

# Restoring Native Grasslands in Semi Arid Regions of South Eastern Australia

on Farmland and Wildlife Sanctuaries

John Endersby  
September 2017

# Historical Reality: The myth of scrub

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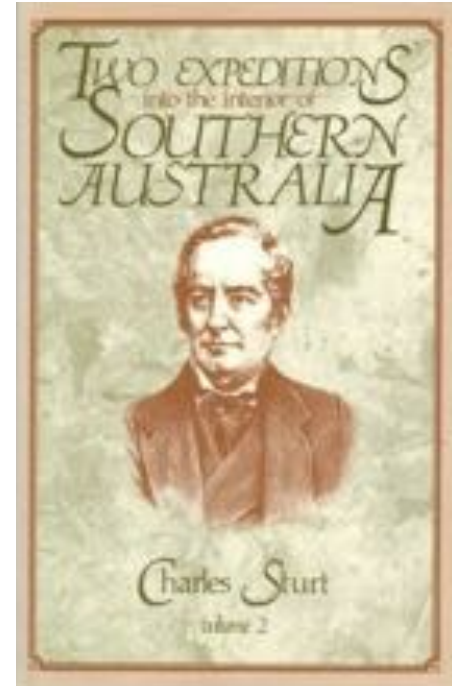
**Relevant references.  
From my proposed  
Management Plan for  
Moorunde Wildlife Reserve**



“Supposing a line to be drawn from the parallel of 34 degrees 40 minutes to the eastward, it will strike the Murray river about 25 miles above the head of the lake, and will clear the ranges, of which Mount Lofty and Mount Barker are the respective terminations. The line will cut off a space whose greatest breadth will be 55 miles, whose length from north to south will be 75, and whose surface exceeds 7 millions of acres; from which if we deduct 2 millions for the unavailable hills, we shall have 5 millions of acres of land, of rich soil, upon which no scrub exists, and whose most distant points are accessible, through a level country on the one hand, and by water on the other.”

*Two expeditions into the interior of southern Australia during the years 1828, 1829, 1830, 1831*

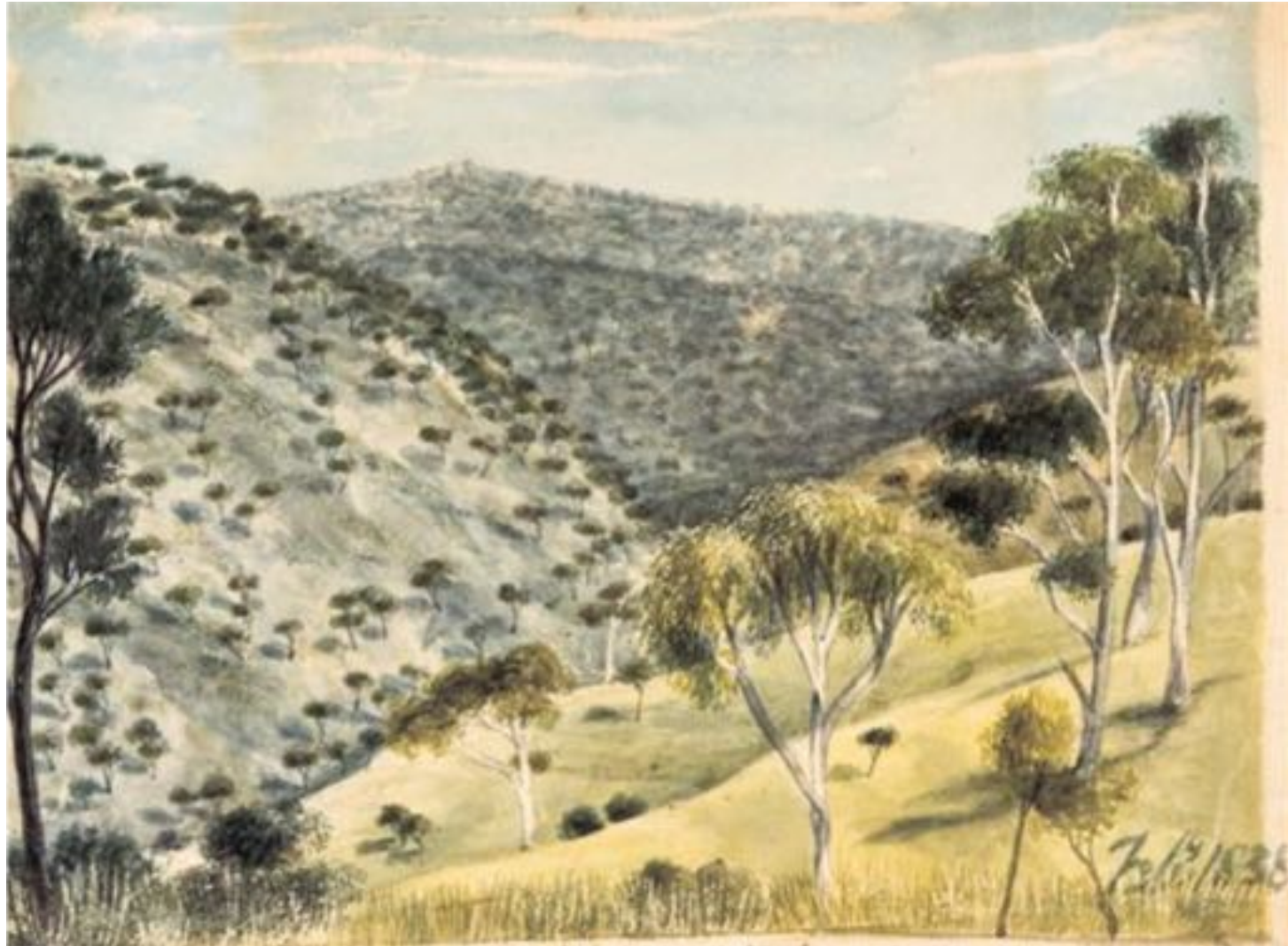
*Capt. Charles Sturt, 39th Regt. F.L.S. and F.R.G.S.*



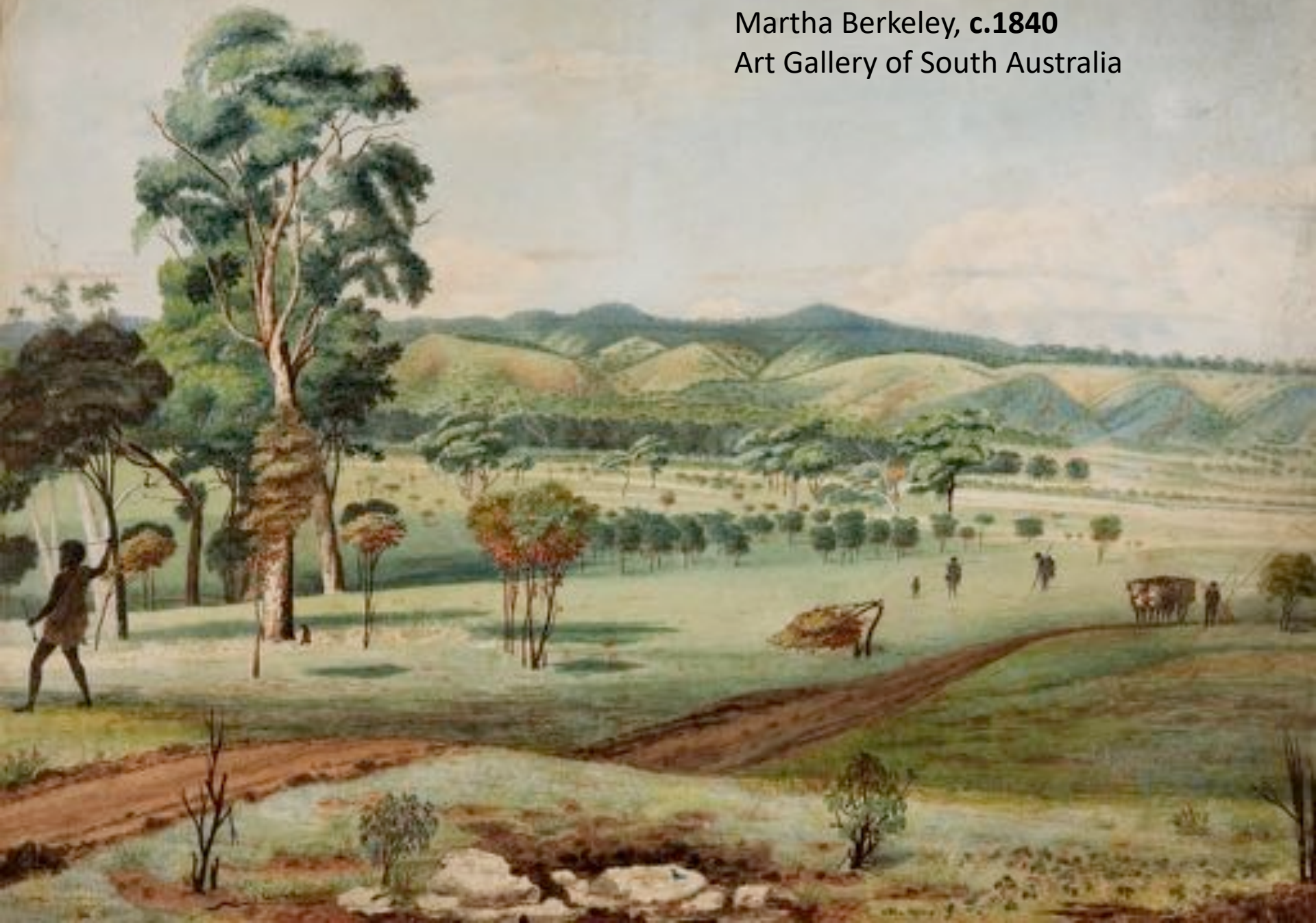
*Onkaparinga, South Australia*, John Michael Skipper, **1838**  
Art Gallery of South Australia



*Mount Lofty, Adelaide*, John Michael Skipper, **1838**  
Art Gallery of South Australia



*Mount Lofty from The Terrace, Adelaide*  
Martha Berkeley, c.1840  
Art Gallery of South Australia





Colonel William Light chose the site for the city of Adelaide.

It was not only easy to occupy without clearing but seemed to display the artifice “*of land in the possession of persons of property rather than left to the course of nature alone*”<sup>2</sup>.<sup>1</sup>

South Australia 1841-61<sup>1</sup>

Date of census	Total population	Population Adelaide urban area	Thousands/ac res cultivated	No. of farms
1843	17,196	6,107	18.9	N.A.
1846	25,893	c. 9,000	26.2	1,714
1851	66,538	c. 15,000	64.7	2,821
1855	97,387	c. 28,000	129.7	5,321
1861	130,627	35,380	428.8	7,090

1. M. Williams, *The Making of the South Australian Landscape*, 1974

2. W. Light, *A brief journal of the Proceedings of William Light*, 1839

“The rich green plains, not covered by dense forest, but by stately trees, rising here and there from their green foundations, in the same way as they do in the noble parks of England, the pretty streams, the broads, margined with beautiful shrubs and flowers, and the gently undulating hills crowned with trees, form altogether frequent scenes of interest and beauty. These beautiful spots are found in every part of Southern Australia, where the turf, the woods, and the banks of the streams which glide slowly through the vales have so much the appearance of well kept parks.”

*Description of South Australia*, Theodore Scott Esq,  
Published 1839, Duncan Cambells, Glassgow

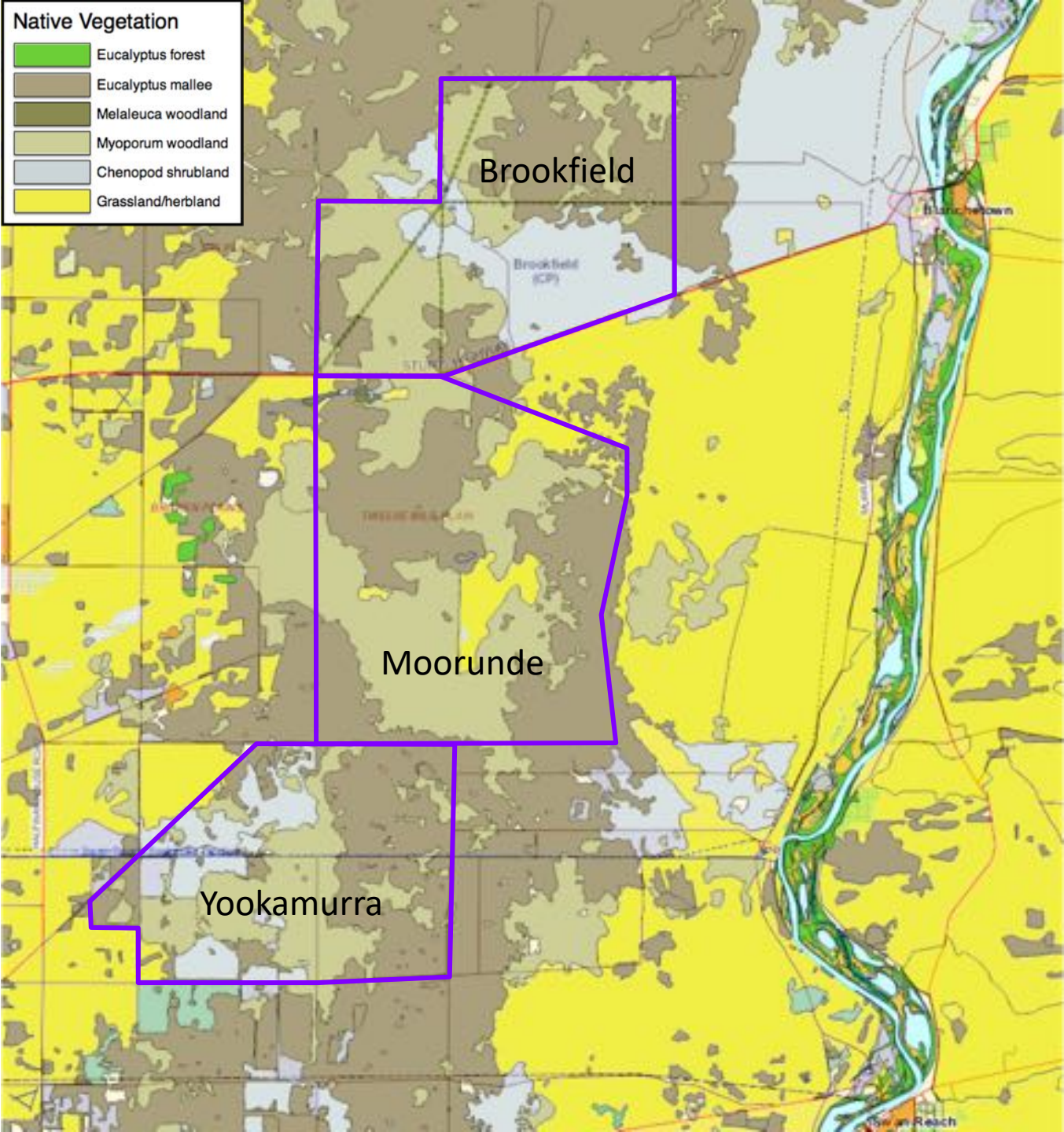
The development of the Rhine Villa (Cambrai) and adjacent communities on the Murray Plains appears to have progressed very slowly, for several years, after captain Charles Sturt and his men rowed down the Murray River in 1830.

Eight years after this exploratory journey ‘The Overlanders’ brought the first cattle to travel overland from Sydney to Adelaide through this area. Joseph Hawdon, one of ‘The Overlanders’ wrote in his diary:- ***“They crossed the Murray River on the 23<sup>rd</sup> March 1838”*** (near where Swan Reach stands today.) He also noted when travelling west ***“They were approaching hills without timber covering.”*** After passing the future site of Sedan they moved towards a water course known as the Marne, and ***“Because they found plentiful grass and water they decided to rest the cattle before moving on to the eastern side of Mt. Barker”***

*“History of Cambrai – The Early Years”*

**Native Vegetation**

- Eucalyptus forest
- Eucalyptus mallee
- Melaleuca woodland
- Myoporum woodland
- Chenopod shrubland
- Grassland/herbland



Brookfield

Moorunde

Yookamurra

Recent History:  
Portee Station/Moorunde Wildlife  
Reserve

***Then***

Moorunde 1970



Alwin Clements: After establishing Moorunde Wildlife Reserve, rain fell in 1970.  
Photo of Berna on Moorunde amongst the Spear Grass (*Stipa* species), 1970.

***Now!***

Moorunde 2015



Monument erected 2001 for the Society founders and volunteers.

***Then***

Moorunde 1974



Alwin Clements: Our central road area showing recovery, Moorunde, December 1974.



***Now!***

Moorunde 2015



Former grassland being taken over by invader species (native woody weeds).

***Then***

Moorunde 1985



Alwin Clements: Location of Glen's patch of *Pterostylis biseta* orchids, over 80 plants, Moorunde, August 1985.

***Now!***

Moorunde 2015



Former grassland being taken over by invader species (native woody weeds).

***Then***

Twelve Mile Plain 1975



Alwin Clements: Jack Platt using NHS's 500mm telelens,  
Portee Station [Twelve Mile Plain], May 1975.

***Now!***

Twelve Mile Plain 2012



Former grassland being taken over by invader species (native woody weeds).

***Then***

Twelve Mile Plain 1975



Alwin Clements: Jack Platt and Alwin Clements using 220mm telelens,  
Portee Station [Twelve Mile Plain], May 1975.

***Now!***

Twelve Mile Plain 2012



Former grassland being taken over by invader species (native woody weeds).

***Now!***

Twelve Mile Plain 2015



Even clay pans are being invaded...



***Now!***

Twelve Mile Plain 2015



... but when the clay pans flood, the shrubs drown.

# Recent History: Swan Reach Conservation Park

***Then***

Swan Reach Conservation Park 1992



North West Corner. Note ruined building.

***Now!***

Swan Reach Conservation Park 2015



The same ruined building with Calitris species in the background...

***Now!***

Swan Reach Conservation Park 2015



... and beyond the Calitris, the vast grassland area in the 1992 photo is being invaded by woody weeds.

***Now!***

Swan Reach Conservation Park 2015



Beyond the Calitris, the vast grassland area in the 1992 photo is being invaded by woody weeds.

# Recent History: District near Sedan and Cambrai


## Sheep farm, Sandleton 2014



Grazing sheep have effectively taken the place of land management by fire of the ice-age habitat maintained by Aboriginal People.



Sheep farm, Sandleton 2017



Wombat warren on farm  
property ripped/destroyed by  
a bulldozer. Wombats probably  
buried alive.

But the problem is, on farm properties the wombats aren't safe...

Bush retreat property, Sedan District 2014



... and in the long term, private sanctuary properties won't be suitable for wombats either—because of tall shrub invasion.

Moorunde July 2015



Meanwhile on some sanctuaries, in areas free of tall shrub invasion and where efforts are made to suppress Onion Weed, salinity problems are developing—this salt pan formed in just four years. Onion Weed can grow even when irrigated with seawater but salinity concentration in these bare areas exceed even that of seawater. The Onion Weed is all that is preventing the entire area from being bare.

# Salt Bush, Spear Grass & Fire

Brookfield Conservation Park, 2014



DEWNR trialling pre-burning salt bush prior to establishing native grasses...

Salt Bush plantation (Saunderston) after the Eden Valley bushfire, Jan 2014



... but salt bush is fire resistant...

2015



... and the two happily grow together as companion plants anyway!

2015





2016



# My Work at Joendara (Cambrai)



**Spear Grass Seeds—the matting problem blocks traditional seeders...**



... so I ran the seed through a hand operated chaff cutter.

Joendara 1990



Sowing the seeds.



Home-made combination ripper and seed hopper.

Joendara



On the year of sowing, Spear Grass doesn't germinate. But the ripping encouraged the existing seed bank of annuals to germinate with a flourish...

Joendara



...but the following year! ...





... then two years later I have a pasture of Perennial Spear Grass pasture with an understory of Annual Medic. Note, the effect of ripping can still be seen.

Joendara 2016



Joendara 2016



# Soil, Wombats, Weeds & Salinity























Does everyone know what Capillary Action is?



## NHSSA Newsletter 2016

In other parts of the reserve, the number of Onion Weeds noted is indeed challenging. After the good rains this year they have germinated from residual seed at many sites in the weed control areas, and as they are now flowering they are more prominent, so concerted efforts were made at two of these sites.

Flower heads were cut off, bagged and later destroyed so there was no chance of more seed adding to the seed bank, then the remainder of the plant was dug up and left for mulch.



Photo: Karen Collins

But the wombats aren't the only diggers...



Moorunde 2017



... and anyway, after the next good rain! ...

Moorunde 2017



... the Onion Weed is back with a vengeance!



It's just as well they aren't such vigorous diggers as the wombats.

# Importance of Grazing

(in the absence of land management with fire)

THE NATURAL HISTORY SOCIETY  
OF SOUTH AUSTRALIA INC.

## JOHN ENDERSBY ENCLOSURE

THIS PROJECT WAS ESTABLISHED IN 1996  
TO PROVIDE INFORMATION ON THE GRAZING  
EFFECTS PRIMARILY OF WOMBATS,  
KANGAROOS AND RABBITS.

THE MODIFIED FENCES ALLOW THE IMPACT OF  
EACH SPECIES TO BE MONITORED INDIVIDUALLY.

THE FENCING MATERIAL WAS PROVIDED BY THE DEPARTMENT FOR ENVIRONMENT AND NATURAL RESOURCES.

<b>A</b> NO ENTRY	<b>B</b> KANGAROO ENTRY	<b>C</b> RABBIT ENTRY	<b>D</b> WOMBAT ENTRY
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Grazing Trial established 1996 on Moorunde Wildlife Reserve.



Early years inside the No-Entry section.



Several years later in the No-Entry section.



No-Entry Section, 2016. This result was the point of the trial!





Ideal grazing pressure—note the seed stems nearly flat on the ground.



Ideal grazing pressure—note the seed stems nearly flat on the ground.



Grazing (or equivalent) is essential to suppress a build-up of dead leaf.

# Work, Trials & Results on Moorunde Wildlife Reserve

# Harvesting the Seed

One method of seed harvesting...



... just add a catcher to the end of a brush cutter.



Another way to harvest seeds using a mower...





... and if the grass is too tall, raise the mower!



# Soil Preparation

## Homemade Ripper



If the soil is hard-panned, ripping is required.



Weeds don't need to be suppressed...



... however, the softer the soil...



... the growth is much more vigorous.

*“grass up to the horses knees” – Alexander Buchanan, 1839*

# Sowing Spear Grass



Modified Leaf Blower/Garden Vacuum.





With mesh from an ironing board attached to end of suction pipe inside seed hopper.



Mount on a stand in a trailer (preferably towed by a tractor) and thousands of hectares can be sown.

# Germination



Spear Grass seedlings can be hard to find...



... and for trial work, a measured area of seedlings has to be monitored.  
Spear Grass seedlings marked with stakes.

Growth



Once the weeds become thick, seedlings are too hard to find and counting cannot continue.







Sowing rate  $0.01 \text{ g/m}^2$  is equivalent to  $100 \text{ g/ha}$ .  
This light sowing rate is to facilitate counting of seedlings.  
Recommend broad area/commercial sowing rate is  $1\text{-}4 \text{ kg/ha}$ .

# Calculating Results

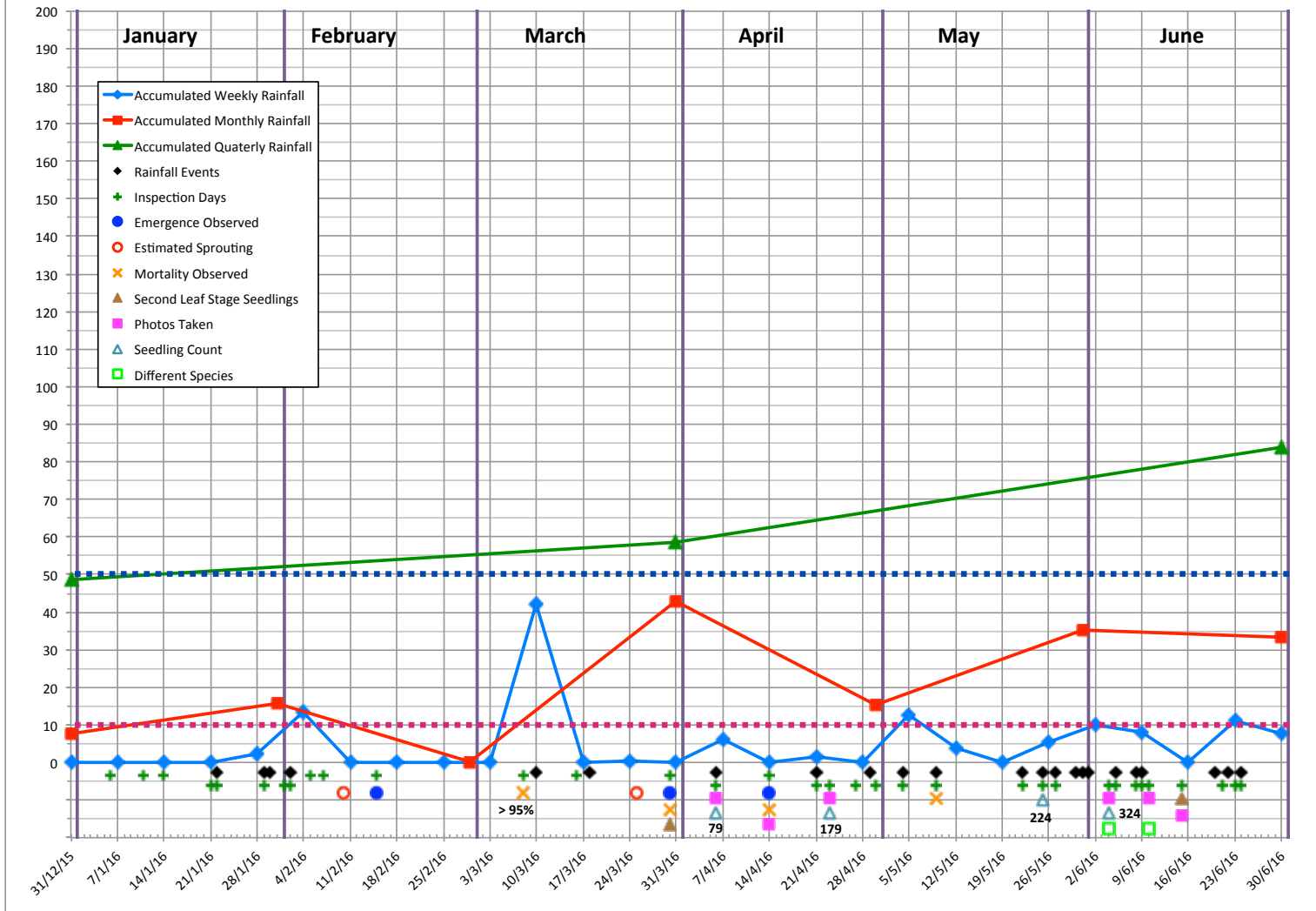


Scrutineer Geoff Weller checking my seedling counts in the Arrangement Enclosure.



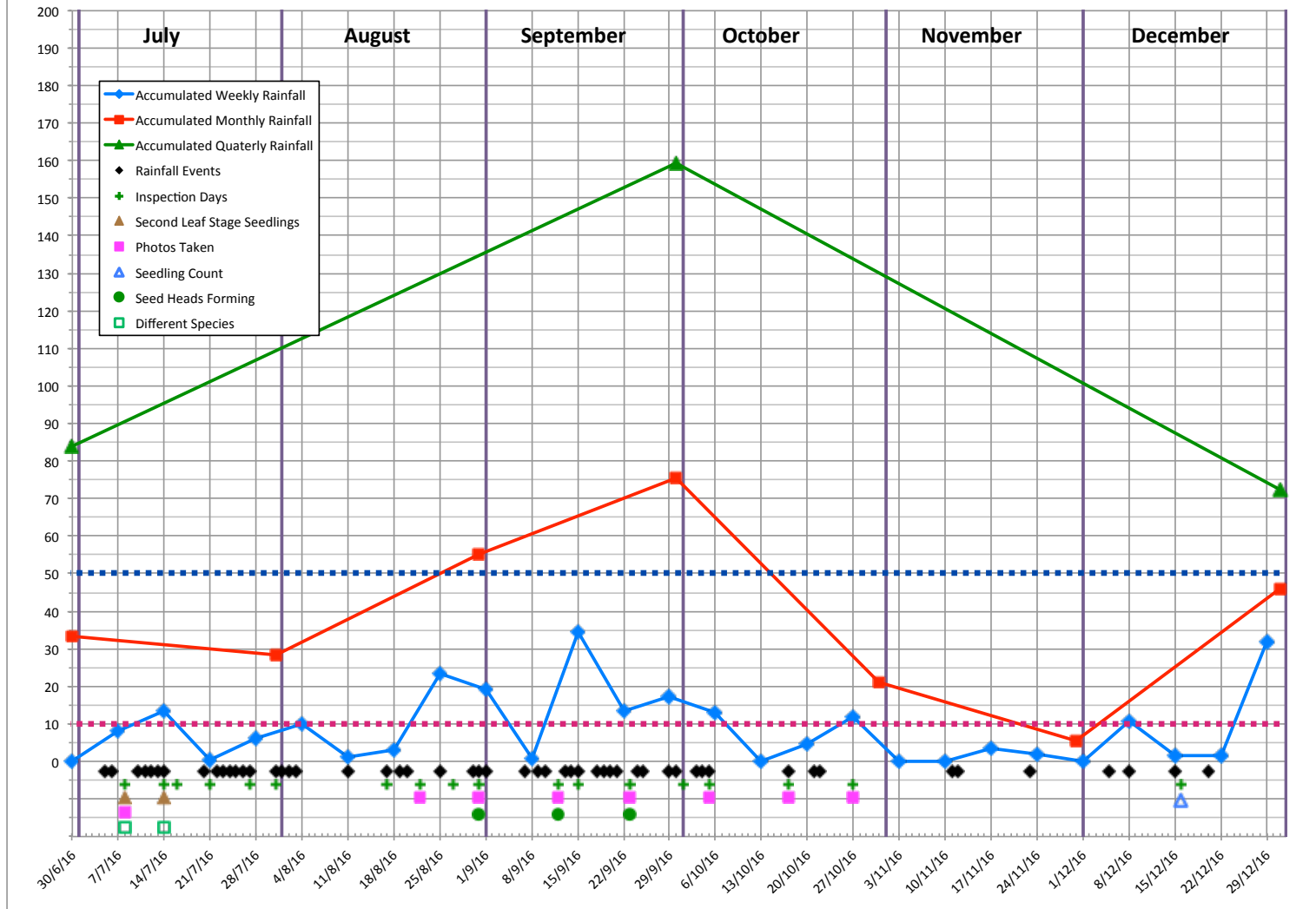
Scrutineer Graham Nye assisting with seedling count  
in the Forgotten Enclosure.

Graph 3(a) Forgotten Enclosure January to June 2016



Data is recorded throughout the year and results are quantified...

Graph 3(b) Forgotten Enclosure July to December 2016



... and graphed to show the relationship between sowing rates, germination, mortality rates and growth to seeding stage against rainfall amount and rainfall events.

John Endersby  
PO Box 66, Cambrai, 5353  
Ph. (08) 8564 5051

More information and articles at  
[www.bushmatters.org](http://www.bushmatters.org)