Koonamore -- KVR -- Ecology, ancient and modern

KVR stands for the Koonamore Vegetation Reserve. Its official name is "The T.G.B. Osborn Vegetation Reserve, Koonamore", but KVR is easier.

This long-term vegetation monitoring project is now over 80 years old, making it one of the longest-running monitoring series of its type in the world.

Here are some details:

THE T.G.B. OSBORN VEGETATION RESERVE, KOONAMORE

A Brief History
The TGB Osborn Vegetation Reserve at Koonamore in arid South Australia has its roots in the historical traditions of ecological research in the School of Earth and Environmental Sciences; of land usage in South Australia; and of early 20th century ecology.

In the mid 1920’s Professor TGB Osborn and his colleagues extended their interests in ecology and field physiology of vegetation to the arid zone of South Australia. In 1892 Dixon had warned the Royal Society of South Australia of serious degradation of the soils and vegetation resulting from pastoralism and other alien influences in the region. Equally important to the origin of KVR was the new theory of vegetation succession derived from North American work early in the century. Osborn was particularly concerned with the question as to whether overgrazing by domestic and feral herbivores would result in return of the original vegetation via recognisable 'seral' stages, or whether the changes were "artificial, mere destructions and as such outside the ecologist's proper field". Although the concepts of 'succession' and the scope of ecology have developed and changed much since that time, nevertheless it was interest in "succession to climax" that gave the initial impetus to KVR and many other long-term vegetation studies from that time.

In 1925 a badly overgrazed area of 400 ha on Koonamore Station was fenced to exclude permanently sheep and (hopefully) rabbits. The aims were stated by Osborn as:

i) To study the regeneration of natural vegetation, particularly of saltbush and trees in an overgrazed area, when all grazing influences, including those of rabbits, are removed.

ii) To study the effect of grazing of known intensity on the process of regeneration.

iii) To study the ecology of the area and particularly the autecology of the species that are most valuable economically.

The theory of vegetation succession gave rise to the permanent charted quadrat as a technique for observing vegetation change. An extensive series of permanent quadrats was set up on KVR and supplemented by a series of fixed photopoints, in order to pursue the first aim. Although some of these were allowed to lapse within five years, many others were sampled more or less regularly, some almost annually up to the present. Several early publications reviewing the progress of vegetation change resulted (See Bibliography). Nothing was done towards the second aim but autecological and population dynamics studies are still being carried out, based on
KVR and its records. The Bibliography contains a complete listing of research publications arising from work done on the Reserve.

Much of the continuity of the earlier records is due to the efforts of Miss Constance Eardley, who while a lecturer in the Department of Botany, organised annual visits of students and staff to take records and maintain KVR. However, after 1950 the rate of sampling had begun to decline and in the mid 1960’s ceased altogether for a period of several years. In the 1970’s Dr Russell Sinclair reactivated the recording programme and also began a sustained effort at rabbit control. Although the Reserve was originally fenced with rabbit-proof netting, the rabbits were never eradicated and the population has fluctuated greatly with the seasons. Beginning in 1975, numbers have been kept very low by careful annual inspection and control. Since that time there has been marked seedling establishment of several tree and shrub species which showed little previous regeneration. The Reserve records now contain a history of the vegetation over 50 years without sheep grazing followed by over 30 years without significant grazing by either sheep or rabbits. Kangaroos and emus have never been excluded from the Reserve, as they can jump the fence, and their numbers vary with the seasons.

The monitoring work at KVR and the curation of its records is continuing under the direction of Dr Sinclair. The Reserve is also used for post-graduate study and complements the arid-zone research interests of Environmental Biology at the Middleback Field Station near Whyalla.

Site Description

The Reserve is located in the centre of Koonamore Station, a sheep-grazing lease 400 km north-east of Adelaide, South Australia (Lat. 32°07”S, Long. 139°20”E) in predominantly chenopod shrubland with mean annual rainfall of about 200mm. The area consists of a complex of low sand dunes alternating with sand plain and harder loam soils with travertine limestone on the intervening flats. The tree cover is a low open woodland formation. The sand dunes carry *Acacia aneura* (mulga), *A. burkittii* and *Eremophila* spp., the sand plain a dense stand of *Casuarina pauper* (blackoak, belah), and the harder loam soils a mixed community of *Myoporum platycarpum* (false sandalwood) and *Alectryon oleifolius* (bullock bush, rosewood).

Understorey shrubs, which also form low chenopod shrubland communities in some areas, include *Atriplex vesicaria* (bladder saltbush), *A. stipitata* and *Maireana sedifolia* (bluebush). Numerous other chenopodiaceous shrubs also occur, and grass and ephemeral herb cover varies with the seasons. Several species of *Senna*, *Eremophila* and other shrubs also occur.

The Photographs

The photopoint collection now contains over 8000 photos, from approximately 80 photopoints.

The Quadrats

Five large quadrats (four 100x100m, one 60x80m) and 7 smaller ones(10x10m and smaller) are regularly remapped. Several others were begun, but readings terminated after a few years. Quadrats were originally mapped annually or more frequently. After various gaps in the records, each quadrat is currently re-read about once every 3 years.

Other Records
The reserve is checked annually for rabbit activity. All burrows found are recorded, fumigated and filled in.
A transect across the reserve and beyond is walked annually to record kangaroo droppings, as an indication of kangaroo activity on the reserve and outside it.
Plant permanent transects across fences are re-read intermittently to record shrub density outside and in.
Several other monitoring projects are also in hand.
Almost no survey or recording of other animal activity is currently undertaken.

Acknowledgements, enquiries and contact details.
Work on the Reserve has been carried out by numerous staff of the Discipline of Ecological and Evolutionary Biology, School of Earth and Environmental Sciences, University of Adelaide, together with a host of undergraduate and postgraduate students, volunteers and others. Significant managers were Prof. T.G.B. Osborn, the founder (1925-1930), Prof. J.G. Wood (1931-1936), Miss Constance M. Eardley (1937-1974), and Dr. Russell Sinclair (1974-present).
Dr. Russ Sinclair is the current manager, to whom enquiries should be addressed. Access to more detailed records, information about the project etc. may be obtained through him, at:

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Why are volunteers needed?
At the end of November each year a work-camp is held at KVR, to remap quadrats, check the reserve for rabbit activity, retake photopoint photos and do general monitoring and maintenance work. The work would not have continued so long if it hadn't been for teams of students each year. At one time these camps were part of the Botany course, but now we rely totally on enthusiastic volunteers. We always seem to find enough, and many people have come back several times, they enjoyed it so much.

We gain increasingly valuable data to add to the records; volunteers have a week of camaraderie among the heat, dust, flies, inspiring sunsets & magnificent cooking (David Ladd is the chef. If you haven't heard of his reputation, ask around; he's famous). You also have the satisfaction of contributing to a worthwhile project of a kind that is rare in the world, despite the increasing interest in long-term records to detect such things as response to climate change.

The deal is that we provide transport and food, you provide the labour, and we all have a good time.
Papers, Conference presentations


Theses, The University of Adelaide


Images and maps

Aerial view of the Reserve, 1987

The Cottage, “Bindy-I” by the Reserve

Volunteers relax after the day's work
Some local wild-life

Koonamore daisy (*Erodiophyllum elderi*) a short-lived local

Sturt Desert Pea (*Clianthus formosus*)
Mulga (*Acacia aneura*), a common long-lived tree.

Sample data

**QUADRAT 100**
*Atriplex* species

**QUADRAT 100**
*M. platyphylum* including adults and seedlings
QUADRAT 100
Senna artemesioides, two sub-species including adults and seedlings

**NUMBER OF PLANTS**

- sub-species coriacea
- sub-species petiolata

**DATE**


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**Koonamore annual rainfall (1923-1993)**

**RAINFALL (mm)**