



Threatened
Species
Recovery
Hub

National Environmental Science Programme



Appendices to the NESP Threatened Species Recovery Hub Project 8.12 final report: Species list and sampling methods; and survey costs

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The following Appendices are taken from work published by Smart et al. (2020). They represent a review of published primary and grey literature and best practice guidelines across each of the 212 vertebrate and plant species considered by experts to be most affected by the 2019/2020 megafires in Victoria Australia. Initial estimates were subject to review by members of the Victorian Bushfire Biodiversity Recovery Panel and species experts, comprising members from state government departments, NGOs and conservation agencies. A maximum of four survey methods and their attended detection probability are presented for each species, although not every survey method that can detect a species has been presented. In rare cases estimates are based on personal communication with field staff (e.g. detection dogs, eDNA surveys). Supporting each survey method, the cost of conducting a survey (for a given detection probability) is calculated based on the survey duration and several assumptions surrounding labour and material costs taken from the review process. For a detailed methodology of the review process and underlying assumptions of survey costs see Smart et al. (2020).

Smart A, Southwell D, Wintle B. (2020) Design of post-fire monitoring of threatened species: Optimising statistical power to detect species recoveries and responses to management after wildfire.

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Cover image: *Burnt coastal woodlands, Yamba, NSW. Image: Tatters Flickr CC BY-SA 2.0*

Appendix 1: Species list and sampling methods

Group	Species	Method 1		Method 2		Method 3	
		Survey Type	Detection Estimate	Survey Type	Detection Estimate	Survey Type	Detection Estimate
Birds	<i>Anthochaera phrygia</i>	active	0.37	area	0.21		
Birds	<i>Atrichornis rufescens</i>	area	0.44				
Birds	<i>Callocephalon fimbriatum</i>	area	0.44				
Birds	<i>Calyptorhynchus lathami halmaturinus</i>	area	0.44				
Birds	<i>Calyptorhynchus lathami lathami</i>	area	0.44				
Birds	<i>Climacteris erythrope</i>	area	0.44	mist	0.44		
Birds	<i>Dasyornis brachypterus</i>	area	0.44				
Birds	<i>Menura alberti</i>	area	0.44				
Birds	<i>Menura novaehollandiae</i>	area	0.44				
Birds	<i>Monarcha melanopsis</i>	area	0.35				
Birds	<i>Origma solitaria</i>	area	0.44				
Birds	<i>Pezoporus wallicus wallicus</i>	acoustic	0.66	point	0.63	autoacoustic	0.44
Birds	<i>Psophodes leucogaster lashmari</i>	area	0.32	acoustic	0.66		
Birds	<i>Pycnoptilus floccosus</i>	area	0.44				
Birds	<i>Stipiturus malachurus halmaturinus</i>	area	0.9				
Birds	<i>Zoothera lunulata halmaturina</i>	area	0.44				
Reptiles	<i>Amalosia lesueurii</i>	area	0.68	spotlight	0.68		
Reptiles	<i>Austrelaps labialis</i>	area	0.68				
Reptiles	<i>Austrelaps ramsayi</i>	area	0.68				
Reptiles	<i>Calyptotis ruficauda</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Carinascincus coventryi</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Coeranoscincus reticulatus</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Cyclodomorphus michaeli</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Cyclodomorphus praealtus</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Drysdalia rhodogaster</i>	area	0.68				
Reptiles	<i>Egernia mcphreei</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Eulamprus heatwolei</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Eulamprus leuraensis</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Eulamprus tympanum</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Harrisoniascincus zia</i>	area	0.68	pitfall	0.44		

		Method 1		Method 2		Method 3	
Group	Species	Survey Type	Detection Estimate	Survey Type	Detection Estimate	Survey Type	Detection Estimate
Reptiles	<i>Hoplocephalus bungaroides</i>	area	0.25				
Reptiles	<i>Liopholis guthega</i>	area	0.68				
Reptiles	<i>Lissolepis coventryi</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Myuchelys purvisi</i>	active	0.68	fyke	0.12		
Reptiles	<i>Phyllurus platurus</i>	area	0.68	spotlight	0.68		
Reptiles	<i>Pseudemoia cryodroma</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Pseudemoia rawlinsoni</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Saproscincus mustelinus</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Saproscincus rosei</i>	area	0.68	pitfall	0.44		
Reptiles	<i>Saproscincus spectabilis</i>	area	0.68	pitfall	0.44		
Mammals	<i>Acrobates pygmaeus</i>	camera	0.54	spotlight	0.68	thermal	0.62
Mammals	<i>Aepyprymnus rufescens</i>	camera	0.71	hair	0.44	area	0.68
Mammals	<i>Antechinus agilis</i>	camera	0.71	hair	0.44	area	0.68
Mammals	<i>Antechinus mimetes</i>	camera	0.71	hair	0.44	area	0.68
Mammals	<i>Antechinus stuartii</i>	camera	0.71	hair	0.44	area	0.68
Mammals	<i>Burramys parvus</i>	camera	0.54	elliott	0.44	hair	0.44
Mammals	<i>Cercartetus nanus</i>	camera	0.54	elliott	0.44	spotlight	0.68
Mammals	<i>Dasyurus maculatus maculatus</i>	camera	0.42	cage	0.44		
Mammals	<i>Isoodon obesulus obesulus</i>	camera	0.54	cage	0.44	hair	0.44
Mammals	<i>Mastacomys fuscus mordicus</i>	camera	0.54	cage	0.44		
Mammals	<i>Notamacropus parma</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Notamacropus rufogriseus</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Ornithorhynchus anatinus</i>	fyke	0.12	edna	0.62		
Mammals	<i>Perameles nasuta</i>	camera	0.54	cage	0.44	hair	0.44
Mammals	<i>Petauroides volans</i>	spotlight	0.68	thermal	0.62		
Mammals	<i>Petaurus australis</i>	camera	0.54	spotlight	0.39	thermal	0.62
Mammals	<i>Petrogale penicillata</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Phascolarctos cinereus</i>	area	0.68	autoacoustic	0.45		
Mammals	<i>Potorous longipes</i>	camera	0.71	hair	0.44	area	0.68
Mammals	<i>Pseudomys fumeus</i>	camera	0.63	elliott	0.45	area	0.44
Mammals	<i>Pseudomys novaehollandiae</i>	camera	0.63	elliott	0.45	area	0.44

		Method 1		Method 2		Method 3	
Group	Species	Survey Type	Detection Estimate	Survey Type	Detection Estimate	Survey Type	Detection Estimate
Mammals	<i>Pseudomys oralis</i>	camera	0.63	elliott	0.45	area	0.44
Mammals	<i>Pteropus poliocephalus</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Rattus fuscipes</i>	camera	0.63	elliott	0.45	area	0.44
Mammals	<i>Rattus lutreolus</i>	camera	0.63	elliott	0.45	area	0.44
Mammals	<i>Sminthopsis fuliginosus aitkeni</i>	camera	0.05				
Mammals	<i>Sminthopsis leucopus</i>	camera	0.54	elliott	0.44		
Mammals	<i>Tachyglossus aculeatus multiaculeatus</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Thylogale thetis</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Trichosurus caninus</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Vombatus ursinus</i>	camera	0.63	area	0.68	thermal	0.62
Mammals	<i>Wallabia bicolor</i>	camera	0.63	area	0.68	thermal	0.62
Bats	<i>Chalinolobus dwyeri</i>	harp	0.13	autoacoustic	0.13	acoustic	0.32
Bats	<i>Falsistrellus tasmaniensis</i>	harp	0.13	autoacoustic	0.13	acoustic	0.32
Bats	<i>Nyctophilus gouldi</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Phoniscus papuensis</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Rhinolophus megaphyllus</i>	harp	0.13	autoacoustic	0.13	acoustic	0.32
Bats	<i>Scoteanax rueppellii</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Scotorepens orion</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Vespadelus darlingtoni</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Vespadelus pumilus</i>	harp	0.13	autoacoustic	0.13		
Bats	<i>Vespadelus regulus</i>	harp	0.13	autoacoustic	0.13		
Frogs	<i>Adelotus brevis</i>	spotlight	0.25	tadpole	0.25		
Frogs	<i>Assa darlingtoni</i>	spotlight	0.25	tadpole	0.25		
Frogs	<i>Crinia tinnula</i>	area	0.44	acoustic	0.44		
Frogs	<i>Geocrinia victoriana</i>	area	0.44	acoustic	0.44		
Frogs	<i>Heleioporus australiacus</i>	spotlight	0.44	tadpole	0.44	autoacoustic	0.54
Frogs	<i>Lechriodus fletcheri</i>	spotlight	0.44	tadpole	0.44		
Frogs	<i>Litoria aurea</i>	spotlight	0.44	tadpole	0.44		
Frogs	<i>Litoria barringtonensis</i>	spotlight	0.44	tadpole	0.44		
Frogs	<i>Litoria booroolongensis</i>	spotlight	0.44	tadpole	0.44		
Frogs	<i>Litoria brevipalmata</i>	spotlight	0.44	tadpole	0.44		0

		Method 1		Method 2		Method 3	
Group	Species	Survey Type	Detection Estimate	Survey Type	Detection Estimate	Survey Type	Detection Estimate
Frogs	<i>Litoria citropa</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria dentata</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria jervisiensis</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria lesueuri</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria littlejohni</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria nudidigita</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria olongburensis</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria phyllochroa</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria revelata</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria spenceri</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria subglandulosa</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Litoria verreauxii alpina</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Mixophyes balbus</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Mixophyes fleayi</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Mixophyes iteratus</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Paracrinia haswelli</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Phyloria kundagungan</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Phyloria pughi</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Pseudophryne australis</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Pseudophryne coriacea</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Pseudophryne corroboree</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Pseudophryne dendyi</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Pseudophryne pengilleyi</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Uperoleia fusca</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Uperoleia mahonyi</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Uperoleia martini</i>	spotlight	0.44	tadpole	0.44		0
Frogs	<i>Uperoleia tyleri</i>	spotlight	0.44	tadpole	0.44		0

Appendix 3: Survey costs

Financial costs of each method utilised within the analysis. Units costs are set to \$0 if surveys are conducted by a fully equipped organisation. Survey duration is based on estimates from published guidelines and grey literature. All values are in Australian dollars.

Detection method	Survey duration (minutes)	Hourly rate (AU)	Unit	Unit cost
Acoustic survey	160	60	1	300
Active search	360	60	0	0
Arboreal camera	2.25	60	9	900
Automated acoustic monitor	45	60	5	1200
Cage traps	150	60	10	40
Cover trap	165	60	20	4
Detection dog	480	125	0	0
Electrofishing	240	60	1	1500
Elliott/Sherman trap	135	60	10	30
Environmental DNA	120	60	2	80
Fyke net survey	120	60	3	300
Ground count survey	60	60	0	0
Hair tube survey	45	60	10	17
Handheld thermal camera survey	240	60	1	1100
Harp trap	60	60	2	2000
Mist net trap	60	60	2	150
Motion trigger camera trap	75	60	9	900
Nest box count survey	120	60	10	60
Pitfall trap	195	60	10	15
Point count survey	240	60	0	0
Spotlight survey	240	60	1	600
Tapdole dipnet survey	120	60	1	15
Taxonomic ID	60	60	0	0
Track and sign survey	240	60	0	0

Further information:

<http://www.nespthreatenedspecies.edu.au>

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