East Finniss River

Map of River

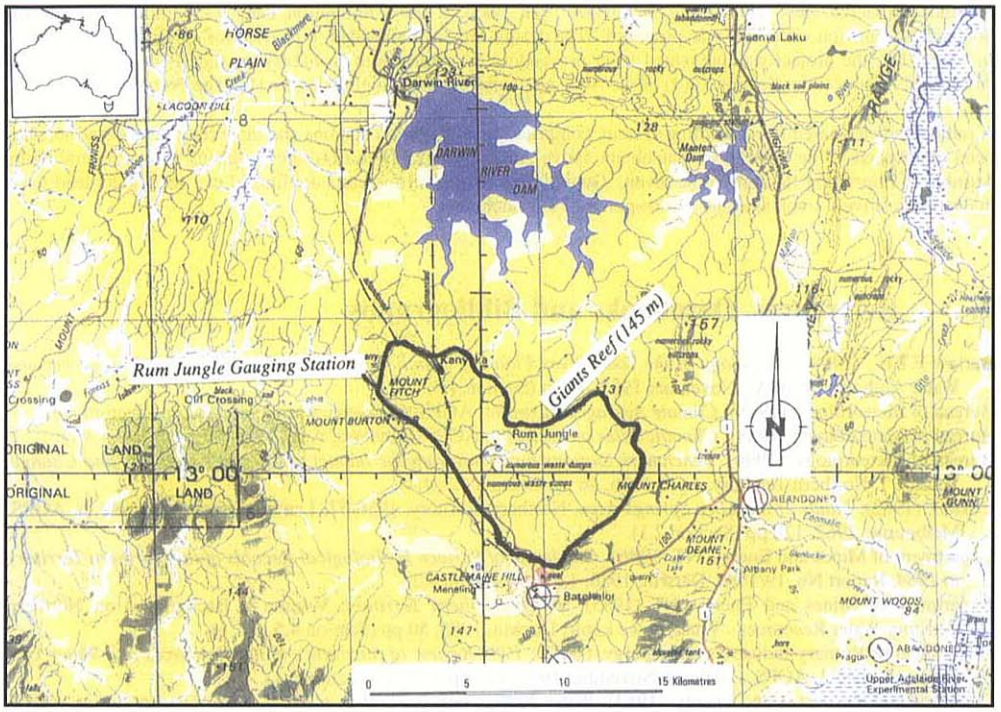


Table of Basic Data

Name: East Finniss River at Rum Jungle (a sub-catchment of the Finniss River)		**Serial No.:** Australia-4
Location: Northern Territory, Central Australia	S 12° 55' ~ 13° 05'	E 130° 55' ~ 131° 05'
Area: 71 km^2	**Length of main stream:** 15 km	
Origin: Daly Range	**Highest point:** 145 m Giants Reef	
Outlet: Timor Sea (Confluence to the Finniss River)	**Lowest point:** 65 m Rum Jungle at the sub-catchment outlet	
Main geological features: Lower Proterozoic: Brocks Creek Group - Sandstone, quartzite, phyllites, and schists with sills of amphibolite; Rum Jungle Granite.		
Main tributaries: None		
Main lakes: None		
Main reservoirs: None		
Mean annual precipitation: 1,410 mm (1937~1994) (Catchment Rainfall - 4 stations)		
Mean annual runoff: 1.02 m^3/sec (1965~1994) at sub-catchment outlet (Rum Jungle)		
Population: < 100 (1994)	**Main cities:** None	
Land use: Mine site rehabilitation, Grazing		

1. General Description

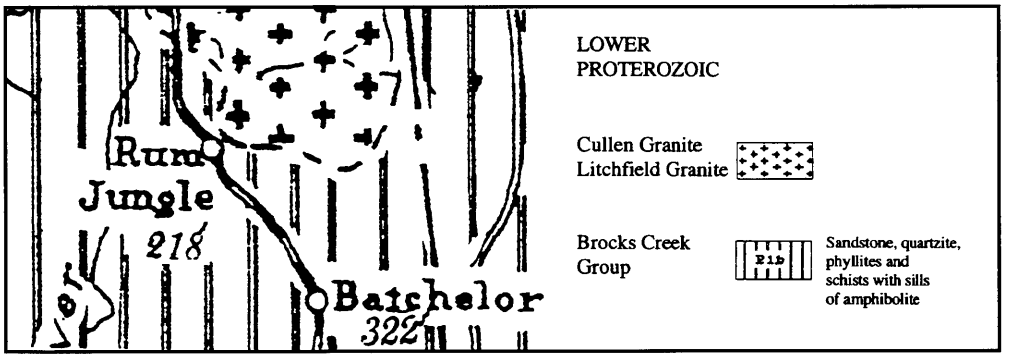
The East Finniss River at Rum Jungle covers an area of 71 km^2 and is located in the northern central part of Australia, Northern Territory, just south of Darwin. Flowing in basically a westerly direction, the mainstream length of the East Finniss River is approximately 20 km. The climate of the catchment is typically humid tropical with high maximum daily temperatures all year round and well defined wet and dry seasons. The wet season extends from late November to late March and the dry season from April to October. The main rainfall producing mechanisms are the summer monsoons. However, occasional heavy rainfall is associated with cyclonic activity, again during the middle part of the wet season. The mean annual rainfall is approximately 1,400 mm, with monthly averages above 200 mm in December, January, February and March. The average monthly rainfalls range from 310 mm in January to 2 mm in July.

The maximum catchment elevation is approximately 145 m and the minimum elevation is approximately 65 m at the gauging site. The main landforms are strong undulating to hilly terrain with frequent rock outcrops. The headwaters of the catchment include the Daly Range and Castlemaine Hill near the township of Batchelor (just outside the catchment). Vegetation is principally Eucalyptus, in the form of a 10-30% coverage of medium (10-30 m) to low trees (<10 m) with tussocky or tufted grasses and graminoids. The soils are shallow and loam soils with some massive earth.

The land use was originally mining and grazing land. However, the mining areas have now been rehabilitated and are subject to limited grazing so as not to impact on the rehabilitation process.

2. Geographical Information

2.1 Geological Map



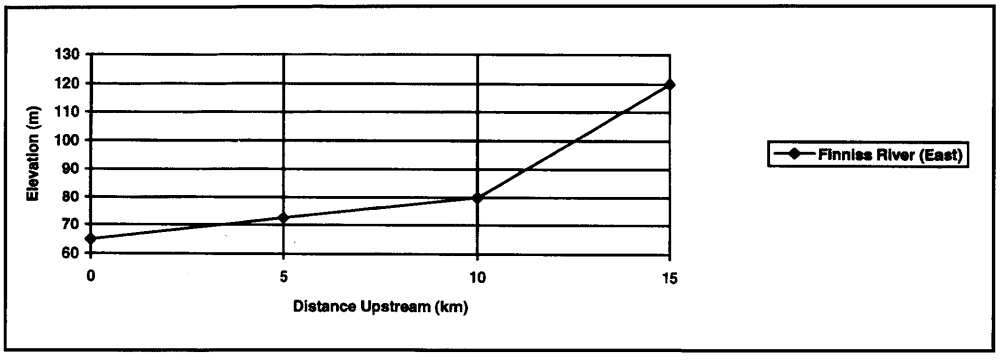
2.2 Land Use Map

The land use within this catchment is principally mine site rehabilitation. Some areas are used for grazing, but stocking rates are not high. The Map of the River (on the previous page) shows the Rum Jungle mine area (numerous waste dumps). Because of this mining activity (and associated pollution) any other land uses have not been allowed.

2.3 Characteristics of River and Main Tributaries

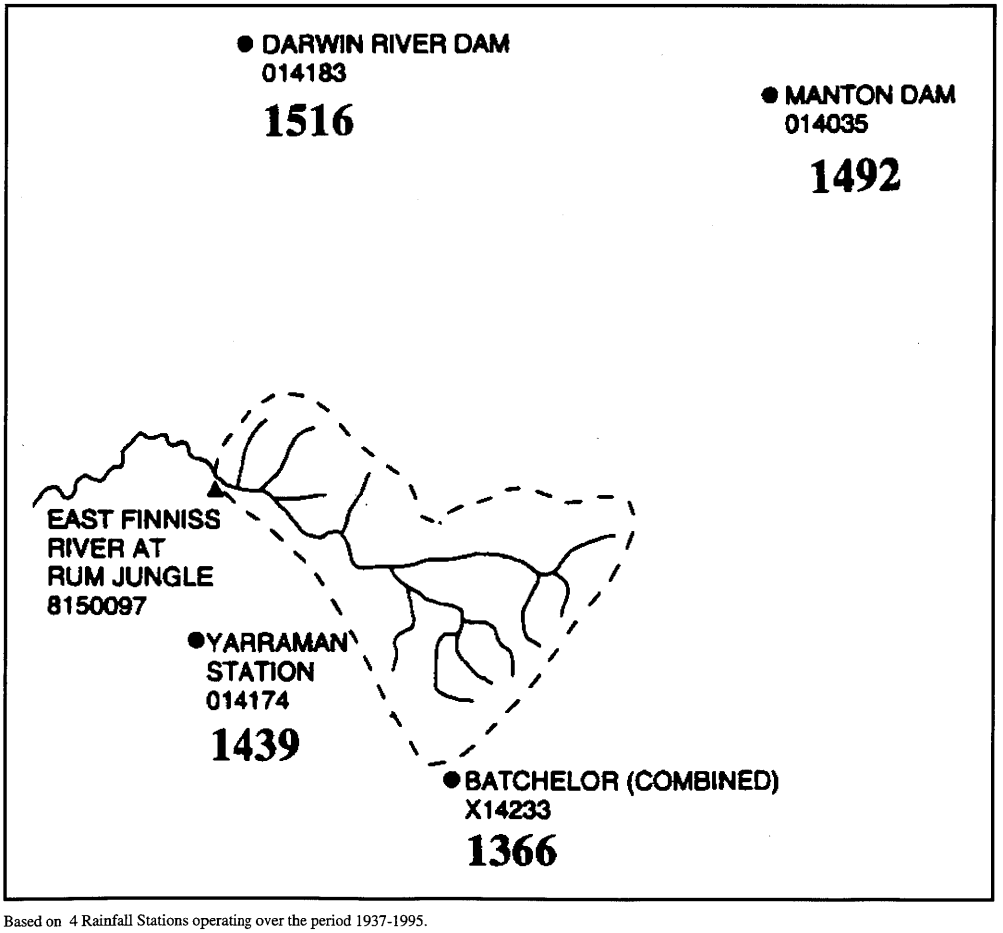
No.	Name of river	Length [km] Catchment area [km^2]	Highest peak [m] Lowest point [m]	Cities population (1994)	Land use [%] (1991)
1	**East Finniss**	20	145		Mine rehabilitation (2%),
	(Main river)	71	65		Grazing (98%)

2.4 Longitudinal Profiles



3. Climatological Information

3.1 Mean Annual Precipitation Map and Observation Stations



Based on 4 Rainfall Stations operating over the period 1937-1995.

3.2 List of Meteorological Observation Stations

Station No.	Station	Elevation [m]	Location	Observation period	Mean annual precipitation [mm]	Mean annual evaporation [mm]	Observation items [1]
014035	Manton Dam	31	S 12° 50' 30" E 131° 07' 45"	1937 ~ 1994	1,492	2,800	P, E
014174	Yarraman Station	40	S 13° 01' 10" E 130° 56' 55"	1966 ~ 1994	1,439	2,800	P
014183	Darwin River Dam		S 12° 49' 24" E 130° 57 ' 42"	1968 ~ 1994	1,516	2,800	P, TSP
014233	Batchelor	104	S 13° 03' 30" E 131° 01' 50"	1960 ~ 1994	1,366	2,800	P

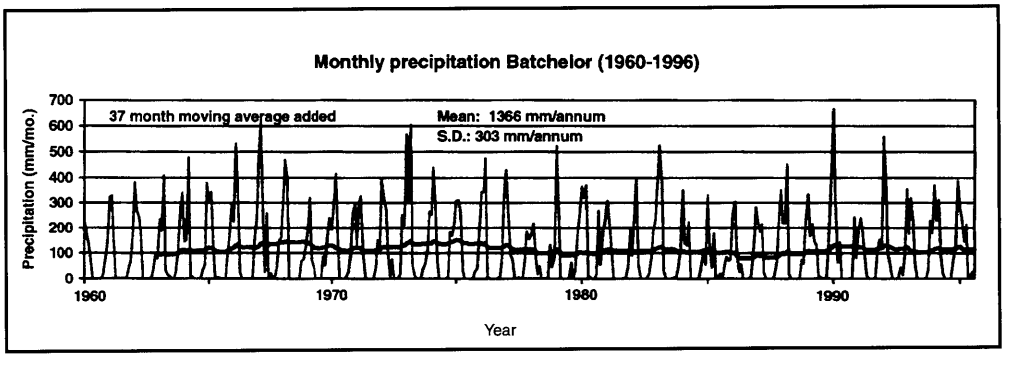
1) E: Evaporation (Class A Pan - 120 cm), P: Precipitation (daily read raingauge 203 mm), TSP: Tilting syphon pluviograph.

3.3 Monthly Climate Data

Observation item	Observation station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Period for the mean
Temperature [°C] Max.	Middle Point	32.7	32.0	32.5	33.1	32.5	31.3	31.2	32.9	34.7	35.7	35.2	33.9	33.1	1957~1994
Temperature [°C] Min.	Middle Point	23.9	23.8	23.6	22.2	19.6	16.3	15.0	16.9	20.2	22.7	23.9	24.0	21.0	1957~1994
Precipitation [mm]	Middle Point	325	277	259	82	19	2	1	2	11	55	126	214	1,375	1957~1994
Raindays [No.]	Middle Point	21	21	18	8	2	0	0	0	2	6	13	17	109	1957~1994
Evaporation [mm] (Pan) [1]	Middle Point	149	123	149	156	161	156	171	192	207	223	192	171	2,044	1957~1994
Duration of sunshine [hr]*	Middle Point	6.0	5.2	6.8	9.0	9.4	9.7	9.9	10.1	9.2	9.3	7.7	6.3	8.3	1965~67, 1991~94

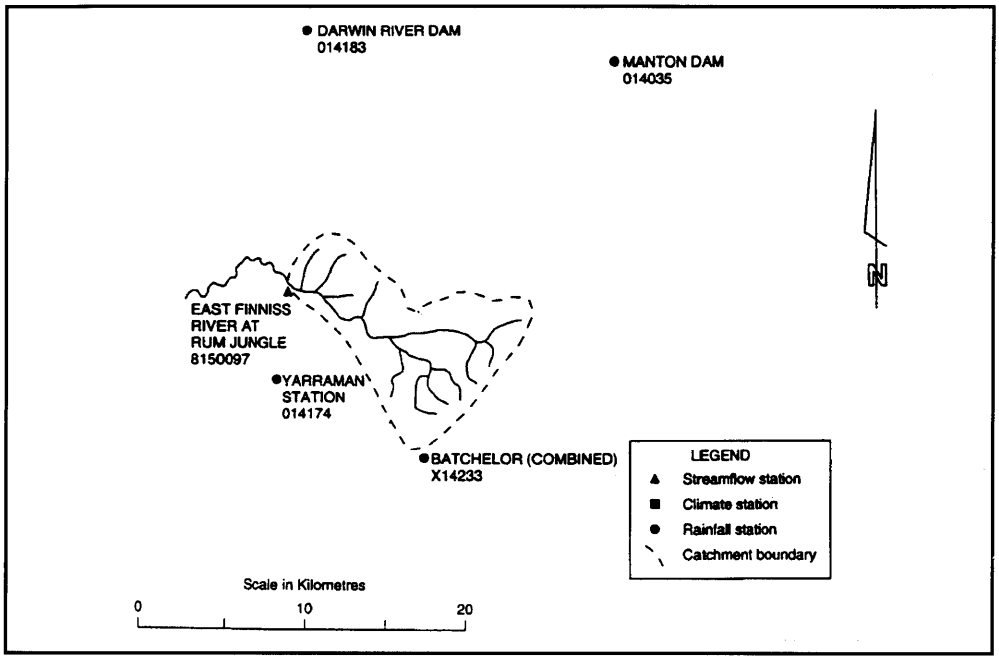
1) Class A Pan (120 cm)
* Daily values

3.4 Long-term Variation of Monthly Precipitation



4. Hydrological Information

4.1 Map of Streamflow Observation Stations



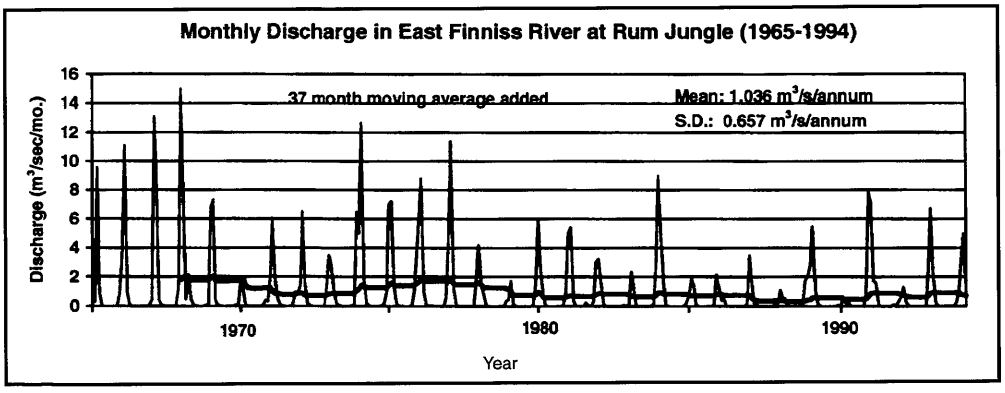
4.2 List of Hydrological Observation Stations

Station No.	Station	Location	Catchment area (A) [km^2]	Observation period	Observation items (frequency)
8150097	**East Finniss River at Rum Jungle**	S 12° 58' E 130° 58'	71	1965 ~ 1996	Continuous height record digital recorder with float sensor

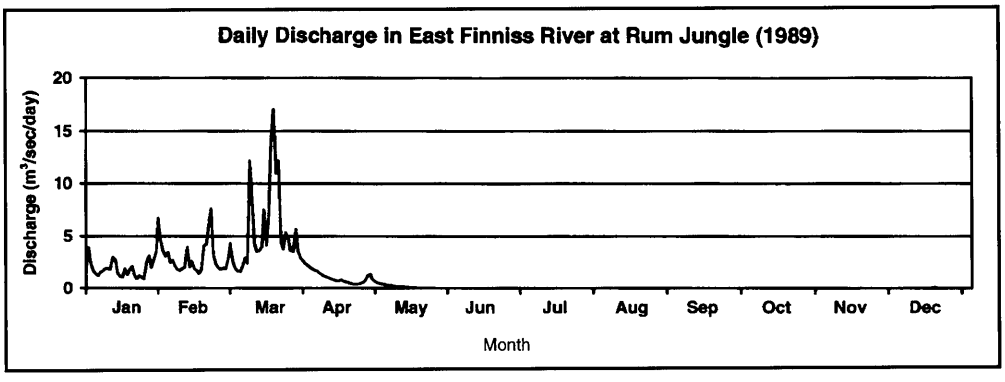
Station No.	$\overline{Q}$ [1)] [m^3/s]	Q max [2)] [m^3/s]	$\overline{Q}$ max [3)] [m^3/s]	$\overline{Q}$ min [4)] [m^3/s]	$\overline{Q}$ / A [m^3/s/100 km^2]	Q max / A [m^3/s/100 km^2]	Period of statistics
8150097	1.036	287.1	85.44	0.004	1.46	404.4	1965 ~ 1994 *

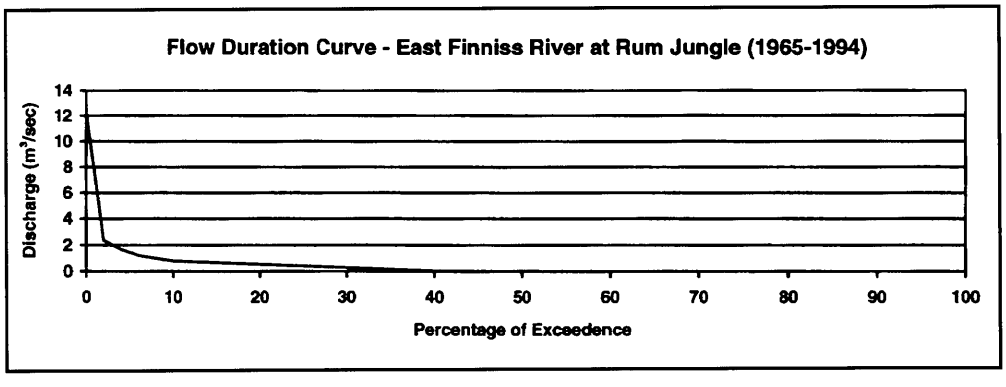
1) Mean annual discharge
2) Maximum discharge * Data missing in 1966, '68, '77, '79, '80, '86, '88.
3) Mean annual maximum discharge
4) Mean annual minimum discharge

4.3 Long-term Variation of Monthly Discharge



4.4 Annual Pattern of Discharge





4.5 Unique Hydrological Features

The runoff from the East Finniss River is highly seasonal, being concentrated in the wet season (December to March). During the dry season, the East Finniss River ceases to flow. Flow rates are in general very low, with flow below 1 m^3/s for over 90% of the time.

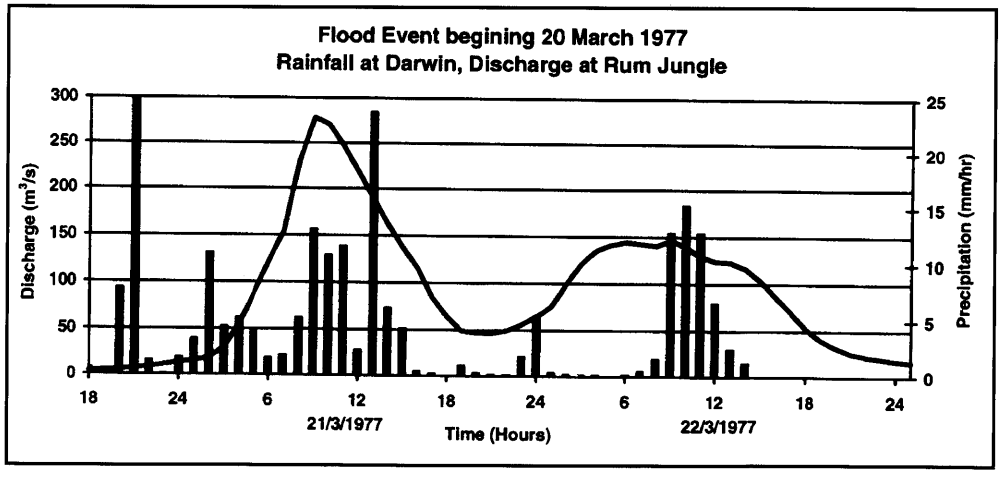
4.6 Annual Maximum and Minimum Discharges

East Finniss River at Rum Jungle [71 km²]

Year	Maximum [1]		Minimum [2]		Year	Maximum [1]		Minimum [2]	
	Date	[m³/s]	Month	[m³/s]		Date	[m³/s]	Month	[m³/s]
1965	2.30	46.97	4 - 12	0.0	**1979**	3.16	20.54	5 - 12	0.0
1966	2.10	165.0	5 - 12	0.0	**1980**	2.11	112.7	5 - 12	0.0
1967	2.21	133.1	7 - 12	0.0	**1981**	3.12	213.7	1, 5 - 11	0.0
1968	2.07	139.6	1, 9 - 12	0.0	**1982**	1.16	37.72	5 - 12	0.0
1969	3.04	218.5	7 - 11	0.0	**1983**	3.15	15.49	1,2, 5 - 12	0.0
1970	12.02	23.07	1, 4 - 11	0.0	**1984**	2.03	130.3	6 - 12	0.0
1971	3.12	92.34	4 - 12	0.0	**1985**	4.13	15.34	1, 5 - 12	0.0
1972	3.17	52.08	7 - 12	0.0	**1986**	1.24	30.04	5 - 12	0.0
1973	2.02	79.06	7 - 11	0.0	**1987**	2.23	15.11	1, 4 - 12	0.0
1974	3.19	107.2	8 - 12	0.0	**1988**	2.22	7.285	5 - 11	0.0
1975	2.14	85.39	7 - 11	0.0	**1989**	3.20	48.54	6 - 12	0.0
1976	3.22	111.0	8 - 12	0.0	**1990**	12.20	9.865	1 - 3, 6 - 12	0.0
1977	3.21	287.1	1, 7 - 12	0.0	**1991**	2.17	126.0	6 - 12	0.0
1978	2.06	49.4	6 - 12	0.0	**1992**	3.14	7.865	5 - 12	0.0

1), 2) Instantaneous observation by recording chart

4.7 Hyetographs and Hydrographs of Major Floods



5. Water Resources

5.1 General Description

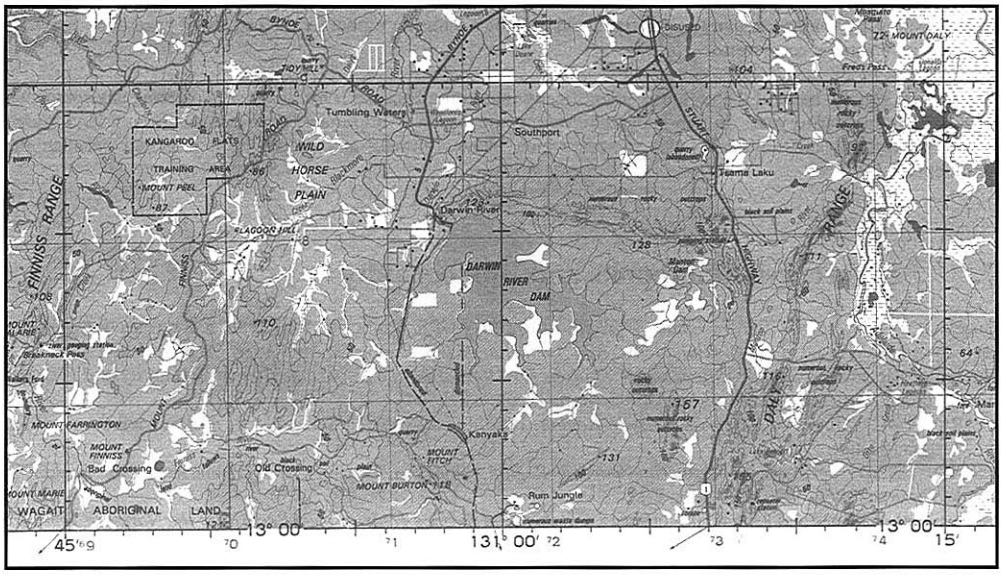
On an overall basis, there are very large water resources in the Northern Territory, but the distribution of water is uneven, with most of the surface runoff being concentrated in the north, gradually decreasing to the south of the divide between the northern drainage divisions (Timor Sea and Gulf of Carpentaria) and the Lake Eyre drainage division, that is over two-thirds of the Territory. As stated previously, the runoff in the East Finniss region is highly seasonal being concentrated in the wet season (December to March) and during the dry season most of the smaller streams cease to flow as indicated in the information provided above. Rates of evaporation are very high and have a significant effect on the yield from storages with large surface areas.

The major water resources systems in this region are not in the East Finniss catchment. There are two major surface

water storages, Manton Dam and Darwin River Dam. These storages supply water to the city of Darwin and are augmented by groundwater from a nearby borefield as necessary. Investigations are being carried out to develop additional sources of supply. This will probably comprise a diversion from one of the streams in the Finniss River basin or further groundwater development. While there is very little irrigation development at present, there is however a large potential.

Development within this region requires resolution of both land claims by the indigenous population and conflicts with mining interests. Uranium extraction at the Rum Jungle site on the East Finniss River has resulted in contamination of the river and its environs by waste containing high concentrations of heavy metals. Based on reviews of the processes which have produced this pollution and hydrological analyses of the site, control measures have been implemented for the rehabilitation of the mine site.

5.2 Map of Water Resources Systems



5.3 List of Major Water Resources Facilities

Major Reservoirs

Name of river *	Name of dam (reservoir)	Catchment area [km^2]	Gross capacity [10^6m^3]	Purpose [1)]	Year of completion
Darwin	**Darwin River Dam**	206	230	A, W	1972
Manton	**Manton Dam**	93	10	W, R	1943
Otto Creek	**Lake Bennett**		3	R	1975

* Not in East Finniss Catchment
1) A: Agriculture use, R: Recreation, W: Municipal water supply.

6. Socio-cultural Characteristics

The climate of this sparsely-populated region is tropical, with hot wet summers and moderate dry winters. The monsoonal rains cause widespread flooding which disrupts transport and communications. In contrast, no rain normally falls during the dry season and there is little to no streamflow. Permanent lakes are rare, but there are many permanent billabongs and waterholes, and some rivers retain large volumes of water in natural impoundments such as gorges, or in billabongs and swamps.

The main tourist attractions and outdoor recreation resources of this region are the rugged scenery, aboriginal sites and abundant wildlife and game. The consistently fine, warm weather during the dry season encourages outdoor activities and camping, fishing and viewing the wildlife are the most popular pastimes. The geomorphological formations in the region have created spectacular water falls and gorges, including Wangi Falls on the Finniss escarpment, and Katherine Gorge which has walls 60 m high. The lily lagoons and lush vegetation on coastal floodplains contribute to the scenic diversity. As indicated above uranium mining has been and continues to be a major activity within the region. Detailed environmental requirements have been attached to mine leases which provide for monitoring programs and research being undertaken. These requirements constitute the strictest supervision of any mining activity in Australia and provide a valuable model for the control of hazardous activities near sensitive aquatic ecosystems.

The diverse aquatic biota of the region is scientifically interesting because it has adapted to extreme environmental variations from year to year. In zoo-geographic terms, the region is important because it has been a land-bridge between Australia and Southeast Asia, across which plants, animals and people have migrated between the continents.

7. References, Databooks and Bibliography

Bureau of Meteorology, (1988): *Climate Averages Australia*, AGPS, Canberra, April 1988, 532 pp (Section 3.3).

Bureau of Meteorology, (1988): *Climatic Atlas of Australia*, AGPS, Canberra, April 1988, 70 pp (Section 3.1).

Bureau of Meteorology, (1996*): Benchmark Stations for Monitoring the Impact of Climate Variability and Change*, Volume 7, Northern Territory, April 1996, 46 pp (Section 4.3, 4.4).

CSIRO, (1952): *Survey of Katherine-Darwin Region*, 1946, Land Research Series No. 1, AGPS, Melbourne, 1952, 110 pp (Section 2.1).

CSIRO, (1956): *Soils of the Katherine-Darwin Region*, Northern Territory, Soil Publication No. 6, AGPS, Melbourne, 1956, 130 pp (Section 2.1).

Department of Mines and Energy, NT (1986) : *Catalogue of Surface Hydrological Records of the Northern Territory to 1984*, Report No. 19/1986, Darwin, 1986, 114 pp (Section 4.2).

Department of Mines and Energy, NT (1985): *Water Northern Territory*, Volume 1, Background on Northern Territory Water Resources - What do we know, Darwin, 1985, 50 pp (Section 4.5, 5.1, 6).

Department of Primary Industries and Energy , (1987): *1985 Review of Australia's Water Resources and Water Use*, Volumes 1 and 2, AGPS, Canberra, November 1997, 114 pp, 158 pp (Section 5.1).

Department of Resources and Energy, (1983): *Water 2000: Consultants Report No. 7, Water Quality Issues*, AGPS, Canberra, 1983, 310 pp (Section 5.1).

Department of Resources and Energy, (1983): *Water 2000: Consultants Report No. 9, In-stream and Environmental Issues*, AGPS, Canberra, 1983, 374 pp (Section 5.1).

Department of Resources and Energy, (1983): *Water 2000: Consultants Report No. 12, Water Demand and Availability with reference to Particular Regions*, AGPS, Canberra, 1983, 321 pp (Section 5.1, 6).