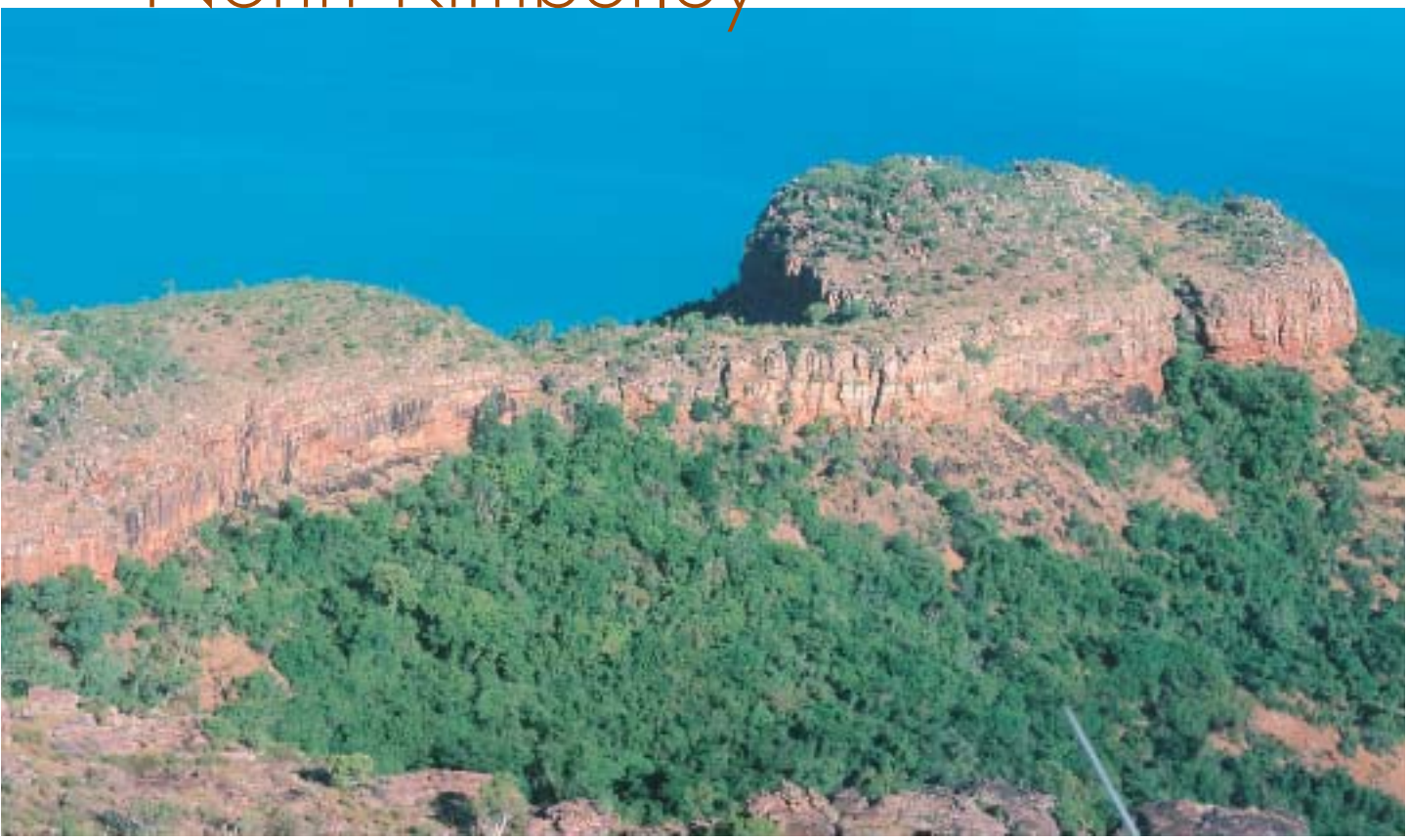
North Kimberley



Open savanna woodland on rugged sandstone and vine thickets on scree slopes under escarpments in the Prince Frederick Harbour, North Kimberley Bioregion, WA. Photo: N.L. McKenzie

Description

Bioregional description and biodiversity values

The North Kimberly bioregion is a dissected plateau of the Kimberley Basin. It features a savannah woodland of woollybutt and Darwin stringy bark over high sorghum grasses and *Triodia schinzii* hummock grasses on shallow sandy soils across outcropping Proterozoic siliceous sandstone strata.

Savannah woodlands of *Eucalyptus tectifica* and *Eucalyptus grandifolia* alliance over high sorghum grasses occur on the red and yellow earths mantling basic Proterozoic volcanics.

Riparian closed forests of paperbark trees and *Pandanus* occur along the drainage lines. Extensive mangals occur in estuaries and sheltered bays. Numerous small patches of monsoon rainforest are scattered through the district.

The climate is dry, hot, tropical and sub-humid with summer rainfall.

The bioregion is divided into two subregions – Mitchell in the west and Berkeley in the east.

The Mitchell subregion has a diverse array of exposed basement strata dissected by rivers, and a rugged sunken coastline, deeply embayed. Skeletal sandy soils incompletely mantle sandstone boulder country, significant areas of volcanic and dolerite surfaces, lateritised upland, and alluvial floors along major river valleys.

The Berkeley subregion is less dissected than the Mitchell, and is dominated by an upland of mainly Pentecost sandstones more continuously mantled by (sandy) soils supporting an open savanna woodland with a few vine thickets.

Special values of the bioregion include a sunken coastline with extensive coastal archipelagos (Buccaneer and Bonaparte) and island groups (Osborne, Eclipse and Sir Graham Moore Islands). The islands form a microcosm of the Mitchell region and present an opportunity to protect intact ecosystems. There is tropical laterite flora with a palm-dominated landscape (*Livistona eastonii*) unique in Western Australia.

The Cape Bougainville rainforest on laterite and volcanics has no hoofed feral animals and is the largest single patch of rainforest in the Kimberley.

The flora and fauna of the Mitchell's north-western margin is still intact, including threatened and/or endemic species such as the golden bandicoot (*Isoodon auratus*), scaly-tailed possum (*Wyulda squamicaudata*), monjon (*Petrogale burbidgei*), nabarlek (*Peradorcas concinna*), golden-backed tree-rat (*Mesembriomys macrurus*), Kimberley rock-rat (*Zyzomys woodwardi*), rough-scaled python (*Morelia carinata*) and black grasswren (*Amytornis housei*). The region is fox and rabbit free and essentially uninhabited. There is a wide range of other endemic vertebrate and land snail species. The declared rare flora species *Eucalyptus ceracea* is endemic.

The main land uses are grazing of native pastures, Aboriginal reserves, unallocated Crown land and Crown reserves, and conservation.

Overall condition and trend

The Continental Stress Class is six (near pristine). This should be reviewed in the light of the threatening processes that are operating at the landscape scale (fire and grazing).

The condition and trend of nearly all flora and fauna species at risk are unknown but indications are that there is a continuing general deterioration in the condition of the bioregion mainly due to fire and grazing.

Conservation priorities

Current fire management practices, pastoral practices and feral animal control need to be improved. An investigation of the current status of individual species and ecosystems is urgent, along with research to build a better understanding of the impact of threatening processes. A range of vegetation associations and ecosystems at risk needs to be reserved.

CALM, Aboriginal communities and the Western Australian Tourism Commission need to collaborate on protecting the natural values of the Mitchell's coastline and islands.

Nationally important wetlands

Four nationally important wetlands are present in the North Kimberley Bioregion, of which three are river systems and one a series of wetlands. Two of these are in good condition and two are considered to be near pristine. Two are declining in condition but the trend for the two that are near pristine is unknown. The primary threatening processes for all these wetlands are changed fire regimes and grazing pressure.

Wetlands of regional significance

Three wetlands in the Mitchell subregion have been identified as being of regional significance. Further work is required to identify wetlands of regional significance in the Berkeley subregion. The wetlands include a riverine floodplain, a freshwater swamp forest and a permanent freshwater lake. The threatening process for one is unknown and grazing pressure is the main threat for the other two.

Riparian zone

The condition of vegetation in riparian zones is generally good but is declining. Threatening processes include changed fire regimes, grazing pressure from feral herbivores and changed hydrology.

Ecosystems at risk

One Threatened Ecological Community (the Black Spring organic mound spring community) is declared Endangered under State legislation, and four are declared Vulnerable (Walcott Inlet, Roe River Rainforest Swamps, Theda Soak Rainforest and Organic mound springs of the southern North Kimberley).

Eleven other ecosystems have been identified as being at risk. They include tropical and sub-tropical rainforest, tropical forests and woodlands, paperbark forests and woodlands and herbland, sedgeland and rushland. A number are unclassified at the National Vegetation Inventory System (NVIS) scale of resolution. Most are in fair condition, and declining or static. The main threatening processes are grazing pressure and changed fire regimes.

There is very little data on threatened ecosystems in the Berkeley; its rainforests, for example, are thought to be subject to the same pressures as their counterparts in the Mitchell.

Species at risk

Under State legislation, two birds and two reptiles (both turtles) are declared as endangered (gouldian finch, crested shrike-tit, and logger head and olive turtles), and a further three mammals, three birds and four turtle species are vulnerable including the golden bandicoot, golden-backed tree rat, Butler's dunnart, red goshawk, purple-crowned fairy wren and partridge pigeon.

Eucalyptus ceracea is the only Declared Rare Flora (Vulnerable) species. The threatening processes for most plants and terrestrial vertebrate are primarily changed fire regimes operating at the landscape scale. To a lesser extent grazing pressure and predation have been identified for vertebrates. The threats for most other groups have not been identified.

Management responses

Reserve system

Regional conservation lands include one large biosphere reserve (Prince Regent River Nature Reserve), one large national park (Drysdale River), two smaller national parks (Mitchell River and Lawley River) and two small conservation parks (Laterite and Camp Creek).

These reserves comprise 13.2 per cent of the bioregion. Their management standard is poor to fair. Apart from a donkey control program, no feral animal control programs exist. There is limited strategic aerial prescribed burning and some opportunistic hand burns, the latter being confined to very small areas of the Mitchell subregion. The effect of threatening processes (fire, weeds, ferals) is not yet determined. Due to uncontrolled stock access, vegetation changes are overt in the region's reserves, particularly in valley systems.

Of the 31 vegetation associations mapped in the region, 16 are unreserved and, along with nine unreserved ecosystems at risk, have a high priority for acquisition. A further eight vegetation associations have a high priority for further acquisition, even though small areas are reserved. Acquisition priorities include grasslands with associated woodland, hummock grasslands with associated woodland, pindan shrublands, tropical woodlands and tropical forests including rainforests, mangroves and mudflats. The level of reservation of three of the ecosystems at risk is unknown.

Constraints on reserve acquisition include competing land uses (such as pastoral production), the cost of purchasing pastoral lands and the lack of data on biodiversity patterns across the region's landscape. We cannot accurately define all acquisition priorities on the ground.

Off-reserve conservation for species and ecosystem recovery

Recovery actions for mammal, bird, turtle and plant species at risk require data on status, population trends and mechanisms of threatening processes, as well as locations of remaining populations. For ecosystems at risk:

- frequent, broad scale, hot, late dry-season burning in savanna needs to be avoided,
- feral stock needs to be removed from conservation estate,
- stock on other lands need close-order management, and
- donkeys and pigs need to be eradicated.

Savanna fire regimes and grazing are the main causes of decline in biodiversity values throughout the region, including its rainforests and riparian zones. To address this issue, coordination between Government agencies, the pastoral grazing industry, traditional owners and the broader community will need to be improved. Limited off-reserve effort would result in significant biodiversity gains.

Integrated natural resource management (NRM)

Existing NRM actions include:

- legislation for pastoral lease condition inspections by the Department of Agriculture. Pastoralists are notified of any problems and, ultimately, the Commissioner for Soil Conservation can resume the lease. In practice, this process does not appear to be very effective,
- threat abatement planning as part of NRM,
- coordinated efforts by the Department of Agriculture to control donkeys, and
- establishing Land Conservation District Committees that provide a venue for discussing conservation matters and integrating property and catchment planning.

There are several opportunities for NRM.

- The duty-of-care for biodiversity on pastoral lands needs to be tightened.
- Environmental management systems for controlling weeds, fire and feral animals should be coordinated across a variety of land tenures through Land Conservation District Committees, supported by research into the mechanism and impacts of these threatening processes and cost effective solutions.
- Shire planning should incorporate biodiversity objectives, acknowledge the worth of the natural environment to tourism and the cost of managing biodiversity and making national parks accessible.
- Catchment and regional plans should be developed collaboratively by all stakeholders.

Constraints include financial resources, the small number of people available to implement strategies and people able to recognise biodiversity benefits.

Major data gaps and research priorities

- There are no region-wide vegetation, soil and environmental geology maps at better than 1:250,000 scale for planning.
- There has been no quadrat-based fauna and flora survey of the region to assess species and ecosystem status, condition, trend and the effects of threatening processes such as cats, cattle, donkeys, pigs, fire and weeds.