

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

Citation: Thackway, R (2012). Blundell's Flat, ACT coupe 427a. Ver. 1. VAST-2: tracking the transformation of vegetated landscapes. Australian Centre for Ecological Analysis and Synthesis, University of Queensland, Brisbane.

1. Name of the site/area

Blundell's Flat, ACT, formerly Uriarra Forest pine plantation (State Forest). Comprising Drapers Block, coupe 427A (12.86 ha).

2. Last modified (version no. 1)

Minor changes July 2013.

3. Location of site

State: ACT.

Biogeographic context - IBRAv7 Classification:

REG_NAME_7:	REG_CODE_7:	SUB_NAME_7:	SUB_CODE_7:
South Eastern Highlands	SEH	Bondo	SEH14

Co-ordinates: 35°18'55.05"S,148°49'7.37"E

4. Area of the site

12.86 ha

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

Brown Barrel *Eucalyptus fastigata*, growing in association with Ribbon Gum *E. viminalis* in the Cotter valley has a relatively narrow altitudinal range from 820 to 1,310m but is most commonly found from 1,070 to 1,160m on south-east aspects. The community's position in the landscape is associated with protected (low radiation sites) on lower slopes and valley floors that are sheltered from westerly winds. It is favoured by soils derived from the volcanic rocks around Mount Coree, allowing it to replace Alpine Ash *E. delegatensis*, which would normally be found below the Snow Gum belt (Butz, M 2004b, p7).

To the west of the arboretum are Devonian volcanics while roughly south of the creek are Ordovician sediments. In places these have been metamorphosed by the underlying volcanics, which has resulted in migration of phosphorus from the rocks and typically very high exchangeable aluminium in the soils. pH below 4 (well documented in field trials). Source: Peter Snowdon pers comm.

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

Public reserve water catchment area

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

Area of the plot: N/A

	Overstorey	Midstorey	Understorey - ground layer
Species NVIS Level VI Sub-association	Brown Barrel E. fastigata, +/- Ribbon Gum E. viminalis, +/- narrow- leaved peppermint E. robertsonii, +/- Mountain White Gum E. dalrympleana	Bedfordia arborescens, +/- Olearia argophylla, +/- Pomaderris aspera +/- Polystichum proliferum +/- Coprosma quadrifida	Polystichum proliferum, +/- Pteridium esculentum
Species richness	4	14	42
Growth form	Tree	Shrub	Ferns and forbs
Structural Formation Class	Open forest	Open shrubland	Open fernland
Height	15-35 m average 25m	3-7 m	<1m
Foliage cover	30-70	10-30	30-70
Structural/age class (stem density sizes)	4% senescent/57% mature/39% regrowth (Source: M Doherty pers. comm. Brindabella NSW Site 109)		
Comments			Pryor (1938) describes the ground cover is a dense mat of Poa caespitosa dotted with many isolated plants such as Viola hederacca, Geranium pilosum, Veronica calycina, Hydrocotyle hirta, Ranunculus sp., Brachycome sp. and Dichondra repens.

The following environmental conditions characterise the site:

Geology Devonian volcanics. Source: Peter Snowdon pers. comm.

Soil Skeletal soils. Migration of phosphorus from the rocks and typically very high exchangeable aluminum in the soils. pH below 4. Source: Peter Snowdon pers. comm.

Fire Importance for regeneration and reproduction, frequency, area burnt. Low fire frequency and intensity. Source: Pryor, L. D. (1938).

Elevation Range 820 to 1,310m but is most commonly found from 1,070 to 1,160m. Source: Ingwersen, F. (1983).

Landform Gullies and on the eastern foot slopes of the Tidbinbilla Range. Source: Ingwersen, F. (1983).

Exposure Low radiation sites sheltered from westerly winds - on south-east aspects. Source: Ingwersen, F. (1983).

Rainfall Hot dry summers, cold winters and rain in autumn and late winter are expected but summers may be humid and wet in some years. Source: Ingwersen, F. (1983). The climate is continental with an average maximum temperature in January of 28°C and average minimum temperature of 0°C in July. Rainfall is uniformly distributed throughout the year and amounts to 790 mm while annual evaporation is 1420 mm. Source Snowdon et al. (1998) p103.



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8. Brief history of the site/area

1788	Unmodified and intact tall open Eucalypt forest; forest unaffected
1860	Area burnt by severe wildfire
1915	Water catchment area declared for Canberra –forest unaffected
1939	Area burnt by severe wildfire
1915-1954	Area managed as Water catchment area – frequent forest fires to control fuel loads
1955	Commenced selective logging of mainly Brown Barrel <i>E. fastigata</i>
1956	Clear-felled remaining wet sclerophyll forest and pushed timber into windrows with a bulldozer
1958	Felled timber burnt in February
1958	1st rotation Radiata (Monterey) Pine <i>P. radiata</i> planted by hand
1960	Controlled competing regrowth native vegetation, manually with axes, slashers, or hoes
1986	1 st rotation trees logged and crawler tractor used to snig timber off site
1987	Slash left on the ground to decompose – no ripping – too steep
1988	Roundup sprayed to kill regrowth. 2 nd rotation <i>P. radiata</i> planted. NPK fertiliser spread around every seedling by hand.
1990	Site hand cut the regrowth using brush hooks e.g. eucalypts, acacia and 1 st rotation pine seedlings
1999	2 nd rotation pines thinned and pruned. Thinnings were left on the ground to decay
2003	Area burnt by severe wildfire killed all pines
2003	Sterile rye corn grass seed was sown across the coupe using light aircraft to stabilise erodible soils
2003	Killed pines and native regrowth pushed over and windrowed with a bulldozer
2004	Site declared minimal use – rehabilitation
2005	Contactors were engaged to manually remove pine seedlings – pines were defined as a weed. Other weeds not controlled
2005-2012	Site left to rehabilitate



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

<100m to very extensive remnant.

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

- A. Map of Uriarra State Forest <http://www.bonzle.com/c/a?a=p&p=57787&cmd=sp> [accessed on 10 May 2013]
- B. ANU (Australian National University) (1973). A resource and management survey of the Cotter River catchment. Canberra: Department of Forestry ANU.
- C. Inferred by Richard Thackway
- D. Butz, M (2004a). Blundells Flat, Uriarra Forest ACT: a Cinderella story, in Calver, M. (ed.) A forest conscienceness: Proc. 6th National Conference of the Australian Forest History Society Inc, Augusta WA Sep 2004. <http://www.markbutz.com/Butz%202004%20Blundell's%20Flat%20AFHS.pdf> [accessed on 10 May 2013]
- E. ACT Government (2011). http://www.environment.act.gov.au/__data/assets/pdf_file/0007/236887/264.pdf [accessed on 10 May 2013]
- F. Snowdon, P, Woollons R.C. and Benson M.L. (1998). Incorporation of climatic indices into models of growth of *Pinus radiata* in a spacing experiment. *New Forests* 16:101-123.
- G. Butz, M (2004b). Blundell's Flat area, ACT: Management of natural and cultural heritage values - Background study for the Friends of ACT Arboreta. Jamison Centre ACT
- H. Peter Snowdon pers. comm.
- I. Neil Cooper pers. comm., 6 December 2011
- J. ACT Government (2004). Think water, act water [3 vols.]. Canberra
- K. Ingwersen, F. (1983). Numerical Analysis of the Timbered Vegetation in Tidbinbilla Nature Reserve, ACT, Australia. *Vegetatio* 51:3, 157-179.
- L. Pryor, LD (1938). The Botany, Forestry and Zoology of the Australian Capital Territory on an ecological basis. Commonwealth Government Printer Canberra.
- M. Department of the Interior (1951). ACT Forest type map prepared from 1944 military sheet photographs 454, 455, 458 & 459 by National Mapping Section, Department of the Interior, Canberra ACT. Interpreted by the Resources Division, Forestry and Timber Bureau, July 1951.
- N. Michael Doherty (unpublished)
- O. Michael Doherty and Richard Thackway pers. comm. Field visit 13 February 2012.
- P. National Parks and Wildlife Service (2009). Brindabella National Park and State Conservation Area, Plan of Management, National Parks and Wildlife Service, Part of the Department of Environment and Climate Change NSW, April 2009. ISBN 978 1 74232 282 7

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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	Spatial reliability LMP	Observed effects and impacts on ecological function and native vegetation	Source effects	Reliability effects	Spatial reliability effects
1800	G	4	Other minimal use 1.3.0	The park lies within the tribal boundaries of the Ngunawal/Ngunnawal, Wolgalu and Wiradjuri people. p21	G	7	1	Native forest not affected by management practices	C	7	1
1818	P	4	Other minimal use 1.3.0	The Southern Highlands were first traversed by non-Aboriginal people in 1818 when Meehan and Hume encountered the Goulburn Plains and Lake Bathurst p22	P	7	1	Native forest not affected by management practices	C	7	1
1820	A	4	Other minimal use 1.3.0	Brindabella Road beyond Uriarra dates back to the early 1800s and was once a major migratory route from the Bathurst and Lake George areas to the Kiandra gold fields.	A	7	1	Native forest not affected by management practices	C	7	1
1824	P	4	Other minimal use 1.3.0	Subsequent visits to the area and the construction of roads resulted in the initial settlement of the Canberra district p22	P	7	1	Native forest not affected by management practices	C	7	1
1829	G	4	Other minimal use 1.3.0	Explorer Mitchell traverses the area and notes a recognisable landmark from several directions, it was referred to by Surveyor-General Thomas Mitchell as the peak of Pabral. p13	G	7	1	Native forest not affected by management practices	C	7	1
1834	D	4	Other minimal use 1.3.0	Mount Coree, shown as 'Pabral' on Surveyor-General Mitchell published the first map of the Colony of New South Wales compiled by trigonometrical survey. p13	D	7	1				

¹ ALUM = Australian Land Use and Management classification

² LU = Land Use

³ LMP = Land or vegetation Management Practice



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1838	G	4	Other minimal use 1.3.0	Terrence Murray followed the bed of the Cotter to the crest of the mountain range. He would have passed through the area now known as Blundell's Flat and almost certainly followed the route taken for many generations by Aboriginal people. p13	G	7	1	Native forest not affected by management practices	C	7	1
1855	A	5	Other minimal use 1.3.0	Much of the land to either side of Brindabella Road, up to Blundell's Farm at the base of Mount Coree, was cleared for farming purposes	A	7	1	Native forest not affected by management practices Mean dry weight of litter 7.5 tonnes/ha	O	7	1
1860	B	4	Other minimal use 1.3.0	Area burnt by wildfire, p200. Cause unknown	B	8	1	Mean dry weight of litter 0.0 tonnes/ha	O	8	1
1865	D	6	Other minimal use 1.3.0	In the 1860's a series of legislative reforms (the Crown Lands Alienation Act 1861 (NSW), commonly referred to as the Robertson Land Act) enabled small settlers to select areas which had previously been the domain of wealthy squatters were made available to small settlers for selection. p15	D	7	1	Native forest not affected by management practices	C	7	1
1870	C	4	Other minimal use 1.3.0	The earliest selection in Parish Tidbinbilla, County Cowley was 40 acres in the middle of what we now call Blundell's Flat, selected by John McDonald of Uriarra. p15	D	7	1	Native forest not affected by management practices	C	7	1
1871	G	5	Other minimal use 1.3.0	There is some information about the practices of European settlers at the Flat, with about 10 acres of 'clearing' shown in 1871, corresponding to the current picnic ground, and an area of ringbarking shown in 1883 on steeper country to the east. P6	G	7	1				



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1885	G	5	Other minimal use 1.3.0	A Travelling Stock Reserve was declared in the 1880's between Condor Creek (Thompsons Corner area) and the Goodradigbee River at Brindabella, passing along the unnamed range. This formalised a long established route leading from the Canberra area across the Brindabellas to the mountain pastures of the Snowy Mountains. p3	G	7	1	Native forest not affected by management practices	C	7	1
1893	G	4	Other minimal use 1.3.0					... along Fastigata Creek 'very steep ridges' were 'heavily timbered' with 'gum and peppermint timber'. Downstream, in 1893-99 Musk Creek and Coree Creek drained 'lightly grassed mountainous country' which was 'heavily timbered with gum, messmate and a little peppermint'. p6	G	7	2
1901-08	G	4	Other minimal use 1.3.0	Following Federation of the Australian colonies in 1901, the decision to build the Federal capital at Yass/Canberra came in November 1908. p19	G	7	1	Native forest not affected by management practices	C	7	1
1910-13	G	4	Other minimal use 1.3.0	The land was formally ceded by NSW in 1910, and Canberra was announced as the name for the capital in March 1913. p19	G	7	1	Native forest not affected by management practices	C	7	1
1913	G	4	Other minimal use 1.3.0	Three months after this latter event, lands in the vicinity of Coree were acquired as part of the Federal Capital Territory This included holdings of J Blundell jr. (320 ac.) and J Blundell sr (560ac), W C McDonald (40 acres) and S A Shannon (103 acres), and an area north of these which was being grazed under licence by M & A J McDonald (2,352 acres) (ms - ACTPLA). p19	G	7	1	Native forest not affected by management practices	C	7	1



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1913 - 1915	E	4	Other minimal use 1.3.0	The original Uriarra Forestry Camp was established in 1913-1915 on the Brindabella Road, about three kilometres from the site of the current Uriarra settlement. The camp was established for forestry workers who cleared the existing eucalypt trees and established Radiata pine plantations which formed the origins of the ACT plantation forest industry.	E	7	1	Native forest not affected by management practices	A	7	1
1915	G	4	Other minimal use 1.3.0	The Blundells appear to have moved from Condor shortly after the acquisition, situated as they were in the catchment of the first water supply dam at Cotter, completed in 1915. The 'Federal Territory Features Map' of c.1915 shows no improvements in the vicinity of the Flat.	G	7	1	Native forest not affected by management practices	A	7	1
1918	B	4	Other minimal use 1.3.0	Area burnt by wildfire, p202. Cause unknown. p209	B	7	1	Native forest not affected by management practices	C	7	1
1923	A	4	Other minimal use 1.3.0	The first Forestry Camps, mainly concerned with the eradication of rabbits and the establishment of road access to re-forestation areas	A	7	1	Native forest not affected by management practices	C	7	1
1926	B	4	Other minimal use 1.3.0	Area burnt by wildfire, p202. Started by grazier's campfire, p209	B	7	1	Native forest not affected by management practices	C	7	1
1927	A	4	Other minimal use 1.3.0	The re-forestation activities gained momentum from 1927 onwards	A	7	1	Native forest not affected by management practices	A	7	1
1929	D	4	Other minimal use 1.3.0	The Blundell's Flat arboretum was commenced p7	D	7	1	Native forest not affected by management practices	C	7	1



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1936	G	5	Other minimal use 1.3.0	Williams, J. (n.d.) lists a number of camps housing forestry workers near Uriarra: Blundell's Camp - on Condor Creek; in use 1936. Uriarra - 'approximately 40 yards off Condor Stream [sic]'; in use 1923 by men engaged in clearing and digging up rabbit burrows; later moved closer to Uriarra Homestead p20	G	7	1				
1939	B	4	Other minimal use 1.3.0	Area burnt by wildfire, p202. Nov to mid-January driest months on record since 1918. The fire was illegally started in NSW by graziers. p202.	B	7	1	Large areas of regrowth trees consistent with an 1860 wildfire	B	8	1
1944	M	4	Other minimal use 1.3.0					Area mapped as Eucalypt Forest - mature - 50-89' (23-42 m) of a moderate density	M	7	1
1945	D	5	Other minimal use 1.3.0	Commercial logging of native forests below Mount Coree began in the 1940's. This involved selective felling of mainly Brown Barrel <i>E. fastigata</i> and also Alpine Ash <i>E. delegatensis</i> , Mountain Gum <i>E. dalrympleana</i> and Ribbon Gum <i>E. viminalis</i> (Higgins, M (1995). Bulls Head and the arboreta: an oral history project. National Estate Grants Program/National Trust of Australia (ACT), cited p.7)	D	7	1				
1940 s - 1960S	G	4	Other minimal use 1.3.0	Logging of native forests below Mount Coree is recorded in the 1940's and continuing until the early 1960's. This involved selective felling of mainly Brown Barrel <i>E. fastigata</i> , but also Alpine Ash <i>E. delegatensis</i> , Mountain Gum <i>E. dalrympleana</i> and Ribbon Gum <i>E. viminalis</i> in the area from Two Sticks Road in the north to about 10km south of Mount Coree. p20	G	7	1				
1954	I	4	Production forestry 2.2.0	Roads established through the native wet sclerophyll	I	7	1				



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1955	I	4	Production forestry 2.2.0	Forest was selectively cut to remove any saleable timber including <i>E. fastigata</i> , <i>E. viminalis</i> , <i>E. delegatensis</i> , <i>E. dalrympleana</i>	I	7	1				
1956	F	4	Production forestry 2.2.0	Clear-felled remaining wet sclerophyll forest (p102) and pushed into windrows. Eucalypt stumps not removed.	F	7	1	Site moderately highly disturbed	C	7	1
1956	I	4	Production forestry 2.2.0	Eucalypt stumps not removed.	I	7	1				
1957	C	4	Production forestry 2.2.0	Felled timber left for one year to dry	H	7	1				
1958	F	4	Production forestry 2.2.0	Felled timber burnt in February 1958. p102	F	7	1	Windrowing results in removal of soil into windrows as well as nutrients in the biomass resulting in the 'ash-bed effect' where growth is much enhanced (especially on nutrient poor sites) on the windrows compared to areas between windrows. On steep slopes there can be much movement of soil resulting in a composite of erosion and deposition sites.	H	7	1
1958	F	4	Production forestry 2.2.0	Planting with sturdy, 30–38 cm <i>P. radiata</i> stock was done in late June. p102	F	7	1				
1960	C	4	Production forestry 2.2.0	Controlled competing regrowth native vegetation, manually with axes, slashers, or hoes.	H	7	1				
1973	B	4	Production forestry 2.2.0	Area mapped as exotic forest	B	7	1				
1995	I	5	Production forestry 2.2.0	Logging of the pine trees commenced around 30 years after planting. Trees were cut by hand and snigged out of the forest mechanically. Logs were taken to Queanbeyan Milling for milling or other treatment	A	7	1	Soils are not very prone to erosion in intense storms because high organic matter and skeletal in nature.	I	7	1



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1996	I	5	Production forestry 2.2.0	Coupe was not ripped or mounded.	I	7	1				
1996	I	5	Production forestry 2.2.0	Coupe was sprayed in March with Round-up using a helicopter to kill regrowth e.g. Acacia, Eucalypts, blackberry and dogwood.	I	7	1				
1996	I	5	Production forestry 2.2.0	2 nd rotation Pinus radiata seedlings planted in July. Holes for seedlings were dug using a rotary excavator. Pine seedlings were planted at 3.6 m x 3.6 m spacing i.e. 450 stems / ha. In Sept 150 gm of NPK fertiliser was spread around every seedling by hand.	I	7	1				
1998	I	4	Production forestry 2.2.0	Coupe were treated by hand cutting regrowth using brush hooks e.g. eucalypts, acacia and pine wildlings from the 1 st rotation	I	7	1				
2002	C	4	Production forestry 2.2.0					Mean dry weight of litter 4.0 tonnes/ha	C	9	1
2003	I	4	Production forestry 2.2.0	An extreme wildfire killed all pines	I	7	1	Killed all pines at 7 years old. Also removed all weeds including blackberry, thistles, St Johns Wort	D	7	1
2003	C	4	Production forestry 2.2.0					Mean dry weight of litter 0.0 tonnes/ha	C	8	1
2003	G	4	Production forestry 2.2.0					Runoff and soil loss in all types are greatly increased if litter cover is reduced and more so if soils are dry. Cover of less than 7 tonnes/ha allows increased runoff, erosion and stream turbidity. p5	G	7	1
2003	I	4	Production forestry 2.2.0	Sterile rye corn grass seed was sown across the coupes using light aircraft	I	7	1	Soil was stabilised because the intensity of the wildfire had combusted all surface soil organic matter. NB: soil on these coupes was much less erodible than granite soils.	I	7	1



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2004	J	4	Land in transition 3.6.0	ACT Government decided not re-plant pine in the former pine plantation in Uriarra due to excessive slope, the need for riparian buffers, wildlife corridors, biodiversity and catchment needs, and straightening of boundaries near national parks	J	7	1				
2005	D	4	Managed resource protection, 1.2.0	Contactors were engaged to remove pine seedlings – pines were defined as a weed	D	7		Natural regeneration of the native forest vegetation was facilitated	C	7	1
2010	A	4	Managed resource protection, 1.2.0					Regrowth of the former (eucalypt) forest has been slow and far from complete. Possibly due to drought	C	7	1
2012	P	4	Managed resource protection, 1.2.0	Site survey	O	7	1	<p>Stratum –</p> <p>Top (Trees – overstorey) No stags or old trees. Height 8-10 m with FPC 10% <i>E. fastigata</i> and <i>E. viminalis</i></p> <p>Mid layer 1 (trees) Height 4-7 m with FPC 15% <i>Acacia falciformis</i> <i>Acacia dealbata</i> subalpine</p> <p>mid- layer 2 (shrubs) Height 2-3 m with FPC 15% <i>Acacia dealbata</i> subalpina <i>Cassinia aculeata</i></p> <p>Lower – layer 1 (shrubs and ferns) Height 0.5-1m and FPC 20% <i>Coprosma hirtella</i> (shrub) <i>Pteridium esculentum</i> (fern)</p> <p>Lower – layer 1 (grass) Previous logging evident. <i>Pinus radiata</i> stumps 8-10m apart burnt off at ground level. Viable soil moisture. Open tree and shrub crowns viable exposure of the skeletal soils.</p>	O	7	1



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11. Data Use and Accuracy Disclaimer

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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

