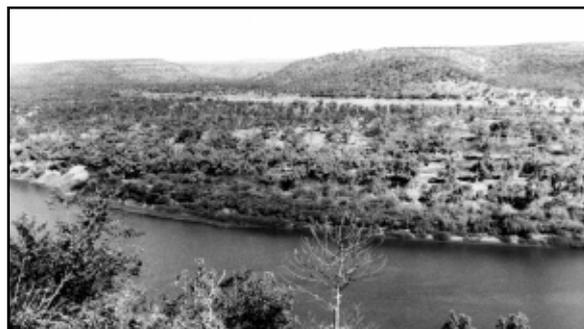


Landscape change in the savannas

A photograph survey funded by the TS CRC shows that many tropical savanna landscapes are gradually being transformed. Thickening vegetation seems to be a major trend and may have wide implications for the north ranging from how we manage fire to how we measure carbon credits, writes *Peter Jacklyn*.

From the TS-CRC's quarterly newsletter Savanna Links, Issue 14.



Above left, the 'Leichhardt' at the Depot Landing, Victoria River, c 1914. The same scene in 1997, above right. *Parkinsonia* has replaced riverside vegetation and vegetation of the plains and hills appear to have increased in density

The photos shown in this article are from a survey assembled by historian Darrell Lewis. He relates how in 1980 he was doing historical research on the VRD using photos from archives when "in amongst them I saw old images of present day locations which made me think 'hang on, something's changed here'".

"So I visited a few of the exact spots where the original photographs were taken from and re-took the shot," said Darrell. These visits confirmed his suspicions that the "something" that had changed was the tree cover, which seemed to have increased in density.

Darrell and other researchers like Dr Jeremy Russell-Smith of the Bush Fires Council of the NT realised that if widespread, such a trend would have implications for land management. The TS-CRC funded Darrell to conduct a more thorough comparison. He now has collected more than 100 of these photo pairs taken at various places across the Victoria River District. According to Darrell "a lot of the photos show the landscape has 'densed-up' a bit—there's a tendency for more trees or for trees having larger canopies in the later shots." (See front page pictures and Figures 1 and 2). "In only one or two comparisons has the trend gone the other way, for example in Jasper gorge" (see Figure 3). The general trend seems to be a thickening of trees in the flatter country along rivers, with less obvious change in the rocky uplands.

Caution needed

As Darrell points out, caution is needed when interpreting these photos. For a start, the older "before" photos tend to have been taken where the people were, on the flatter country and there are few shots from the

rest of the landscape. This is where a more intensive on-ground study by Oxford University PhD student Ben Sharp comes in. Ben surveyed hundreds of sites across all land types in Bradshaw station in the northern VRD. He too recorded thickening on the alluvial flats but they made up a relatively minor portion of his study area. By contrast, on Bradshaw's sandstone plateaus 58 per cent of his sites had experienced vegetation loss in the last 50 years compared to only 12 per cent that had thickened up. Ben also found more complex changes in many sites involving invasions by different plant species.

On a larger scale, clearer patterns were seen in a TS-CRC funded systematic survey of aerial photographs which sampled the entire VRD, and which dated back to the 1940s. Dr Rod Fensham and Russell Fairfax of the Queensland Herbarium undertook this project over the last two years. Preliminary results found increases in tree cover across a broad range of landscape types although some sites showed no change or decreases in cover.

A Recent Change?

The aerial photo survey showed that significant vegetation change seems to have occurred in the last few decades—and this is also supported by Darrell Lewis. A few years ago Timber Creek in the VRD hosted a 50th anniversary celebration for soldiers who had been stationed there during World War II. "When they looked at the bush of the 1990s the visiting veterans were shocked," relates Darrell Lewis. "Then they looked at some 1914 photos of the region and said 'that's what it looked like' (in the 1940s) very open country."

Such stories imply much of the changes occurred after World War II, as seen in Figures 1 and 2.





Figure 1 Above: Conellan's mail plane at Coolibah Station with Wondoan Hill in the background, 1959-60. Same location below, picture taken in 1996. In this case most of the scatter of trees on the far side of the airstrip in the repeat shot are probably growing along the banks of a shallow billabong which circles around the north side of the homestead.

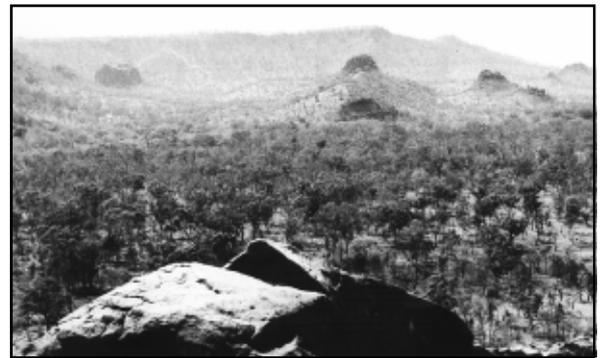


Figure 2: Pinnacles east of the road into Bullo River Station, 1967 (left) and 1999 (right). In the repeat photo there appears to be tree thickening.

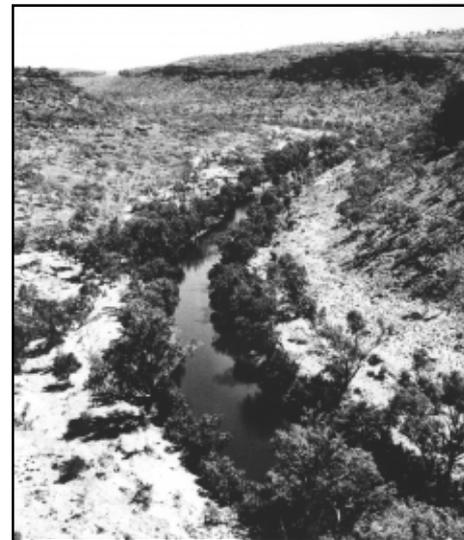


Figure 3: Left, view west along Jasper Gorge, 1950. Right photo taken in September 1998. Jasper Gorge is sandstone country and it is difficult to detect any major change in the original photo and the repeat.

Photo on left from the National Library, Frank H. Johnstone Collection



Changes in vegetation

The big question is of course: why is the vegetation changing? Dr Fensham thinks that while altered fire and grazing patterns have played a role, it is changes in rainfall that may be particularly important. “Changes in the way country was burned and the way it was grazed (due to the shift from Aboriginal to European management) occurred fairly early on, but the biggest changes in vegetation seem to have happened in the last 30 years,” said Rod.

“This correlates with climate changes—there were major droughts in the 30s and 60s and high rainfall in the 70s.” What we may be seeing is partly a decades-long recovery cycle from severe drought. (See article this issue, pages 10–11.)

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Other factors may also be involved, for example carbon dioxide concentration in the air has increased by more than 20 per cent since 1940 which may be encouraging plant growth. At the smaller scale of Bradshaw station, the picture seems more complex and Ben Sharp records clear correlations between grazing and fire history and various types of vegetation change. While the exact nature and extent of this landscape change is still unclear, what is plain is that the landscape can no longer be regarded as a static backdrop. Quite apart from the more obvious human impacts the passing decades may see slowly changing fuel loads for fires; varying carbon storage levels and altered impacts for animals in the tropical savannas.

For more information about land-management issues in northern Australia, go to the Savanna Explorer section of our website at <http://savanna.ntu.edu.au/>

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