



Using historical photos to monitor long -term changes in South Australian rangelands

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Abstract

Using repeat photography, or retaking photos at a later date from the same or similar locality, is a technique often used to illustrate changes particularly in built environments. In rangelands and other natural environments, the technique in a general sense is often used to illustrate changes in rangelands measured or monitored by other means. The concept of a photographic monitoring point, or photopoint, is derived from this simple concept, and is commonly used to describe photo-sites taken from a fixed point, either using posts, pegs or other markers, or by means of an accurately geo-positioned location.

The project seeks to find out what ecological changes in the South Australian Rangeland area can be revealed simply by accurately re-locating sites where the original photo was taken 50-100 years ago. The original photos were sourced mainly from the records of early pastoral inspectors and Pastoral Board members. A few were sourced from pastoralists, as well as other government officials.

An appraisal of changes evident from 103 photo-pairs this year reveal almost ubiquitous improvement in site condition, and vegetation cover. However some areas, particularly with sandy soils show significant increases in less palatable shrubs and bushes.

Introduction

The poster provides a summary of changes in vegetation, soils, and other aspects of pastoral landscapes revealed from the relocation and repeat photography taken of the 103 sites where historical photos were taken, dating back to early last century. A book entitled “Land, Lease and Lens” has been produced which includes all the changing photo-pairs relocated in 2024.

The project, completed by Bren and Elizabeth Lay in 2024, was originally developed in 1995 as a research project funded by the then Australian Natural Heritage Trust. At that time, the Pastoral Board was overseeing the first round of pastoral lease assessments under the *Pastoral Land Management and Conservation Act 1989*. That program involved the establishment of fixed ground-based photopoints set up in each paddock or land type on all properties held under pastoral lease tenure. These new sites generally

had quantitative data including belt transects and plant species lists collected at the time of establishment or re-visit.

At the time of the first round of pastoral lease assessments, there was an expectation that these new photopoints would be regularly re-visited. The Board in the 1990's emphasised its desire to obtain the "Second point on the graph" as a general expression for its role in capturing any significant land condition trends at the site (and surrounding area) during this process.

The simple objective of this work was, therefore, to determine what information, at both a site, and regional level, can be gained from analysis of retakes of a suite of historical photos. This recognised that in most cases no data was gathered at the time the photos were first taken. However, for many sites, site data was gathered during retakes at the time the project was begun, in the 1995-2000 period. These sites will be shown as a series of three photos in the book, as in the series included here (fig 1-3).

Methods

Most of the photos gathered for this project and re-visited in 2024 were taken from published or unpublished historical texts, or from reports submitted to the Board by early pastoral inspectors or Board members.

Of particular note here is the photos taken by one of the Board's earliest Inspectors appointed in 1924; Mr Cecil Goode, who was the first person attached to the Board, who accurately recorded the location from where he took many of the photos in his inspection reports. These photos date from the early 1940's, and provided some of the more interesting photo-comparisons to come out of this study.

The methods used for this repeat photography project was similar to that of books or monographs published overseas, particularly in the United States of America, such as Hastings and Turner (1965).

The challenge: finding the sites.

We recognised that because there was generally minimal or no data attached to the original photos, then they would only be worth the effort to re-visit if there was a reasonable prospect that the location could be found, or that the scene in the photo could be matched with a reasonably degree of certainty.

Achieving this part of the project sounded straightforward, but turned out to be quite challenging for us. because:

- Paddock or property configurations had changed, with fencing not maintained or removed
- Tracks were no longer visible, or had overgrown or washed out.
- The original track alignment had sometimes been obliterated by bulldozed replacement tracks or roads
- Even where the site location was known or evident, it was sometimes physically impossible to drive to it, necessitating a walk or swim to the exact location.
- The location was found, but deemed unsuitable due to the original scene being occluded by tree or shrub growth in the foreground of the photo.
- Site data was not available to us, or to the lessee concerned.

Despite these challenges, some sites were found purely by perceptive observations of the station managers or the authors.

Results

Altogether 103 sites were re-photographed and a selection included in the book if they fitted this criterion *and* showed or contributed to an interesting story from an ecological or land condition perspective. The re-takes were completed in calendar year 2024. At least another 50 sites were searched for without success, or were abandoned/not included for the reasons listed above.

For each site, these successful or abortive attempts involved vehicle traverses of up to 100km or more, and the large amount of off-track traverse resulted in the destruction of more than a dozen AT rated tyres.

Analysis of changes

For the purpose of comparing and analysing the changes evident in the photo-pairs or triples, the rangeland region was divided into six districts recognised by the S.A. Arid Lands Landscape Board. As these districts were defined, at least in part, by land type, it made sense to investigate whether or not there were any generalisations which could be made about changes evident in each district. In addition, if any vegetation type occurred more widely, the question was asked as to what significant trends were evident over these long time periods.

For this paper and to illustrate the process, trends evident from a typical three-photo series in the Northern Flinders Ranges are summarised as Figures 1-3.

The generally barren landscapes in overgrazed areas and distinctive topographic features fortunately enabled accurate re-location of many sites, although tree and shrub growth in some cases precluded views of the mid and background areas.

Discussion [Conclusions/Implications]

When undertaking this project, we were guided in our approach by the many publications using this technique. A good discussion and bibliographic summary of work using repeat photography from an Australian rangelands perspective is Pickard (2002). He points out that there are relatively few comprehensive studies using this approach in this country. In South Australia, studies of changes over long time periods at Koonamore (Hall et. Al. (1964) provide some of the best insights as to the value of long-term repeat photography from fixed points.

It is from the USA that a number of studies such as this one provide the material on historical or ecological changes in a particular region or land type. Some of them have been produced as a book, often best described as a generalised account of landscape changes in a particular area or region. Progulské (1974), and Gruell (2001) have provided insightful accounts over long time periods in coffee-table book format.

Conclusions

The question most often asked of this work is “Were there any consistent trends evident across the rangelands of South Australia over these long time periods?”. Based on a careful comparison of changes evident in the 100 or so photo-pairs, it was clear that:

- More than 75% of sites had clearly improved in condition, based on commonly accepted criteria
- Many sites distant from stock watering points had dramatically improved due presumably to the reduction of rabbit populations since the release of the Calicivirus.
- A number of native trees have changed little over the 50-100 year time interval. Red mallee (*Eucalyptus socialis*), coolabah (*E. microtheca*) and Flinders Ranges corkbark (*Hakea edniana*) are foremost among these.

- By contrast, common wattle species, such as mulga (*Acacia aneura*), western myall (*A. papyrocarpa*) and sandhill wattle (*A. ligulata*) have often not survived over these time periods, or have regenerated spectacularly where seasonal conditions have enabled this to occur.
- In the northern cattle country, changes in abundance and composition of short-lived herbaceous plants and grasses are far more evident than was the case at sites further south. This may have been due, at least in part, to the heavy summer rains received in some areas in early 2024.

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1966

Figure 1: Dunbar Hut Warraweena Station, Flinders Ranges. A stock watering point about 1km west of here explains the degradation and gullying evident, compounded by uncontrolled goat and rabbit grazing pressure. The only vegetation on the range at rear are some remnant native cypress-pines.



1999

Figure 2 Dunbar Hut, Warraweena Station (now formalised as PP 6682). Dramatic improvement in land condition 33 years later, in part explained by the purchase of the lease by a conservation company, which also encourages the control of feral goats. Extensive regeneration of the pines is now evident, at rear, complemented by the recent growth of Lemon-scented grass following a good summer rainfall event that year.



2024

Figure 3 Dunbar Hut, Warraweena Station. (PP 6682)

The fence has now been removed for firewood, while the regeneration of pines continues on the range behind, together with various Wattle species. In the foreground dry seasonal conditions prevail with no annual growth

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