



Alligator Rivers Region

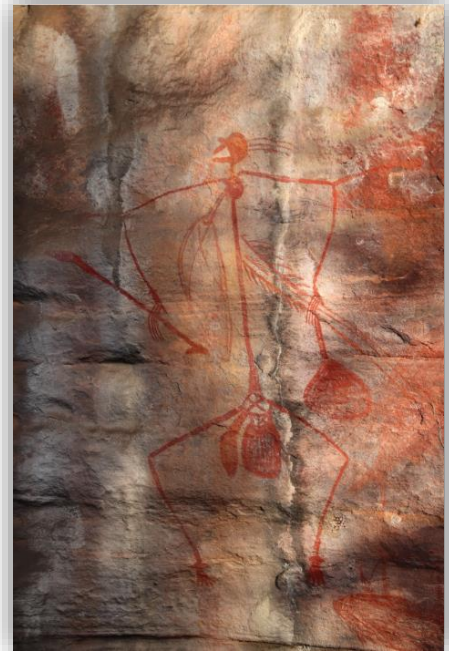


Jim Jim Falls in Kakadu National Park © Department of the Environment and Energy & Ian Oswald-Jacobs

About the Alligator Rivers Region

The Alligator Rivers Region (ARR) is located about 220 km east of Darwin in the Northern Territory of Australia. Comprising an area of about 28,000 km², it includes the catchments of the West, South and East Alligator Rivers, extending east into Arnhem Land and south into the former Gimbat and Goodparla pastoral leases. The leases were resumed by the Commonwealth and incorporated into Stage 3 of Kakadu National Park in 1987.

The ARR includes Kakadu National Park which is a World Heritage area and listed under the Ramsar convention on wetlands. The ARR is internationally recognised for more than 60,000 years of continuous human habitation, prolific rock art, outstanding diversity of flora, fauna and landscape, and expansive areas of pristine wilderness.



Aboriginal rock art © Supervising Scientist



Physiography

In the eastern part of the Region, the Kombolgie Sandstone forms the Arnhem Land Plateau. It varies in elevation from 250 to 300 metres with residuals on the plateau rising to 520 metres. Drainage follows a trellised pattern controlled by the jointing in the sandstone sequence, and erosion has produced large areas of intricately dissected plateau.

The retreat of the Arnhem Land Plateau has produced an escarpment over 500 km long and varying from vertical cliffs faces to stepped cliffs with long talus slopes. Massive boulders from the retreating scarp lie up to a kilometre from the cliff line. In the south the escarpment rises about 200 m while in the north it is generally less than 100 m high and is much more broken. The retreat of the scarp and the headward erosion by streams have isolated massive blocks of resistant sedimentary rock producing classic outliers. Subsequent erosion along joint and bedding plans and the weathering of tunnels in less resistant strata have produced intricate patterns of relief as well as large numbers of overhang caverns which house much of the Aboriginal rock art. Most of the watercourses originate on the plateau and waterfalls occur at widely spaced nick points along the escarpment.



Ubirr Rock region, Kakadu National Park © J. Mollison

The lowlands constitute the most widespread landform, being the subdued hill surface of the Archaen basement rocks. The average relief is low (between 25 and 50 m) and much of this landform has a surface that is deeply lateritised. The courses of rivers and creeks are



outlined by chains of billabongs, some of which persist through the Dry season. Watercourses traversing the lowlands commonly form braided sand-bottomed beds of quartzose sediments, reflecting their origin in the sandstone of the escarpment.

A major feature of the senile lowland landscape is the extensive floodplain system which merges in its seaward extension with the tidal flats. Wide swinging river meander belts, oxbow lakes, backswamps and natural levees are common. River beds are perched above the level of their marginal flood plains which flood extensively in the December-April period; some permanent freshwater billabongs have developed along the outer margins of the lower flood plains. Wet season flooding covers the flood plains leaving a seasonal veneer of silt.

Climate

The Region, in common with much of far northern Australia, has a monsoon-like climate. Virtually the entire rainfall occurs in the Wet season, which varies in length but is generally confined to the November-March period; October and April tend to be transitional months - with the Dry season lasting from about May to September. Annual rainfall at Jabiru (120° 40'S, 132° 54'E) averages approximately 1540 mm and annual evaporation is about 2500 mm. Prevailing winds are easterly to southeasterly in the Dry season and northerly to north-westerly in the Wet season, and like other parts of northern Australia, the Region is subject to cyclones.



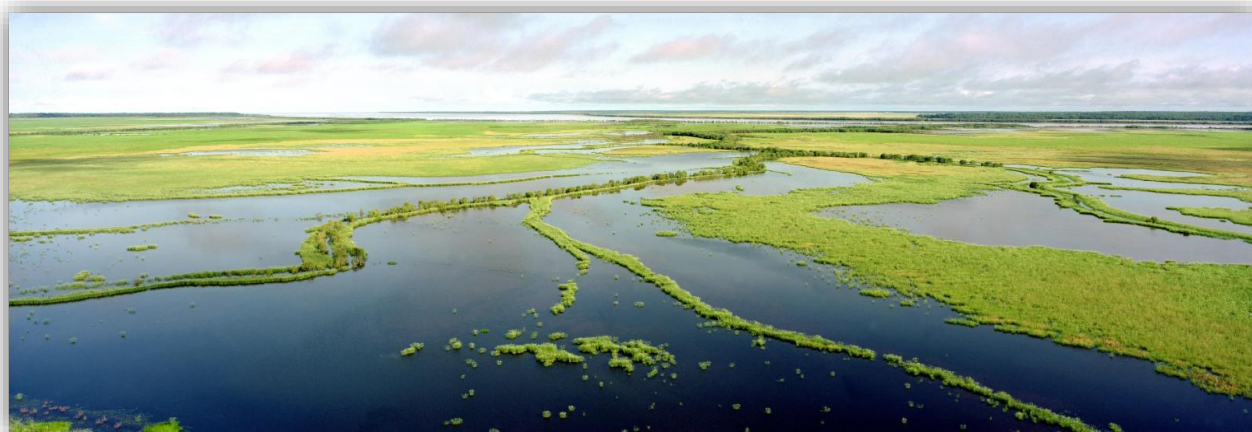
East Alligator River in Kakadu National Park © Department of the Environment and Energy

Hydrology

The two major river systems of the Region, the East and South Alligator Rivers, both drain to van Diemen Gulf and are tidal in their lower reaches. The headwaters of these rivers and their major tributaries rise in the sandstone plateau region to the east and south and generally flow in a north-westerly direction in shallow valleys across the lowlands to discharge through extensive flood plains.

The upper sections of tributary streams usually have sandy or rocky bottoms, and in places are bordered by dense vegetation. The stream courses in the lowlands vary in form, but most commonly they are channel complexes which link billabongs. In the Wet season they overflow into adjacent swamps.

The three Alligator rivers and the Wildman River maintain a flow in their lowest sections in the dry season. All other streams - including the main tributaries, Cooper, Magela, Nourlangie, Jim Jim and Barramundi Creeks - cease to flow for the major part of their length in the last few months of most Dry seasons. Permanent water is restricted to springs, waterholes and billabongs.



Floodplain in Kakadu National Park © Department of the Environment and Energy & Ian Oswald-Jacobs

The major rivers maintain their channels and levee banks across the flat floodplains areas. However, some of their major tributaries (e.g. Magela Creek) are cut off from the river by a levee bank and require accumulation of Wet season water before commencing to flow into the river. Thus a floodplain is formed. These broad areas of flooding remain for periods varying from three to nine months according to location and rainfall. Once this water has receded, there remain only permanent billabongs on a dry plain; these are extremely important for the ecosystem.

The hydrological regime is dictated by the seasonal rainfall distribution and both the total annual stream discharge and its pattern within a season can vary considerably. Wet season stream flows typically comprise a series of peak flows superimposed on a base flow which usually begins in about mid-December and ceases by the end of June. In a wet year, however, flow might commence in November and finish in August. The flow pattern over this period varies considerably from year to year; e.g. the total annual flow past G8210009 near Jabiru East in Magela Creek was recorded as approximately 840 million cubic metres in 1975-76 and 190 million cubic metres in 1982-83, and between 1972 and 1986 the number of days of flow ranged from 82 - 170.



Sunset over Ubirr Rock region of Kakadu National Park © Department of the Environment and Energy

Water quality

Surface waters arising from the sandstone plateau are among the softest in Australia. Typically, Wet season freshwaters have relatively high water temperatures, a low buffering capacity, are moderately acidic, extremely soft and carry low suspended solid loads. Changes in water quality that occur in those waterbodies that remain after flow ceases are dictated largely by the extent of evaporation and groundwater inflow. Deeper water bodies with steep banks and sandy bottoms tend to remain cooler, clearer and of higher quality than shallower waterbodies which generally increase in turbidity as the Dry season progresses.

Biological diversity

The distinctive subregions and the large seasonal changes give rise to a wide diversity of plants and animal habitats. As a consequence, the Region is rich in numbers of species of both flora and fauna. Zoologically and botanically it is representative of a large part of the far north of tropical Australia but because of the diversity of the native species that occur in the region, it is regarded as one of the richest in Australia in biological terms. For example, almost 1500 species of plants have been recorded and they occur in a wide range of vegetation types, including mangrove, grassland, monsoon forest, woodland and scrub communities. More than one-third of the bird species in Australia have been sighted in the region, and the large populations of waterfowl on the wetlands are one of its outstanding features. Of the aquatic fauna, the 46 species of fish occurring in the Region represent about a quarter of all recorded Australian native freshwater fish.



Jabiru (Black-necked stork) guarding its nest © Department of the Environment and Energy