

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

Citation: Thackway, R (2012). Goorooyarroo Nature Reserve Site 2, ACT. 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, Goorooyarroo Nature Reserve Site 2

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°11'15.64"S, 149°10'16.81"E

Spatial precision re Attachment 1: Code = 1.

4. Area of the site

~150 ha of remnant within 683 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.

Woodland overstorey thinned ~1920s and again 1960-70s. Adjacent to Mulligans Flat Nature Reserve.

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

Public conservation reserve - Mulligans Flat Nature Reserve.

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

Area of the plot: n/a



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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.
1905	Area used for sheep grazing – continuous /set stocking.
1920	Fallen timber collected for firewood started.
1961	Mature trees on the site were ring barked to promote pasture grasses.
1973	Dead and fallen trees felled for fire wood.
1979	Bushfire burns through the area.
1994	Mulligans Flat Nature Reserve established.
1995	Continuous stocking with sheep grazing ceased.
1995	Collection of firewood ceased.
1995	Pasture improvement ceased.
1996	Kangaroo population begins to rapidly increase.-
2006	Roo proof fence completed.
2006	Commenced annual removal of pest species of plants and animals.
2010	Commenced annual Kangaroo cull.

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

N/A

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 Gorooyaroo and Mulligans Flat Nature Reserves, Australian Capital Territory. *Cunninghamia* 11(3): 319-357.



COMPILER: Richard Thackway.

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- C. Site data from McIntyre *et al.* (2010)
- D. Inferred by Richard Thackway
- E. Grant Woodbridge and Peter Mills
- F. NearMap 2010
- G. Peter McKechnie pers. comm. 2011. Neighbour
- H. Bureau of Meteorology rainfall anomaly 1900-2010
- I. Shaw, John H, Collins Australian Encyclopedia, Collins, Sydney, 1984, ISBN 0-00-217315-8
- J. Bureau of Meteorology The "Federation Drought", 1895-1902 <http://www.bom.gov.au/lam/climate/levelthree/c20thc/drought1.htm>

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

Year	Source year	Temporal Reliability	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		Severe drought in NSW that caused Lake George to dry up	F	7			
1850	F	4		Severe drought, with big losses of livestock across inland (NSW)	F				

¹ ALUM = Australian Land Use and Management Classification

² LU = Land Use

³ LMP = Land or Vegetation Management Practice



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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
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		Drought period was rather severe	F	7			
1868	F	4		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		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			
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	C	8
1902	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
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			



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1920	C	4		Fallen timber collected for firewood started to supply Canberra market	C	7			
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			
1961	F		Grazing native vegetation 2.1.0	Mature trees on the site were ring barked to promote pasture grasses	F		Soil compaction, soil erosion, introductions of pasture weeds, change in function groups in the understorey, loss of soil on under slopes, Crown cover of overstorey reduced to <10%	C	
1960-62	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7	Regeneration of eucalypts stimulated because of open crown and less competition and rainfall	C	
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			



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1979	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1973 - 1995	F		Grazing native vegetation 2.1.0	Dead trees felled for fire wood. Fallen trees removed for fire wood	F				
1979	A	4	Grazing native vegetation 2.1.0	Bushfire burns through the area	A	7			
1982	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E				
1984	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7	Regeneration of eucalypts stimulated because of open crown and less competition and rainfall	C	
1985-86	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1989	E	4	Grazing native vegetation 2.1.0	Below average summer rainfall	E	7			
1992	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7	Regeneration of eucalypts stimulated because of open crown and less competition and rainfall	C	
1994	B	4	Grazing native vegetation 2.1.0	Mulligans Flat Nature Reserve established in 1994	B	7			
1995	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7			
1995	A	4	Nature conservation 1.1.0	Area declared as Mulligans Flat Nature Reserve	A	7	the effects of previous pastoralism on the ecosystems are significant, and it cannot be assumed that protection status alone will allow the ecosystems to spontaneously recover their complete diversity and function.	B	



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1995	B	4	Nature conservation 1.1.0	Sheep grazing removed from the area	B	7			
1995	B	4	Nature conservation 1.1.0	Collection of firewood ceased	B	7			
1995	B		Nature conservation 1.1.0	cessation of pasture improvement	B				
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 Kangaroo densities in the ACT reserves have been recorded at 233 km ⁻² i.e. extremely high -	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			
2006	A	4	Nature conservation 1.1.0	Roo 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



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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 %: 11.5 Fallen log %: 1.0 Litter %: 68.5 Cryptogam %: 5.4 Nitrate-N (mgkg ⁻¹): 0.5 (low) Carbon (%): 2.4 pH(CaCl ₂): 4.3 (mod low) Available phosphorous (mgkg ⁻¹): 4.9 (low) C:N: (moderate) 2.1:0.1 = 21 (high) Relative no. of weeds compared to native spp: 15:39 Observed number of native species across MFGNR 116 Observed number of native spp at site compared to MFGNR: 33.6%	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	Commenced spraying 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	D	4	Nature conservation 1.1.0	Continued shooting/poisoning/trapping Foxes/Cats/Rabbits/Hares	D	7			



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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	E	4	Grazing native vegetation 2.1.0	Above average summer rainfall	E	7	Regenerating eucalypt seedlings common and shrubs reasonably dense following good rains in 2008-10 after 2000-07 drought. Many larger trees are dead. Evidence of gully erosion/scalds - -NEARMAP	C	
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	D	4	Nature conservation 1.1.0	1Ha low intensity burn for ANU research	D	7			
2011	C		Nature conservation 1.1.0	Field reconnaissance May 2011	C	7	Multiple age regeneration of eucalypt suckers and seedlings – three separate heights/cohorts. Estimated to be 2yr, 5yrs and 10yrs. Surface erosion – patchy areas with the loss of A0 revealing finer gravelly A1 and B1. Other areas showing deposition in depressions	C	



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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

