

## 1. INTRODUCTION

P.F. Berry\*

### History of Land Use at Abydos-Woodstock

Abydos and Woodstock Reserves (Nos. 22626 and 22627) were formerly two adjoining pastoral properties in the Pilbara. Abydos homestead (no longer existent) was about 150 km south of Port Hedland and Woodstock homestead is approximately 20 km further south (Figure 1.1). The areas of the Reserves are 56,442 ha and 97,660 ha respectively, a total area of 154,102 ha. As they have been managed as a single reserve unit since the 1940s, they are hereafter referred to as the Abydos-Woodstock Reserve.

Land use may be divided into five successive regimes: traditional Aboriginal (up to 1860s), pastoral (1880-1945), agricultural research (1945-1976), Museum protection of Aboriginal cultural heritage and historical buildings (1978-1990) and contemporary Aboriginal (1991-).

#### *Traditional Aboriginal Use*

No reliable records of specific Aboriginal land use practices at the time of European settlement of the northern Pilbara in the 1860's are available, nor is the size of the Aboriginal population known, reflecting the settler's indifference to Aboriginal culture and society and the resultant dislocation of surviving traditional Aboriginal landowners, many of whom became stockmen, domestic servants or pearlers.

According to Hallam (1985) and Burbidge (1985) fire was used by Aboriginal people in hummock grasslands of the arid zone for a variety of purposes:

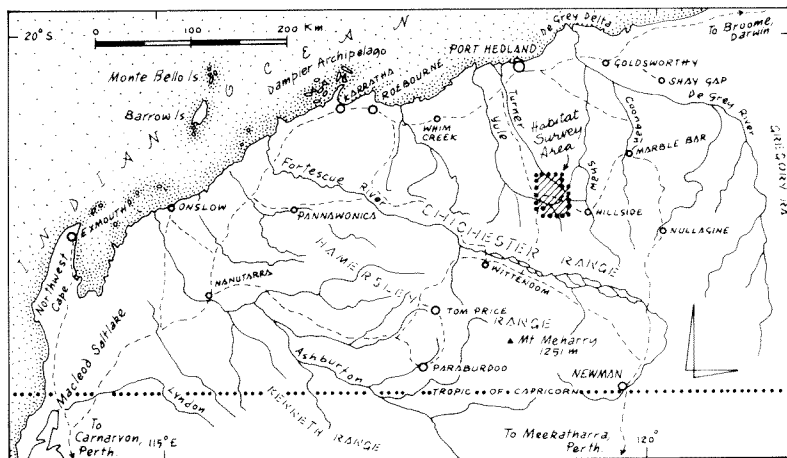
- a. Hunting. Fire was used to flush out both large and small animals;
- b. Stimulating regeneration and fruiting of food plants;
- c. Stimulating new nutritious growth which attracted game species;
- d. Signalling; and
- e. Clearing ground to facilitate travel.

The resultant mosaic of patches of country in different seral stages of recovery provided suitable habitat for animals both in terms of food and shelter, as well as reducing extensive wildfires as these soon ran into low fuel areas which acted as firebreaks (Burbidge 1985).

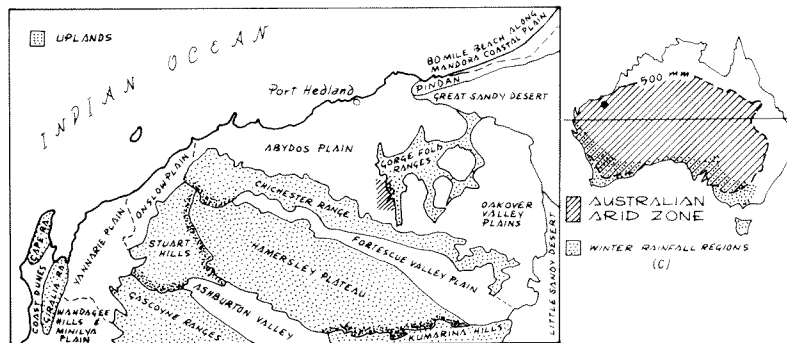
According to Ealey (1967a) early settlers reported that when the leases were first taken up, both Euro (*Macropus robustus*) and Red Kangaroo (*Macropus rufus*) were present in low numbers and that hunting by Aborigines as well as predation by Dingos (*Canis familiaris*) and Wedge-tailed Eagles (*Aquila audax*) were probably factors that controlled their numbers.

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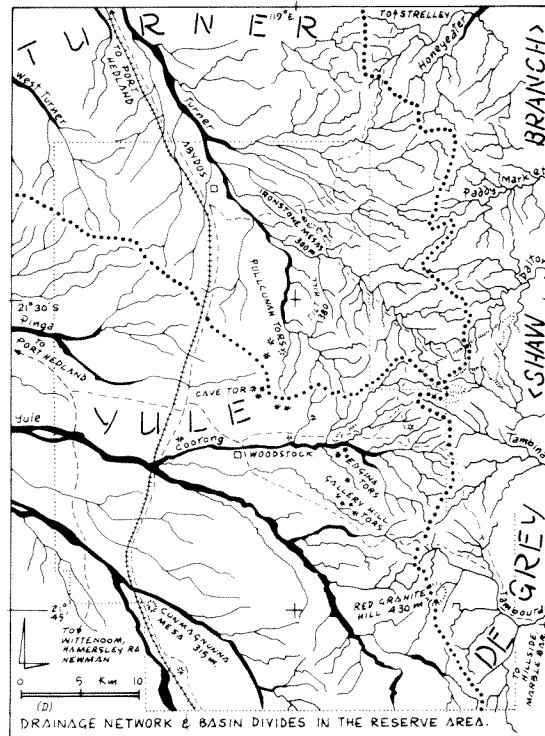
\*Western Australian Museum, Francis Street, Perth, Western Australia 6000.



(A) GEOGRAPHIC LOCATION



(B) PHYSIOGRAPHIC UNITS (from Beard 1975)



(C) DRAINAGE NETWORK &amp; BASIN DIVIDES IN THE RESERVE AREA.

**Figure 1.1** The Aabydos-Woodstock Natural Heritage Reserve: Location, Regional Context and Drainage.

### Pastoralism

Sheep were introduced into the northern Pilbara in 1866 (Ealey 1967a). Pastoralism soon expanded inland and in 1882 two leases were granted which were to form the basis of Abydos Station, the land-use being grazing of sheep. At about the same time the first lease that was to become Woodstock Station was granted and a stone homestead was built in 1883/84 (Bindon 1979). Although intended as a sheep station, discovery of gold at Tambourah induced the lessee to use the homestead as an inn until about 1898 when sheep grazing became the primary land use. A small number of cattle were also run on both stations for home consumption only.

The history of the sheep population in the northern Pilbara region is described by Ealey (1967a) and Suijdendorp (1955 and 1967). The first flocks relied on natural surface water resulting in localized overgrazing of the surrounding areas. Pumping of underground water enabled the area occupied by sheep to be expanded and the population increased dramatically despite heavy losses caused by occasional droughts, to reach a peak of nearly 800,000 in the early 1930s. Thereafter followed an overall decline influenced by droughts, the arrival of the blowfly (*Lucilia cuprina*) in 1942 which killed more than 100,000 sheep, depredation by Dingos and alleged competition by Euros which had dramatically increased in numbers. Sheep grazing virtually collapsed in 1946 resulting in abandonment of some pastoral leases and amalgamation of others between 1946 and 1960. Abydos and Woodstock were foreclosed in 1945 and the two properties jointly became a Government research station under the Department of Agriculture. (For details of changes in the sheep population in the Pilbara and the increase in cattle numbers since the 1960s, see Suijdendorp 1980).

Based on his experimental work conducted at Abydos-Woodstock research station and that of Burbidge (1943) in the district, Suijdendorp (1955 and 1967) concluded that stocking methods and levels, together with the burning practices of the pastoralists, had produced drastic changes to the vegetation when compared with early records of Battye (1915). Burbidge (1943) recorded that it was the custom to burn in winter (April to June) while mustering for shearing, a line of riders dropping matches into the spinifex. Suijdendorp's experiments showed that this annual winter burning degenerated a mixed pasture of high and low protein plants into either pure stands of *Triodia pungens* which, though edible, was too low in protein to sustain sheep breeding, or the inedible *Triodia lanigera* or *Triodia longiceps*. *T. pungens* is normally the climax community only on shallow soils associated with granitic hills and outcrops. However, under this management regime it expanded onto extensive areas of deeper soils at the expense of more nutritious plants. Burbidge (1943) showed that in the inland country, fires completely destroyed spinifex tussocks and regeneration was almost entirely from seed the following summer, unlike the situation nearer the coast where regrowth occurred from a viable butt. During the intervening period between winter burning and summer rains the burnt area remained bare in the inland country and was subject to erosion.

Work by Ealey *et al.* (1965), Ealey and Main (1967) and Ealey (1967a, b) at Abydos-Woodstock between 1954 and 1958, showed that the changes to the vegetation brought about by pastoralism favoured the Euro which is able to breed on a low protein diet in

pasture dominated by *T. pungens*, unlike sheep and the Red Kangaroo, which require relatively higher protein pasture. The consequence was that both sheep and Red Kangaroo declined while Euros became the most abundant vertebrate. According to Ealey, until 1932 there were reports of "many thousands" of Red Kangaroos on the best Woodstock pastures, but after the 1944-45 drought in which there was extensive mortality of both kangaroo species, only Euros recovered and Red Kangaroos were still rare in 1954-58. At the time of Ealey's work on Abydos-Woodstock, Euros had reached a density of between 1 per 2.8 ha to 1 per 10.5 ha. Euros were still subject to massive mortality during drought, probably as a result of the population size, and in the summer of 1953/54 Ealey records that thousands died in caves and around water holes at Abydos-Woodstock. Ealey (1967a) refutes the claim by pastoralists that increase in watering points increased density of Euros and that this was to blame for pasture degeneration. He points out that Euros had not degraded the vegetation in the areas where there were numbers of natural water holes before the introduction of sheep. He concludes "It is probably safe to say that pasture degeneration and subsequent fall in sheep numbers would have occurred in the absence of Euros". This view was supported by Suijdendorp's work which demonstrated degeneration of pastures by sheep in enclosures which excluded macropods.

Attempts by pastoralists to control kangaroos by largescale but inefficient poisoning in the 1930s and 1940s are mentioned by Ealey (1967a). As a result of his ecological work on Euros, Ealey developed an effective method of poisoning them at water points. At nearby Talga Talga Station near extermination of Euros was achieved in 1959 throughout an area of 48,600 ha, with the estimated number of animals killed exceeding 12,500 (Ealey and Richardson 1960, Ealey 1967a). From 1960-62 a regional campaign of poisoning Euros was undertaken based on Ealey's method, together with shooting at natural water holes. This reduced their population in the region and on Abydos-Woodstock to the current low levels which are probably similar to those of pre-European times.

#### *Agricultural Research Use*

The Department of Agriculture attempted unsuccessfully to run Abydos-Woodstock as a commercial concern for the first few years after acquisition, maintaining established management practices. In 1948 a joint committee consisting of members of CSIRO, Department of Agriculture and the Institute of Agriculture (University of Western Australia) decided to set up an experimental programme to investigate pasture management and animal husbandry problems of the region. Research undertaken is summarised as follows:

1951 Pasture experiments with:

- (a) Plant introduction studies
- (b) Experimental cultivation techniques to establish buffel grass (*Cenchrus ciliaris*)
- (c) Observations on plant succession and regeneration of soft spinifex (*T. pungens*) country after fire (H. Suijdendorp)

- 1953 Expansion of (c)
- 1958 Ecology of Euro (E.H.M. Ealey)
- 1959 Study of vegetation and habitats (N.T. Burbidge)
- 1962 Lambing trials (H. Suijdendorp)
- 1963 Sheep fertility experiments (P.D. Morgan)
- 1968 Wool growth measurements (O.B. Williams and H. Suijdendorp)
- 1968 Cross breeding of sheep for meat production (P.D. Morgan, B.R. Stone and D.G. Burnside)
- 1971 Cattle grazing trial (B.R. Stone)

As a result of work undertaken on the research station the following management plan was developed for sheep: mate in mid-November to early December using locally bred rams. Burn in early summer (November) before the rains, deferring grazing for at least 6-8 weeks thereafter to allow regeneration and seeding of annuals and perennial grasses. Lambing in May to benefit from perennial grasses before winter drought took effect. Shear in August.

The results of the cattle grazing trial indicated that low levels of grazing by cattle had no detrimental effect on pasture. However, animal performance and the potential for meat production was low.

Probably the most significant changes to land use on Abydos-Woodstock during the thirty years that it was an agricultural research station were the destocking of sheep and introduction of cattle and, post 1960, the reduction of the Euro population by poisoning.

Despite the advances in land management as a result of research conducted at Abydos-Woodstock, the property was not considered to be commercially viable for pastoralism and it was closed as a research station in 1976.

### *Museum Custodianship*

In 1978 Abydos-Woodstock was vested in the Western Australian Museum for the purposes of "Preservation of Aboriginal cultural materials and historic buildings, and grazing". Responsibility for management of the reserves was exercised by the Aboriginal Cultural Committee, as delegated by the Trustees of the Museum, through the Museum's Aboriginal Sites Department. A ranger took up residence in the Woodstock homestead in May 1978.

The Museum's primary management concern was protection of the numerous petroglyphs on granite outcrops on Abydos-Woodstock. As these are vulnerable to damage by exfoliation caused by high intensity fires, a burning regime was adopted aimed at reducing fuel levels around the major granite outcrops.

By the time the Museum took over responsibility for the reserves, all pumped watering points for stock had ceased to function and most of the extensive fencing for the Department of Agriculture's experimental work, although still present, had fallen into disrepair.

Cattle grazing continued at a relatively low level largely on the west of the property through an informal agreement with an Aboriginal community, the Mugarinya Community Association Inc., which occupies the adjacent property (Yandeyarra). As no watering points existed, cattle largely moved along rivers relying on natural water holes. Herds of feral donkeys and some camels occurred and were controlled by the Agricultural Protection Board. Suijdendorp (pers. comm. 1991) reports that populations, were larger than they had been in the days of the Agricultural Research Station when they were more vigorously controlled due to the damage they did to fencing. Cattle were mustered periodically, but at times reached stocking levels when they, together with feral donkeys, were causing considerable erosion damage.

The Museum discouraged visits to petroglyph sites by tourist operators and opposed applications for mining exploration.

In 1989 and 1990 in collaboration with the Agricultural Protection Board a 1080 fox baiting programme designed to reduce predation on Rock Wallabies was undertaken on the Reserve.

Suijdendorp revisited Woodstock in 1988 and noted significant and extensive regeneration of perennial grasses since the early 1960s (Suijdendorp 1988). This is confirmed by the findings of Tinley (Chapter 4) and it is concluded that at the end of the Museum's period of tenure, and almost 45 years after the conclusion of commercial pastoralism, the vegetation of Abydos-Woodstock is at least partially recovering towards the pre-pastoralism state. The fauna assemblage documented in this study is therefore also likely to resemble the pre-pastoral situation, although introduced species, particularly foxes are thought to be affecting it.

The Euro population never recovered from the 1960-62 poisoning campaign. Throughout the Museum's period of management it remained at a low level. The reason for this is puzzling, because food resources were presumably still favourable. It is suggested that the closure of artificial watering points, which coincided with their near extermination in the region, may have been a factor that prevented a build up to former population levels. This supports pastoralists' views that increase in artificial watering points originally brought about the Euro population explosion (and not the change in the vegetation, as maintained by Ealey (1967a)).

### *Contemporary Aboriginal Use*

In February 1991 the vesting of the reserves was transferred to the Mumbultjari Corporation for the purposes of "Preservation of Aboriginal cultural materials and historic buildings, and grazing". This is subject to the condition "The Corporation is required under section 34A of the Land Act to submit to the Minister for Lands a management plan outlining the development, management and use of the land, with particular attention to protection of Aboriginal cultural materials, historical buildings and known rare fauna species which are in danger of extinction."

### Background to the Present Study

Abydos-Woodstock has particular historic significance in terms of pioneering biological studies of the arid zone in Western Australia. Ealey's work on the ecology of the Euro (Ealey and Main 1965, Ealey 1967a, b and Ealey and Main 1967), Burbidge's (1943 and 1945) studies of the vegetation and Suijdendorp's (1955 and 1967) studies of the effects of fire and grazing provide a background of knowledge on the area unequalled elsewhere in the Pilbara. In addition, it was known that the area contained an interesting assemblage of native fauna through specimens collected and lodged in the Museum, particularly by E. Ealey, H. Butler, P. Woolley and A. Chapman. Of particular interest was the rare Rothschilds Rock Wallaby (*Petrogale rothschildi*) which occurs on the same granite outcrops as the petroglyphs. Concern expressed by J. Kinnear, Department of Conservation and Land Management, that the fire regime used to protect the petroglyphs might be detrimental to the rock-wallaby population prompted the Division of Natural Science to seek funding in the form of a National Estate Grant in 1988 to carry out an investigation of the ecology of Abydos-Woodstock. Objectives of the study were to:

- (a) Identify and describe the vegetation and major habitats,
- (b) Document and obtain ecological information on the native vertebrate and selected groups of invertebrate fauna,
- (c) Evaluate effects of fire, particularly on rare fauna such as the rock-wallaby population, and
- (d) Make recommendations for conservation of the natural heritage attributes of Abydos-Woodstock.

Nine field surveys were undertaken between March 1988 and November 1990 (see Chapter 5). Based on the initial survey of habitats and vegetation by Tinley in March and April 1988 (see Chapter 4), 8 sites representative of major habitat types, were selected for repetitive sampling. Surveys were timed to cover seasonal and rainfall induced changes. The study period started at the end of a prolonged drought and included cyclonic rains, giving good coverage of climatic extremes.