

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Citation: Thackway, R (2012). Goorooyaroo Nature Reserve Site 3. Ver.1. VAST-2: tracking vegetation transformation in Australian landscapes. Australian Centre for Ecological Analysis and Synthesis, University of Queensland, Brisbane.

1. Name of the site/area

ACT Goorooyaroo Nature Reserve Site 3

Peter McKechnie (pers comm 2011), neighbour and son of the former lessee said the name of the site was called the "50 acre paddock". Adjacent to Mulligans Flat Nature Reserve. It was cleared in the 1970s.

2. Last modified (version no. 1)

Minor changes July 2013

3. Location of site

State: ACT

IBRAv7 Classification:

REG_NAME_7:	REG_CODE_7:	SUB_NAME_7:	SUB_CODE_7:
South Eastern Highlands	SEH	Murrumbateman	SEH06

Co-ordinates: 35°11'2.81"S, 149°11'3.77"E

Spatial precision re Attachment 1: Code = 1.

4. Area of the site

~23 ha of remnant within ~600 ha reserve established in 1994

5. Brief description of the natural undisturbed ecosystem of the site/area

Woodlands on the deeper soils of the lower slopes and flats (*Eucalyptus blakelyi* and *Eucalyptus melliodora*) McIntyre et al 2010.

6. Current purpose (2011) of the site/area

Public conservation reserve - Goorooyaroo Nature Reserve

7. Reference or benchmark vegetation description: pre clearing or pre European community

Area of the plot: n/a



VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

8. Brief history of the site/area

1819	Area managed by Indigenous Ngunnawal people.
1826	Sheep grazing with shepherds commenced.
1860	Fences constructed - continuous stocking with sheep commenced in large paddocks.
1920-25	Large old and dead trees felled for firewood for Canberra market.
1961	50 acre paddock fenced as a future lambing paddock
1962-65	Remaining trees ringbarked, left to stand to dry out and sold as firewood.
1966-78	Paddock converted to improved pasture. Repeated resown and fertilized.
1979-2004	Holding paddock for lambing ewes.
1994	Mulligans Flat Nature Reserve established.
2004	Continuous stocking with sheep grazing ceased.
2005	Kangaroo proof fence erected.
2008	Kangaroo population begins to rapidly increase.
2008	Commenced annual removal of pest species of plants and animals.
2009	Introduced large logs to the site from off the Reserve.
2010	Commenced annual Kangaroo cull

9. Proximity to large area of intact and largely intact and unmodified remnant

<250 m to remnant patch.

10. Sources of data and information used to complete description of use and management and their effects on native vegetation over time

- A. ACT Government - compiled by Parks and Conservation staff using information held on government records. Supplied by: David Shorthouse
djshorthouse@apex.net.au
- B. McIntyre, S, Stol, J, Harvey, J, Nicholls, AO, Campbell, M, Reid, A, Manning AD, and Lindenmayer D (2010). Biomass and floristic patterns in the ground layer vegetation of box-gum grassy eucalypt woodland in Goorooyarroo and Mulligans Flat Nature Reserves, Australian Capital Territory. *Cunninghamia* 11(3): 319-357.
- C. Site data from McIntyre *et al.* (2010)



VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

- D. Inferred by Richard Thackway
- E. Grant Woodbridge Area Ranger ACT Government pers. comm. 2011.
- F. Bureau of Meteorology rainfall anomaly 1900-2010
- G. Shaw, John H., Collins Australian Encyclopedia, Collins, Sydney, 1984, ISBN 0-00-217315-8
- H. Bureau of Meteorology The "Federation Drought", 1895-1902 <http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought1.htm>
- I. Peter McKechnie pers. comm. Son of the former owner of the property.
- J. NearMap <http://www.nearmap.com/>

Description of use and management and their effects on native vegetation over time (explanation of numbered codes in Attachment 1)

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1819	A	4	Managed resource protection 1.2.0	Area managed by Indigenous Ngunnawal people	A	7	Native vegetation unmodified	C	7
1820	A	4	Managed resource protection 1.2.0	Explorer Charles Throsby traversed the area	A	7	Native vegetation unmodified	C	7
1826	A	4	Grazing native vegetation 2.1.0	Sheep grazing with shepherds commenced. George Thomas Palmer is the district's first landowner establishing a large estate	A	7	Minimal impacts on species composition, vegetation structure and regenerative capacity	C	7
1826-29	F	4	Grazing native vegetation 2.1.0	Severe drought in NSW that caused Lake George to dry up	F	7			
1850	F	4	Grazing native vegetation 2.1.0	Severe drought, with big losses of livestock across inland (NSW)	F				
1860	A	4	Grazing native vegetation 2.1.0	Fences constructed - Set stocking commenced. Area used for sheep grazing	A	7	Start of impacts on species composition, vegetation structure and regenerative capacity	C	8

¹ ALUM = Australian Land Use and Management Classification

² LU = Land Use

³ LMP = Land or Vegetation Management Practice



VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1862	A	4	Grazing native vegetation 2.1.0	The Crown Lands Alienation Act 1861 (NSW), commonly referred to as the Robertson Land Act heralds a new wave of closer settlement.	A	7			
1864 - 66	F	4	Grazing native vegetation 2.1.0	Drought period was rather severe	F	7			
1868	F	4	Grazing native vegetation 2.1.0	Drought period was rather severe	F	7			
1871	A	4	Grazing native vegetation 2.1.0	Wallaby drives occur and continue to the 90s.	A	7			
1895-1902	F	4	Grazing native vegetation 2.1.0	Federation Drought was very severe	F	7			
1890	A	4	Grazing native vegetation 2.1.0	Hares increase rapidly in response to more open country.	A	7			
1895	A	4	Grazing native vegetation 2.1.0	Wallaby drives cease - population assumed to be locally extinct	A	7			
1897	F	4	Grazing native vegetation 2.1.0	Drought	F	7			
1903	A	4	Grazing native vegetation 2.1.0	Hares decline but rabbits reach alarming proportions. The English fox becomes well-established in the district.	A	7			
1905	C	4	Grazing native vegetation 2.1.0	Sheep grazing – continuous set stocking	C	7	Regeneration of taller shrubs (<i>Acacia dealbata</i> , <i>Acacia parramattensis</i> , and <i>Daviesia mimosoides</i>) expected to begin declining and become sparse livestock trampling and grazing, and subsequent erosion lead to low infiltration in parts of the landscape	C	8
1902	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			



VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1906	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1912	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1920	C	4	Grazing native vegetation 2.1.0	Fallen timber collected for firewood started to supply Canberra market	C	7			
1925	C		Grazing native vegetation 2.1.0	Area ring barked to promote pasture grass	C		Changes in pasture density	C	
1926	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1930-33	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1934-36	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			
1937-44	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1947-48	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			
1950	C	5	Grazing native vegetation 2.1.0	Regular control of exotic weeds (primarily serrated tussock <i>Nasella tricotoma</i> and sweet briar <i>Rosa rubiginosa</i>)	C	7			
1950	C	5	Grazing native vegetation 2.1.0	Commenced regular control of kangaroos to reduce total grazing pressure	C	7			
1960-62	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			



COMPILER: Richard Thackway.

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1964-65	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1971	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			
1979	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1958	H	4	Grazing native vegetation 2.1.0	Earth dams established	H		Some dead standing timber – most removed for fire wood	H	
1961	H	4	Grazing native vegetation 2.1.0	Site was fenced Kangaroos controlled to reduce competition for pasture grasses	H		Some mature trees left standing Native grass	H	
1962 - 1965	H	4	Grazing native vegetation 2.1.0	Sheep grazing Trees ringbarked and left to stand to dry out Cut for fire wood Stumps pulled Pushed in to a pile and burnt Some mature trees left standing for shelter for stock Kangaroos controlled to reduce competition for pasture grasses	H		conversion to exotic plant dominance due to grazing, the use of fertilizers and the introduction of exotic species pasture development - elevated phosphorus and nitrates supporting, * <i>Trifolium</i> and <i>Austrodanthonia</i> as dominants	B	
1966	H	4	Grazing modified pastures 3.2.0	Ploughed and sown to oats and clover and rye grass Fertilised with super 5 times Kangaroos controlled to reduce competition for pasture grasses	H		livestock trampling and grazing, and subsequent erosion leads low infiltration in parts of the landscape	C	
1978	H	4	Grazing modified pastures 3.2.0	Last time ploughed and sown Lambing ewes Kangaroos controlled to reduce competition for pasture grasses	H				



COMPILER: Richard Thackway.

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1979	H	4	Grazing modified pastures 3.2.0	Bushfire burns through the area, removing any fallen timber.	H		livestock trampling and grazing, and subsequent erosion leads low infiltration in parts of the landscape Some surface erosion	C	
1979	H	4	Grazing modified pastures 3.2.0	Grazing modified pastures 3.2.0	H				
1979	A	4	Grazing native vegetation 2.1.0	Bushfire burns through the area	A	7			
1982	E	4	Grazing modified pastures 3.2.0	Below average summer rainfall	E				
1984	E	4	Grazing modified pastures 3.2.0	Above average summer rainfall	E	7			
1985-86	E	4	Grazing modified pastures 3.2.0	Below average summer rainfall	E	7			
1989	E	4	Grazing modified pastures 3.2.0	Below average summer rainfall	E	7			
1992	E	4	Grazing modified pastures 3.2.0	Above average summer rainfall	E	7			
1994	B	4	Grazing modified pastures 3.2.0	Goorooyoroo Nature Reserve established in 1994	B	7			
1995	E	4	Grazing modified pastures 3.2.0	Above average summer rainfall	E	7			
1995	A	4	Nature conservation 1.1.0	Area declared as Goorooyoroo Nature Reserve	A	7			
1995	B	4	Nature conservation 1.1.0	Sheep grazing removed from the area	B	7			



COMPILER: Richard Thackway.

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
1995	B	4	Nature conservation 1.1.0	Collection of firewood ceased	B	7			
1995?	B	4	Nature conservation 1.1.0	control of exotic weeds (primarily serrated tussock <i>Nasella tricotoma</i> and sweet briar <i>Rosa rubiginosa</i>)	B	7			
1996	B	4	Nature conservation 1.1.0	Large population of macropods - without control. Kangaroo densities in the ACT reserves have been recorded at 233 km ⁻² i.e. extremely high -	B	7	High grazing pressure resulting from large populations of macropods	B	7
1997-98	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
2000-07	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
2004	H	4	Grazing native vegetation 2.1.0	Last sheep removed	H	7			
2005	C	4	Grazing native vegetation 2.1.0	Kangaroo proof fence erected to prevent roos leaving the reserve and damaging fence on adjacent private land and competing for pasture with domestic stock	C	7			
2006	A	4	Nature conservation 1.1.0	Predator proof fence completed	A	7			
2006	D	4	Nature conservation 1.1.0	Commenced removal of rabbits and foxes from inside the perimeter fence. Trapping, baiting and shooting	D	7			
2007	D	4	Nature conservation 1.1.0	Continued to remove rabbits and foxes	D	7	Accumulation of woody debris and leaf litter is very evident under the larger trees	B	7
2007	I	4	Nature conservation 1.1.0	Digital aerial photographs	I	7	Disc plough ridges very obvious NearMap 10 Jan 2010. Last ploughed was in 1978. Peter McKeahnie (pers comm) confirmed ridges caused by disc plough	C	7



COMPILER: Richard Thackway.

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
2007	B1	4	Nature conservation 1.1.0	Ground cover vegetation survey site: WG152 averaged across 4 sites Floristic group: 6	B1	7	Bare ground %: 12.1 Fallen log %: 1.0 Litter depth where present (mm): 5.8 Cryptogam %: 2.5 Nitrate-N (mgkg ⁻¹): 7.2 (high) Carbon (%): 2.1 pH(CaCl ₂): 4.5 (moderate) Available phosphorous (mgkg ⁻¹): 7.5 (moderate) C:N: 20 (moderate) Relative no. of weeds compared to native spp: 26:31 Observed number of native species across MFGNR 116 Observed number of native spp at site compared to MFGNR: 27% Levels of N and P applied in the 1960s-70s appear to have now recovered levels close to those of native soils.	B1	7
2008	B	4	Nature conservation 1.1.0	Kangaroo density in winter 142 km ⁻²	B	7	regeneration of taller shrubs (<i>Acacia dealbata</i> , <i>Acacia parramattensis</i> , and <i>Daviesia mimosoides</i>) observed to be low – current density is sparse Current levels of ground cover are moderately high consisting primarily of litter, plant basal area and cryptogams.	B	7
2008	D	4	Nature conservation 1.1.0	Recommended weed control spraying of Briars/St Johns Wort & Serrated Tussock	D	7			
2008		4	Nature conservation 1.1.0	Continued shooting/poisoning/trapping Foxes/Cats/Rabbits/Hares	D	7			
2009	D	4	Nature conservation 1.1.0	Continued spraying St Johns Wort & Serrated Tussock	D	7			
2009	B			Introduced large logs to the site from off the reserve	B	7			



VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Year	Source year	Reliability year	Land use (ALUM ¹)	List of LU ² and LMP ³	Source LMP	Reliability LMP	Observed effect and impacts on ecological function and native vegetation	Source effects	Reliability effects
2009	D	4	Nature conservation 1.1.0	Continued shooting/poisoning/trapping Foxes/Cats/Rabbits/Hares	D	7			
2010	D	4	Nature conservation 1.1.0	Continued shooting/poisoning/trapping Foxes/Cats/Rabbits/Hares	D	7			
2010	D	4	Nature conservation 1.1.0	Continued spraying St Johns Wort & Serrated Tussock	D	7			
2010	D	4	Nature conservation 1.1.0	Annual Kangaroo Management Program - Culling	D	7			
2010	D	4	Nature conservation 1.1.0	Experimental burn 1 ha	D	7			
2010	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			
2011	D	4	Nature conservation 1.1.0	Continued spraying St Johns Wort & Serrated Tussock	D	7			
2011	D	4	Nature conservation 1.1.0	Continued shooting/poisoning/trapping Foxes/Cats/Rabbits/Hares	D	7			
2011	D	4	Nature conservation 1.1.0	Annual Kangaroo Management Program – Culling. Estimated density 0.5 per hectare	D	7			
2011	C	4	Nature conservation 1.1.0	Field reconnaissance May 2011	C	7	Dense and thick ground cover. Lots of exotic pasture species.	C	7



VAST–2 - Site-based recording of use and land management and their effects on native vegetation over time

Attachment 1

Reliability standards used to compile historic and contemporary site-based chronologies.

Reliability level standards	Spatial precision (Scale)	Temporal precision (Year of observation)	Attribute accuracy (Land use, land management practices, effects on condition)
HIGH "Definite"	Reliable direct quantitative data. Examples: Site, plot and transect based records. Code: 1	Reliable direct quantitative data. Examples: Day-month-year, season-year and year. Code: 4	Reliable direct quantitative data. Examples: Inventory and counts, recorded observations from field survey and monitoring, farm records Code: 7
MEDIUM "Probable"	Direct (with qualifications) or strong indirect data. Examples: Land unit and soil-landscape reports. Code: 2	Direct (with qualifications) or strong indirect data. Examples: Mid 1850s Code: 5	Direct (with qualifications) or strong indirect data. Examples: Reconnaissance surveys, medium and moderate resolution remote sensing, regional mapping Code: 8
LOW "Possible"	Limited qualitative and possibly contradictory observations. More data needed. Examples: Land system, sub-bioregion and bioregion reports. Code: 3	Limited qualitative and possibly contradictory observations. More data needed. Examples: Early 1800s and first half of 19 th century. Code: 6	Limited qualitative and possibly contradictory observations. More data needed. Examples: Generalised descriptions and narratives, census-based surveys Code: 9

