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THE CHANGING GREENOUGH FLATS

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WHAT was the place like before farming? What is the story of human land use here? How and why did today's bush remnants survive? These are questions land managers often ask. The answers are typically used in planning future revegetation, but have also been applied to redesigning wheatbelt farming systems to function like the native vegetation they replaced.

We spent the period between 1996 and 2001 asking these very questions of the Greenough Flats (south of Geraldton). Although the Flats are often thought of as a pair of flood plains, they include the coastal Quindalup dunes on one side and Tamala limestone hills in between. The Flats are a fascinating subject given their long Aboriginal and European history. Aboriginal occupation of the Greenough region dates back more than 37 000 years. The first European pastoralists and herds appeared in 1850, followed by agriculture in 1857. The last pastoral leases were given up in the 1880s. When John Beard examined the area in 1974 there were few vegetation remnants on the flood plains. After consulting a local historian and similar landscapes at the Hutt Estuary he concluded that the flood plains were once covered in an *Acacia* low forest.

To look at the questions in more depth we turned to the archives – accounts left by European travellers such as George Grey, land surveyors' field books and maps, printed district plans and studies and specimen collections left by passing botanists. This material was re-mapped with GIS onto a recent land system map by Gary Rogers, from which it was possible to reconstruct the original landscape of Greenough, and then examine how it has changed since 1849.

The results were not particularly surprising for the non-alluvial parts of Greenough: scrub on the coastal dunes and various types of thickets on the Tamala limestone hills. The results for the flood plains were more detailed, probably because they were the subjects of much of the historical records, and also quite surprising. On both flood plains the records suggested savannah-like plant communities – extensive areas of grasses and herbaceous plants, dotted here and there with shrubs. Typical is the following diary entry by the early pastoralist Logue in which he described the Back Flats in 1850:

> ...we laid up on a fine flat lately burnt but with green Kangaroo grass [*Themeda triandra*] already springing from the tussocks clumps of a kind of wattle dotted here & there like a planted park, fine light alluvial soil...*31 October 1850*

These savannah woodlands were easy to travel across, and places where Europeans met large Aboriginal groups often engaged in digging for the yam *Dioscorea hastifolia*.

On the Front Flats, the alluvial plain nearest the ocean, the historical records suggest a pre-European vegetation of the northern two-thirds was a black wattle (*Acacia rostellifera*) savannah woodland. The southern third was probably

Estuary at mouth of Greenough River. Photo: M O'Connor.

Leaning river gum. Photo: M O'Connor.

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covered in grassland with sparse shrubs, clumps of *A. rostellifera* and *Muehlenbeckia florulenta*. This shrubby grassland also occurred on the southern part of the Back Flats. The mid-section of the Back Flats was covered in a York gum-wattle (*Eucalyptus loxophleba* - Acacia) savannah woodland. The northern part was similarly a savannah woodland, but one in which the woody component was a species of *Eucalyptus*. Although many of the early accounts refer simply to 'grass', a few detailed accounts from the Greenough Flats and nearby landscapes suggest that the grass species on both flats were mostly kangaroo grass (*Themeda triandra*) and spear grass species such as *Austrostipa elegantissima*. *Panicum decompositum* and species of *Danthonia* and Aristida species were present in places but perhaps not widespread. Herbs are also an important part of grasslands. At Greenough there were orchids such as *Microtis* and *Thelymitra*, the clover-like *Trigonella suavissima*, paper daisies (*Rhodanthe* and other species), and the vines *Dioscorea hastifolia* and *Clematicissus angustissima*. Wet depressions contained species such as the sedge *Schoenus*.

Interestingly the botanical symbol of the Greenough Flats – the 'bendy' river gum (*Eucalyptus camaldulensis*) – is not a focus of early traveller accounts. The field books of Phelps, who surveyed parts of the Greenough Flats twice in the early 1860s, record 'wattles' at about 50% of survey points and 'flooded gums', 'white gums' or 'white gum saplings' at about 1% of sites. It is possible that river gums were neither as extensive or large as they are at present, being then restricted to the main channel and creek lines of the Greenough River (which runs across the Back Flats and turns northward up the Front Flats).

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From historical records the study also reconstructed Aboriginal land use at Greenough, and the ecological patterns and processes of the relatively sudden transition to European land uses. This provided an understanding of how the original ecosystems responded to this change and how today's remnants were created. Europeans were intensely interested in utilising the Greenough Flats' natural resources; their subsequent pastoral success validated their landscape assessments. Early herds did well, although the suppression of regular firing by Aboriginal groups in the 1850s seems to have led to a proliferation of wattles on the flood plains. The first farmers on the Front Flats in 1857 had relatively little clearing to do, but those who took up land on the Front and Back Flats after 1861 had more work in front of them. Once the alluvial plains had been turned to agriculture, the other parts of the landscape came under pressure for agriculture even though the soil was not nearly so productive.

Today the flood plain ecosystems are probably extinct, although the good news is that many of the component species are still present on its margins. Plant species such as the once extensive grass *Themeda triandra* were collected for the first time from an area burnt in a very hot fire in January 1997, while others such as the mysterious wildflower 'dobies' remain to be found. Similarly, what became of the fauna of the flood plains is uncertain. For example, species such as the Australian bustard (*Otis australis*) were recorded at the Flats in the 1850s but their present status is unknown.

The results of the study may encourage flora and fauna researchers to look for species that until now haven't been thought likely to have occurred on the Flats. They are also useful to anyone thinking about revegetation or land management at Greenough. When compared to the landscape changes that have occurred in the central wheatbelt (e.g. Kellerberrin) the sequence at Greenough was found to be quite similar but much quicker. Thus in the wider context, the findings illustrate the contribution that history can make to planning sustainable futures for any wheatbelt landscape.

Silt in river side channel with River Gums over paddock plants. Photo: P Hussey.

Michael recently completed his PhD at Curtin University of Technology under the supervision of Bruce Gardiner. Michael's thesis was titled The historical ecology of the Greenough Flats, Western Australia. *and is now working on a book based on this research. If you have any historical information on Greenough Flat vegetation, including early photos or personal descriptions, Michael would be very interested to hear from you!*
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