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# PILBARA RANGELAND SURVEY – THE BIGGEST SURVEY IN THE WEST

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## INTRODUCTION

A joint team from the Department of Agriculture and the Department of Land Information has recently completed its largest endeavour yet - land classification, mapping and resource evaluation of 181,736 sq km in the Pilbara region in the State's north-west (Van Vreeswyk *et al.* 2004). Eighty-eight per cent of the pastoral rangelands of the state have now been covered by rangeland surveys.

With 44 pastoral leases covering about 58% of the survey area, pastoralism is the most extensive land use within the Pilbara. Mining is an economically important land use that is largely confined to ironstone ranges and greenstone belts. Areas set-aside for nature conservation cover about 9% and land set aside for aboriginal use covers about 6%. Large tracts of unallocated Crown land account for the remaining 27%.

## LANDFORMS

Ranging from the coast to the desert, 102 land systems in 20 broad land types were identified and described in detail. The landforms comprise about 52% erosional surfaces and 48% depositional surfaces. They consist of extensive hill and plateau tracts on sedimentary, igneous and metamorphic rocks above lower pediments and sheetwash plains. These drain into major river systems and their associated alluvial plains. Sandplains and dune fields are common particularly in the east. Coastal plains and beach dunes flank the coastal strip. For much of the area relief is subdued, interspersed with low to high (30-300m) hills and occasionally very high (>300m) rugged ranges (e.g. the Chichester Plateau and Ophthalmia Range). The Karijini National Park includes the spectacular dissected plateaux of the Hamersley Ranges. Drainage is organised and flow is seasonal and sometimes dramatic from cyclonic rains in the summer. All rivers flow generally north-westerly to the Indian Ocean. Landform patterns are best considered in terms of greenstone belts surrounded by extensive granitoid expanses and peripheral sedimentary basins that have undergone deep weathering and stripping.

## VEGETATION

The vegetation of the Pilbara is essentially Eremaean. The central ranges and upland plains are dominated by spinifex hummock grasslands grading to pindan vegetation (*Acacia* shrublands with scattered trees and a grass layer) towards the north. To the south mulga (*Acacia aneura*) shrublands and woodlands prevail.

A total of 1,337 species of vascular plants were recorded representing 362 genera in 103 families. *Triodia pungens* was the most commonly recorded species in the northern, central and south western parts of the survey area, where it was recorded over 50% more often than the next most commonly recorded species: *Hakea lorea*, *Cenchrus ciliaris* and *Acacia inaequilatera*. In the south east part of the survey *A. aneura*, *Senna artemisioides* subsp. *helmsii*, *Solanum lasiophyllum* and the annual grass *Aristida contorta* were the most commonly recorded species.

Forty-four site types (an ecological classification based on plant community, soil type and landform) in eleven broad site type groups were identified and described in detail. Hummock grasslands were the most extensive site types comprising 57% of the land systems, followed by sclerophyll shrublands (17%), tussock grassland (12%), halophytic shrublands (8%) and drainage woodlands (6%).

The introduced *Cenchrus* grasses, buffel grass (*C. ciliaris*) and to a lesser extent Birdwood grass (*C. setigerus*) have become widely established in parts of the survey area, particularly the coastal plains and the floodplains of major rivers. It is estimated that the communities dominated by *Cenchrus* grasses cover about 3,400 sq km or 2% of the Pilbara.

## RANGE CONDITION

Visual assessments of vegetation condition, and the type and extent of soil erosion were made at 12,448 traverse points at one kilometre intervals across the survey area. Approximately 77% of traverse records indicated good range condition, 11% indicated fair condition and 12% indicated poor condition.

Table 1 shows a summary of the resource condition in the survey area compared with other surveys undertaken by the regional survey team.

Table 1. Resource condition summaries for regional rangeland surveys.

Region surveyed (and year commenced)	Total area (sq km)	No. of traverse assessments	Severely degraded and eroded area (as mapped)		Resource condition classes (% of assessments)		
			sq km	%	Good	Fair	Poor
Gascoyne (1969)	63,400	2,426	1,205*	1.9*	32	53	15
West Kimberley (1972)	89,600	4,532	2,000*	2.2*	20	50	30
Eastern Nullarbor (1974)	47,400	1,273	0	0	50	10	40
Ashburton (1976)	93,600	8,608	534	0.6	50	34	16
Carnarvon Basin (1980)	74,500	10,952	647	0.9	45	32	23
Murchison (1985)	88,360	13,441	1,560	1.8	21	37	42
Roebourne Plains (1987)	10,216	1,172	233	2.3	51	27	22
North-eastern Goldfields (1988)	100,570	10,470	452	0.4	39	32	29
Sandstone-Yalgoo-Paynes Find (1992)	94,710	9,435	145	0.2	45	32	23
Pilbara (1995)	181,723	12,448	310	0.2	77	11	12
All areas surveyed	844,079	74,757	7,086	0.8	44	31	25

\* Not mapped, estimate only.

The Pilbara survey area is in considerably better condition than other survey areas. Also the proportion of land which has been mapped as being severely degraded and eroded (about 0.2%) is considerably less than the proportion of severely degraded and eroded land across other survey areas. A large proportion of the Pilbara supports spinifex grasslands which are largely unaltered by grazing. A significant area is not used for pastoralism because it is inaccessible to stock or supports hard spinifex grasslands which are not grazed.

The most frequently observed impacts of pastoralism were loss in perennial species richness and perennial plant density. A less frequently observed impact was accelerated soil erosion. Major alterations to vegetation and consequent accelerated soil erosion were most frequently observed in tussock grassland and chenopod shrubland site types. These site types are preferentially grazed and often occur on alluvial plains that are inherently susceptible to soil erosion.

## REFERENCE

Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004). *An inventory and condition survey of the Pilbara region, Western Australia*. Department of Agriculture, Western Australia, Technical Bulletin No. 92.