

Eighty-three years of vegetation change on the TGB Osborn Vegetation Reserve, Koonamore

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Abstract

The TGB Osborn Vegetation Reserve, Koonamore, was established in 1925 to record the changes in vegetation of a chenopod shrubland as the land recovered from severe stocking pressure. Permanent quadrats, photopoints and transects have recorded changes over 83 years to the present. Sheep were removed from the reserve, but rabbits, though initially suppressed, were not controlled for the first 50 years, and numbers were high in several periods. For the last 30 years continuous rabbit control has kept their numbers very low. There have been large changes in the vegetation in response to the changes in grazing pressure, and also rainfall events. Changes on one of the quadrats between 1926 and 2009 are presented in the form of a video, made from the photos taken at one of the permanent photopoints on the quadrat. The video shows a dramatic increase in *Atriplex* species during the first 55 years, and a more recent large increase in *Senna* species. A “time-lapse” video spanning such a long period is probably unique. Similar videos are being prepared for the many other photopoints on the Reserve.

Introduction

The TGB Osborn Vegetation Reserve, formerly known as the Koonamore Vegetation Reserve (KVR), is the longest-running vegetation monitoring project in Arid Australia, and one of the oldest of its kind in the world. KVR consists of 390 ha in the centre of Koonamore Station, a sheep grazing lease in the NE Pastoral Zone of South Australia, about 400 km north of Adelaide (32° 07'S, 139° 20'E) (Fig. 1).

Professor Osborn of the Botany Department, University of Adelaide, set up the reserve in the 1920s in cooperation with the lease-holders on “the worst eaten out area of the station”. It was fenced in July 1925. The original intention was to exclude all domestic stock and feral rabbits, and record how the vegetation recovered from overgrazing, by means of permanent quadrats, photopoints and transects.

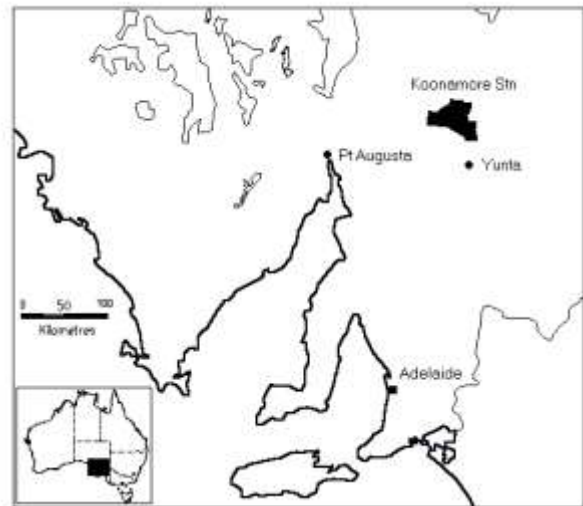


Fig. 1. Koonamore location map

However, rabbits were not completely excluded and after the first few years of control their numbers increased again. Effective rabbit control was recommenced in the mid 1970s.

The area is predominantly chenopod shrubland, with mean annual rainfall of 214 mm. The reserve consists of a complex of low sand dunes alternating with sand plain and harder loamy soils, underlain by travertine limestone. Tree cover is a low open woodland formation, including *Acacia aneura* Benth. (mulga), *Myoporum platycarpum* R.Br. (false sandalwood, sugarwood), *Alectryon oleifolius* (Desf). S.T. Reynolds (bullock bush, rosewood) and *Casuarina pauper* F. Muell ex L.A.S. Johnson (blackoak, belah). Historical background and a detailed description KVR may be found in (Hall *et al.* 1964) and (Sinclair 2005).

Many papers have been published describing changes that have occurred over the years, (Sinclair 2005), mostly based on data from the permanent quadrats. Less use has been made of the photographs, although there are now over 8,000 of these. Photographs are easy to take, but harder to use; a project has now been completed to digitise the entire photo collection to make it more accessible. The project was partly supported by the SA Pastoral Board, and has largely being undertaken by one of us (Dean Graetz). On completion of the scanning process, the next phase is to explore the possibilities of combining the repeat images from a single photopoint to make movies. A number of these movies have now been completed, and one will be shown at the conference.

The video

The video to be presented is one in a series entitled “Recalling the past – Responses of a degraded landscape”. It shows changes on the north-west portion of Quadrat 100, located in the northeast area of the Reserve, between 1926 and 2009.

Details of image processing

Negatives rather than prints were used, as these were expected to be of higher quality. Negatives were of several forms, the earliest being glass, then larger or smaller celluloid, finally 35mm black and white, or colour transparencies. Most recent photos are colour print 35mm film. Many different cameras have been used, with different types of lens, so that the field of view of the photos has not been consistent over time.

The negatives were first scanned using an Epson V700 scanner, on loan from the SA Pastoral Board, to produce large (~10 megapixel) Tif files. Site names, dates and other information were added as metadata, and the images were converted to jpg format, cropped where necessary, and brightness and other adjustments made to maximize clarity of image.

The images from each photopoint were then combined, with adjustments made to keep the registration as uniform as possible, so as to create a video sequence showing the changes in the field of view over up to 83 years. The images in the videos were annotated with the following information:

Acquisition date

Rainfall for the prior 12 months*

Camera position change

Estimate of rabbit abundance*

**Taken from published information about the reserve.*

Comments on the video

At the beginning of the sequence, in 1926, the area was almost bare. In the foreground are several dead shrubs, probably *Senna* species, and in the background several live *Myoporum* trees. There is very little ground cover or small shrubs. During the first few years, small herbs and grass appear and disappear, and within ten years *Atriplex* species begin to develop, and

the ground cover increases. A few *Senna* shrubs appear, probably germinating from seed left by the dead plants seen in the first few images. Biomass of grass and small shrubs fluctuates with changing rainfall.

By the 1950's *Atriplex* has become dense, and this increase continues until approximately 1980 (Fig. 2). During this time the *Senna* that germinated in the first few years have increased in size, but very few others have established. During this period rabbit numbers reached high levels several times, and many examples of rabbit damage to small shrubs were recorded. Vigorous rabbit control resumed in 1975, and by 1985 numbers were greatly reduced. Record rains in the period 1974-1976 are reflected in big increases in biomass at this time, and by 1980 many small *Senna* seedlings are appearing. These increase in size and number over the next 20 years, dramatically changing the appearance of the quadrat.

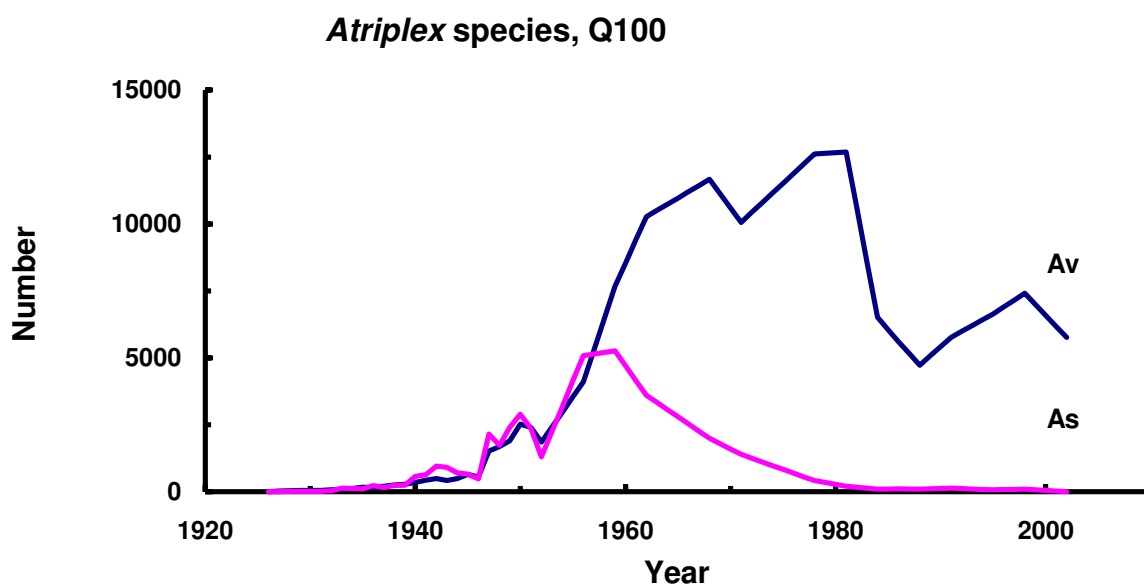


Fig. 2. Numbers of *Atriplex* (saltbush) on Quadrat 100. Av *Atriplex vesicaria*, As *Atriplex stipitata*.
From Sinclair (2005)

Time-lapse photography over this length of time is probably unique. Presenting the images in this form gives a striking impression of the dynamics of vegetation change, in response to several climatic and human influences. More videos of this type are in production, to bring to life the Koonamore photo archive.

References

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