carmine red on	Although dispersal mechanisms have not			Fitzgerald Eremophila is endemic to Western		64569	http://books.googl	

185	Plant	Silky Eremophila	Eremophila nivea	Endangered	Good							The main identified threats to Silky Eremophila are habitat clearing and	N/A	Silky Eremophila occurs in open York Gum (Eucalyptus	Associated species include Acacia acuminata.	N/A	Approximately 75% of eremophilas are	Although dispersal mechanisms have not			Silky Eremophila is known from six		14431	http://bo oks.googl	
186	Plant	Betka Bottlebrush	Callistemon kenmorri:	Vulnerable	Good							The Betka Bottlebrush is known only from one very small area in far	N/A	C. kenmorrisonii is a rheophytic chasmophyte (ie. a	At the Stony Peak Rd site the	N/A	Bright red flowers with purple anthers	For serotinous species, like Callistemon and			The Betka Bottlebrush is endemic to Victoria		64862	http://w ww.publi	
187	Plant	Warby Range Swamp (	Eucalyptus cadens	Vulnerable	Good						Eucalyptus cadens is a long-lived tree producing a large	The Warby Range Swamp-gum has almost certainly undergone a	N/A	Eucalyptus cadens stands tend to occur in woodlands	Vegetation communities are often dominated by	N/A	Did not find specific pollinator. did find	Past clearing, changes to watercourses and			The species is endemic to north-		21845	http://w ww.sprin	
188	Plant	Lloyd's Olive	Notelaea lloydii	Vulnerable	Good							Adult plants are capable of resprouting from the base after fire	N/A	The species occurs on undulating to hilly terrain	Lloyd's Olive is found in the ecotone between	N/A	Flowers are pale yellow or cream, up	It is suggested that dispersal may be			Lloyd's Olive is known from eight sites at five		15002	http://w ww.daff.	
189	Plant	Bog Willow-herb	Epilobium brunnescer	Vulnerable	Good		On other subspecies: Invader in Great Britain: "The wind				The single population of Bog Willow-herb occurs on moist,	Climate Change: Climate change impacts, including extended drought,	N/A	The single population of Bog Willow-herb occurs on moist,		N/A	Flowers appear in summer and are	Invader in Great Britain: "The wind			It is known from just a single site in the		6192	http://w ww.brc.a	
190	Plant	Floodplain Rustyhood	Pterostylis cheraphila	Vulnerable	Good		Orchid seeds are very small, extremely light and produced in				Pterostylis cheraphila is a terrestrial herb that is	Disturbance to/destruction of plants and habitat – off-road activities of	N/A	Pterostylis cheraphila grows in open Eucalyptus		N/A	The pollinator is not known, although	Orchid seeds normally wind pollinated.	The plants reproduce solely		Pterostylis cheraphila is endemic to western		56508	http://w ww.scien	
191	Plant	Waxy Sarcochilus	Sarcochilus hartmann	Vulnerable	LOW DATA		Orchid seeds are very small, extremely light and produced in					The main identified threats to Waxy Sarcochilus are excessive illegal	N/A	Waxy Sarcochilus is known from the Richmond River in	It is also found occasionally at the base of	N/A	Another Australian Sarcochilus species is	Cannot find info on this species, but being	Info from above may relevant,		Waxy Sarcochilus is conserved in		4124	http://w ww.istor.	
192	Plant	Edgar Range Pandanus	Pandanus spiralis var.	Endangered	Good						Seedlings grow actively during summer, responding	The main potential threats to Edgar Range Pandanus are cattle grazing,	N/A	The species grows in white and grey sand over sandstone		N/A	The pendulous fruits are made up of 16	Only four species were shown (Table 1) to		Small population size and potentially	Edgar Range Pandanus is endemic		8825	http://w ww.virtu	
193	Plant	Twining Finger Flower	Cheiranthera volubilis	Vulnerable	LOW DATA						Mean annual rainfall in the vicinity of the known	No research has been conducted to determine the fire and disturbance	N/A	Cheiranthera volubilis has been observed to grow on the	The majority of sub-populations of C. volubilis	N/A	Cheiranthera plants are very				Cheiranthera volubilis is endemic to		3125	http://w ww.publi	
194	Plant	Western Giant-leaved	Pleurophascum occid	Vulnerable	LOW DATA							There are no identified past threats. Present: There are no identified	N/A	Grows with other mosses under the cover of	This distinctive moss grows in loose mats on	N/A		Most bryophytes rely on wind for spore			The species is endemic to Western		56779	http://w ww.anbg.	
195	Plant	Deyeuxia appressa	Deyeuxia appressa	Endangered	DATA DEFICIENT						The species is reported to occur on wet ground.	If still extant, the main identified threats to D. appressa are habitat loss	N/A			N/A	Given that D. appressa hasn't been				Deyeuxia appressa is a highly restricted NSW		7438	http://w ww.envir	
196	Plant	King Blue-grass	Dichanthium queensla	Vulnerable	DATA DEFICIENT								N/A	This grass was only recorded in Blue grassland on basalt,		N/A					The grass (Dichanthium		5481	http://w ww.publi	
197	Plant	Remote Thorny Lignun	Muehlenbeckia horrid	Critically Endangered	Good						A 2003 survey found that there is a higher germination	There are a number of threats currently impacting on the species	N/A	Rising salinity is likely to impact on the extent of	Species associated with Remote Thorny Lignum	N/A	ON ANOTHER SPECIES OF Muehlenbeckia:	On ANOTHER SPECIES of muehlenbeckia:			The Remote Thorny Lignum is endemic to		65937	http://w ww.doc.g	
198	Plant	Knotweed	Persicaria elatior	Vulnerable	Good						Knotweed normally grows in damp places, including:	This species is threatened by: inadvertent clearing of moist	N/A	Knotweed grows on sandy, alluvial soil in swampy areas	Associated species include Melaleuca linearifolia, M.	N/A	ON ANOTHER SPECIES : "During the study	ON ANOTHER SPECIES: "Persicaria perfoliata is			Knotweed is known from the North Coast.		5831	http://w ww.sprin	
199	Plant	Christine's Grevillea	Grevillea christineae	Endangered	Good		Initial dispersal in Grevillea is passive after ripe fruits dehisce.					The main identified threats to Christine's Grevillea are damage or	N/A	Christine's Grevillea often occurs on narrow, weed-	It has been recorded in tall shrubland and low open	N/A	Flowering occurs in July to early	Study done on 6 Grevillea species (not			Christine's Grevillea is endemic to Western		64520	http://w ww.publi	
200	Plant	Anglesea Grevillea	Grevillea infecunda	Vulnerable	Good		Anglesea Grevillea has no known method for producing					Root-suckering may be stimulated by fire or slashing, however appropriate	N/A	The Anglesea Grevillea occurs in a hilly area dominated by	Species commonly found amongst populations of	N/A	The Anglesea Grevillea apparently	Flowers are yellow-green and brown with		Lack of sexual reproduction	Anglesea Grevillea is endemic to Victoria.		22026	http://w ww.anbg.	
201	Plant	Stream Clematis	Clematis fawcettii	Vulnerable	Good		The one-seeded fruit has long feathered tails arranged in fluffy				Stream Clematis occurs most commonly in the canopy	The Stream Clematis flowers from October to December, with fruits	N/A	Soil types in known habitats are varied, but are mainly	Stream Clematis occurs most commonly in the	N/A	Flowering is known to occur from	The Stream Clematis is a climbing vine with	Potential threats to Stream Clematis		Stream Clematis is endemic to Australia,		4311	http://w ww.publi	t. Boyd and Hilton (1994)
202	Plant	Anemone Buttercup	Ranunculus anemone	Vulnerable	Good		Information regarding the dispersal strategies and agents					Threats listed included grazing and ski resort development.	Plants flower soon after snow	Costin et al. (1979) note that the Anemone Buttercup is		N/A	The Anemone Buttercup (family	Despite its attractive appearance, little			The lineal range of the species is	Plants flower soon after snow melt. A more detailed	14889	http://mr o.massey.	
203	Plant	Baloskion longipes	Baloskion longipes	Vulnerable	Good						The species grows in seasonally inundated peat.	The species is known to resprout after fire (Meney & Pate, 1999). The main	N/A	The species grows in seasonally inundated peat.		N/A	Baloskion longipes, Family Restionaceae.	Produces new shoots from underground			Baloskion longipes is known from the		5003	http://w ww.sprin	
204	Plant	Manypeaks Rush	Chordifex abortivus	Endangered	Good							It is also suspected to be relatively drought sensitive and it may have	N/A	The species grows in sand over gravelly clay in heath or	Associated species include Hakea cucullata, Banksia	N/A	Chordifex abortivus is an erect, slightly	Chordifex abortivus is a seeder, with a seed		It is likely that genetic lethals,	Three populations (five subpopulations)		64868	http://w ww.publi	
205	Plant	Cotoneaster Pomaderr	Pomaderris cotoneast	Endangered	LOW DATA							Little is known about the ecology of the species. It is probably killed by fire	N/A	Usually growing on shallow soils with outcropping rock.	Associated with Westringia sp. aff. longifolia, Grevillea	N/A	Some NZ species are asexual.	Flowering of P. cotoneaster occurs		Low numbers. The low numbers of P.	Occurs in south-eastern NSW (South		2043	http://w ww.envir	
206	Plant	Bent Pomaderris	Pomaderris sericea	Vulnerable	LOW DATA							Extant populations are potentially threatened by too frequent burning.	N/A	In NSW, habitat is given as 'on footslope, beneath sandstone	Vegetation is riparian scrub and associated	N/A	Little is known of its ecology or threats to				Recorded in recent times from three		9597	http://w ww.envir	East/West
207	Plant	Aphanes pentamera	Aphanes pentamera	Vulnerable	DATA DEFICIENT								N/A	Aphanes pentamera is confined to the Little Desert		N/A	The minute green flowers, 1.5–2 mm	Fruit non-fleshy; not hairy; not spinose. The			Aphanes pentamera, Family Rosaceae, is		18582	http://w ww.ecofl	Northern
208	Plant	Trailing Woodruff	Asperula asthenes	Vulnerable	DATA DEFICIENT							The main identified threats to Trailing Woodruff are weed invasion:	N/A	Trailing Woodruff is found in scattered locations within		N/A	Asperula asthenes, Family Rubiaceae.						14004	http://w ww.envir	East/West
209	Plant	Correa calycina	Correa calycina	Vulnerable	Good						Usually growing on or near banks of streams. Growing	The main identified threats to C. calycina are competition from weeds	N/A	On the mainland, it occurs on dark reddish-brown to brown	On kangaroo islands occurs with many species,	N/A	Correa calycina is a tall, dense, branching	For a study done on the family: Local			Correa calycina is only found on Kangaroo		7226	http://w ww.rbgsv	Northern
210	Plant	Davies' Waxflower	Phebalium daviesii	Critically Endangered	Good							Using dendrochronology it was determined that fires occurred in	N/A	Davies' Waxflower grows in free draining coarse sandy	The community is dominated by Eucalyptus	N/A	Phebalium daviesii flowers between late	Flowering occurs from Sept. to mid-Jan. The		For a rare plant, there is a high	This species occurs near St Helens in NE		16959	http://w ww.envir	Northern
211	Plant	Diels' Currant Bush	Leptomeria dielsiana	Vulnerable	DATA DEFICIENT							The main potential threat to Diels' Currant Bush is mining. Extensive	N/A	Occurs within heath and/or scrubland in the Scott River		N/A	Information relating to this species is very				Diels' Currant Bush was recorded from		5146	http://w ww.dec.	Northern. Information
212	Plant	Austral Toadflax	Thesium australe	Vulnerable	Good						Often found in damp sites in association with Kangaroo	Loss and degradation of habitat and/or populations by intensification	N/A	Occurs in grassland or grassy woodland. The Austral Toad-	Often found in damp sites in association with	N/A	Austral Toadflax is a small, straggling herb	Expansion out of Africa suggests long distance	Often found in damp sites in		Austral Toad-flax is found in very small		15202	http://on linelibrar	East/West
213	Plant	Isis Tamarind	Alectryon ramiflorus	Endangered	Good		The reproductive biology of A. ramiflorus is not well				The location of 80+ seedlings under an adult tree at	As these communities are fire sensitive, their distribution is affected	N/A	A. ramiflorus is confined to remnant araucarian	The Cordalba site has a small patch of araucarian	N/A		The species readily forms adventitious		Production of viable fruit	In late 1999 there were 69 individuals.		6416	http://w ww.sprin	East/West
214	Plant	Cossinia	Cossinia australiana	Endangered	DATA DEFICIENT							Fire and other disturbance not considered to be a potential threat.	N/A	Cossinia is known from fragmented relict patches of		N/A	Fruits are hairy, three-lobed, inflated	On the family: "Several were with inflated			Cossinia is known from fragmented		3066	http://w ww.sprin	East/West
215	Plant	Euphrasia bowdeniae	Euphrasia bowdeniae	Vulnerable	Good		ON EUPHRASIA: "Population sizes are generally small, at		ON EUPHRASIA: "Most seed is		Populations of Euphrasia species are transient. The	Populations of Euphrasia species are transient. The persistence of	N/A	This species in known to occur at 750 m asl but is likely	Euphrasia species are non-host specific semi-	N/A	Euphrasia, commonly known as eyebright,	ON EUPHRASIA: "Seed production is copious	Euphrasia species are non-host	The main potential threats to the	The species is endemic to the higher		21521	http://w ww.envir	East/West
216	Plant	Peninsula Eyebright	Euphrasia semipicta	Endangered	Good		ON EUPHRASIA: "Population sizes are generally small, at		ON EUPHRASIA: "Most seed is		The habitats of Euphrasia species are associated with	Populations of Euphrasia species are transient. The persistence of	N/A	ON EUPHRASIA: "Results from the research (Potts 1997)	Suitable habitat for this species is heathy, sedgey	N/A	ON EUPHRASIA: "The breeding system of	ON EUPHRASIA: "Seed production is copious	Euphrasia species are non-host		The four extant populations are		9986	http://w ww.doiw	Northern
217	Plant	Samadera bidwillii	Quassia bidwillii	Vulnerable	Good						Quassia is commonly found in areas adjacent to both	The main identified threats to Quassia are soil erosion and habitat clearing as	N/A	Quassia commonly occurs in lowland rainforest or on	Quassia commonly occurs in lowland rainforest or on	N/A	ON A RELATED SPECIES: "No	The fruit are ovid-ellipsoid, 1 cm long,			Quassia is endemic to Queensland and is		10094	http://w ww.sprin	East/West. Quassia
218	Plant	Samadera sp. Moonee	Quassia sp. Mooney C	Endangered	Good							The role of fire in regeneration of the Moonee Quassia is uncertain.	N/A	Shrubby layer below tall moist eucalypt forest and tall dry	The habitat of the Moonee Quassia at Moonee and	N/A	The Moonee Quassia flowers in November	The seed dispersal mechanisms of the	The Moonee Quassia can be	It is also possible that the Moonee	The species is endemic to the north		56783	http://w ww.sprin	East/West
219	Plant	Western Woolly Cypha	Cyphanthera odgersii	Endangered	LOW DATA							Cyphanthera odgersii subsp. occidentalis plants are killed by fire,	N/A	Cyphanthera odgersii subsp. occidentalis grows in orange	Associated species include Allocasuarina	N/A	Cyphanthera odgersii subsp. occidentalis is	Many other family members dispersed by			Cyphanthera odgersii subsp. occidentalis is		14002	http://w ww.scielo	Central
220	Plant	Menindee Nightshade	Solanum karsense	Vulnerable	Good							Threats: The main identified threat to Menindee Nightshade is that much of	N/A	Menindee Nightshade occurs mainly in lake beds or	The vegetation associated with this species includes	N/A	The flowers are purple, shallowly bell-	Has been observed in the field to have an			Menindee Nightshade is known from the		7776	http://w ww.istor.	Central
221	Plant	Lasiopetalum joyceae	Lasiopetalum joyceae	Vulnerable	LOW DATA						OTHER SPECIES IN THE GENUS occur in riverine	The main identified threats to L. joyceae are too-frequent hazard	N/A	Lasiopetalum joyceae grows in heath on sandstone, on		N/A	Flowers are in clusters of three to	ON A RELATED SPECIES: "L.			This species occurs within the		20311	http://w ww.envir	East/West
222	Plant	Round-leaf Lasiopetalu	Lasiopetalum rotundil	Endangered	LOW DATA							The main potential threats to Round-leaf Lasiopetalum include gravel	N/A	At Brookton, this species is known to grow in areas of	In the past it was collected from south of New Norcia,	N/A	There are no petals. There are five	ON A RELATED SPECIES: "L.			Round-leaf Lasiopetalum is		2885	http://w ww.dec.	East/West.
223	Plant	Wongan Hills Triggerpl	Stylidium coroniforme	Endangered	Good						ON THE GENUS: "The trigger plant genus Stylidium is the	Stylidium coroniforme is a short-lived species that appears following	N/A	Stylidium coroniforme grows on shallow yellow sand over	Associated species include Allocasuarina acutivalvis.	N/A	Under favorable conditions a	ON THE GENUS: "The seeds of triggerplants		Research into the genetic structure	Stylidium coroniforme is currently known		10122	http://cf 5pm8sz2l	East/West
224	Plant	Yellow Mountain Trigg	Stylidium galioides	Vulnerable	Good						ON THE GENUS: "The trigger plant genus Stylidium is the	The main potential threats to Yellow Mountain Triggerplant include fire,	N/A	Yellow Mountain Triggerplant grows in shallow soil among	Associated species include Dryandra quercifolia,	N/A	Stylidium galioides, Family Stylidiaceae,	ON THE GENUS: "The seeds of triggerplants			Yellow Mountain Triggerplant is		4666	http://flo rabase.de	Northern
225	Plant	Ooline	Cadellia pentastylis	Vulnerable	Good						More recently, the species was noted fruiting	The main identified threats to Ooline are localised extinction due to small	N/A	The geology of the hillslope is complex, being a mix of	Ooline grows in dry rainforest, semi-evergreen	N/A	Flowers are usually single, with white	There was prolific fruiting in the Cadellia			Ooline occurs on the western edge of the		9828	http://w ww.envir	East/West
226	Plant	Kelleria	Kelleria laxa	Vulnerable	LOW DATA				Plants grow on alpine humus		Plants tend to occur in slight depressions, and it suspected	All known patches of K. laxa appear unaffected by the extensive wildfires	N/A	Topography is more or less flat or sloping slightly	Kelleria laxa occurs in Poa costiniana grassland and	N/A	The cream to white flowers appear in	Population size is difficult to estimate.			Kelleria laxa is endemic to Victoria.		21991	http://w ww.dse.vi	Northern
227	Plant	Pimelea curviflora var.	Pimelea curviflora var	Vulnerable	Good						Descibed as being drought tolerant.	This species lives in an inconspicuous cryptic (hidden) habitat, and appears	N/A	This species occurs in open forest on sandy soil derived		N/A	The flowers are bisexual or female	Toxic to stock. ON GENUS: "may be			This species is restricted to the		4182	http://w ww.tandf	East/West
228	Plant	Glandular Pink-bell	Tetratheca glandulosa	Vulnerable	Good							The age of individual plants of Glandular Pink-bell is difficult to	N/A	Glandular Pink-bell is associated with areas of shale-	Common woodland tree species include: Red	N/A	The leaf margins have small stiff hairs that	Glandular Pink-bell resprouts from a		Glandular Pink-bell may be threatened	Glandular Pink-bell is endemic to NSW in		2350	http://rb gsyd.nsw.	East/West
229	Plant	Black-eyed Susan	Tetratheca juncea	Vulnerable	Good						Habitat suitability modelling conducted by Driscoll (2009).	The short-lived seed bank and very low seed viability after soil storage	N/A	Black-eyed Susan is found in sandy, occasionally moist	Associated species include Angophora costata.	N/A	Tetratheca juncea Smith (family	Reproduction in Tetratheca juncea is			Historic distribution Black-eyed Susan is		21407	http://w ww.envir	East/West
230	Plant	Fragrant Pepperbush	Tasmannia glaucifolia	Vulnerable	Good						Usually grows in or near Antarctic Beech Nothofagus	The main potential threats to Fragrant Pepperbush include vegetation	N/A	Fragrant Pepperbush is found on basalt substrate and,	Associated vegetation includes tall	N/A	Unpollinated female flowers of T.	This species is dioecious, with			Fragrant Pepperbush is restricted to three		21975	http://on linelibrar	East/West
231	Plant	Broad-leaved Pepperb	Tasmannia purpurasc	Vulnerable	Good			It is found in cool temperature high		It is found in cool temperature high rainfall		The main identified threats to Broad-leaved Pepperbush include weed	N/A	Broad-leaved Pepperbush occurs in chocolate brown	Broad-leaved Pepperbush grows in tall, moist	N/A	The leaves have a spicy or peppery	ON A RELATED SPECIES: "Few			Broad-leaved Pepperbush is known		9022	http://w ww.envir	East/West
232	Plant	Shiny Grasstree	Xanthorrhoea bractea	Endangered	Good							Vegetation is often heathy Black Peppermint (Eucalyptus amygdalina)	N/A	The Shiny Grasstree occurs in low-lying sandy coastal areas	Vegetation is often heathy Black Peppermint	N/A	The flowers of Xanthorrhoea species	The Shiny Grasstree is a trunkless perennial			he Shiny Grasstree is endemic to Tasmania		7950	http://w ww.envir	Northern
233	Plant	Macrozamia occidua	Macrozamia occidua	Vulnerable	Good							The main potential threats to M. occidua include inappropriate fire	N/A	Macrozamia occidua occurs in open forests dominated by	At one site, the species grows on coarse sandy soil	N/A	Male and female cones occur on	ON THE GENUS: "The value of inbreeding co-		He of 0.144, in comparison to	There are fewer than 1000 plants (Pl		64584	http://on linelibrar	East/West

The species information used to score the various factors under the NatureServe climate vulnerability index was collected from a variety of places. The first point of call for each species was the Australian Goverments Department of the Environment SPRAT database (Species Profile And Threats Database). The search then expanded to include various other government documents (often recovery plans), and a literature search using Google Scholar and Web of Science. Some species had more information than others, and this is reflected in the number of resources listed. Sources have not been referenced, the links to the information has just been collected. All websites/journal articles were accessed between April and June 2012. The seventeen species that were deemed as being 'data defecient', are still contained within this spreadsheet.
Information was copied from the primary source into this database, it is generally divided among the appropriate columns in the database (based on the different factors being assessed). However, sometimes the information for multiple columns/factors is contained in one of the cells.