GROUNDWATER of the NORTHERN TERRITORY

AQUIFER TYPES

- Unconsolidated sediments with intergranular porosity. Intermediate scale aquifers
- Sedimentary rocks with intergranular porosity. Regional to local scale aquifers
- Fractured and Weathered Rocks with some intergranular porosity. Intermediate scale aquifers.
- Fractured and Weathered Rocks. Local scale aquifers.
- Fractured and Weathered Rocks with minor groundwater resources. Local scale aquifers.
- Fractured and Karstic Rocks. Local and intermediate scale aquifers.
- Fractured and Karstic Rocks. Regional scale aquifers.

Note: The boxes on the left give schematic view of the aquifers.

Source:

Hydstra Database and existing hydrogeological mapping. Northern Territory Department of Land Resource Management.

1 : 2 500 000 scale digital geology, 1 : 2 500 000 scale digital geology, Geological Survey, Northern Territory Department of Mines and Energy.

AQUIFERS

The majority of aquifers in the Northern Territory are developed in networks of fractures (cracks) in hard rocks. Their extent depends on the intensity of fracturing and the degree to which fractures are connected with each other. Fractures are more commonly open in weathered rock and so more capable of storing and transmitting groundwater.

The highest yielding zones are often situated at the base of weathered rock. This typically varies between 30 and 80 metres, depending on the region.

Extensive sedimentary basins containing limestone and dolomite support "Karstic" aquifers formed both by fractures and also by solution cavities ranging up to the size of caves.

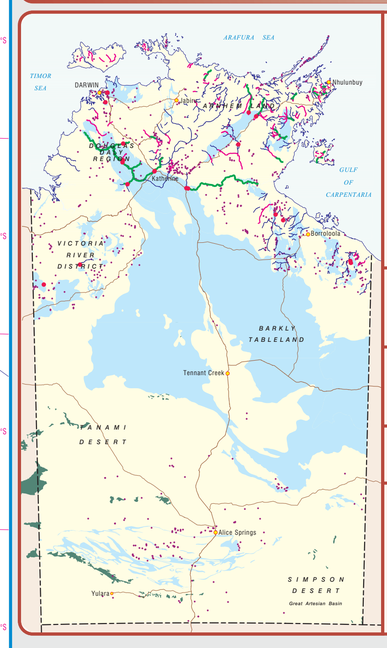
Aquifers that have primary intergranular porosity are formed in both unconsolidated sediments (e.g. river gravels) and in older sandstones. The extents of the former are poorly known. The Ti-Tree Basin and an alluvial aquifer in the Keep River area are the only "unconsolidated sediment" aquifers shown on the main map. Others are shown on the "Palaoevalleys" side map.

AQUIFER SCALE

This refers to the distance over which groundwater flows through the aquifers from recharge to discharge areas.

Local - less than 5 kilometres Intermediate - 5 to 50 kilometres Regional - more than 50 kilometres

GROUNDWATER DISCHARGE



DISCHARGE

Groundwater usually discharges at low-lying points in the landscape. It can take the form of individual springs or as diffuse seepage into stream beds. Recharge to groundwater is greatest in the higher rainfall zone in the north, so discharge is correspondingly greater.

Many streams in the north maintain a flow for at least part of the long dry season because of groundwater discharge. Some streams, particularly those with major karstic or porous rock aquifers in their catchments, flow throughout the dry season. Springs with significant discharges (more than 100 L/s) only occur in karstic aquifers.

Another mechanism for groundwater discharge is where trees in the riparian zone directly tap the watertable. This occurs throughout the Territory, but in the arid south it is thought to be the dominant process along with discharge through salt lakes.

This map shows recorded springs and streams that flow throughout the dry season. The streams have been classified according to their flows at the end of the dry season. The classification only extends to the tidal limit, so some streams such as the Roper River appear to stop before reaching the coast.

SPRINGS

- Springs
- Major Springs
- Salt Lake

END OF DRY SEASON FLOWS

- Greater than 100 Litres/second
- 10 to 100 Litres/second
- Up to 10 Litres/second

AQUIFER

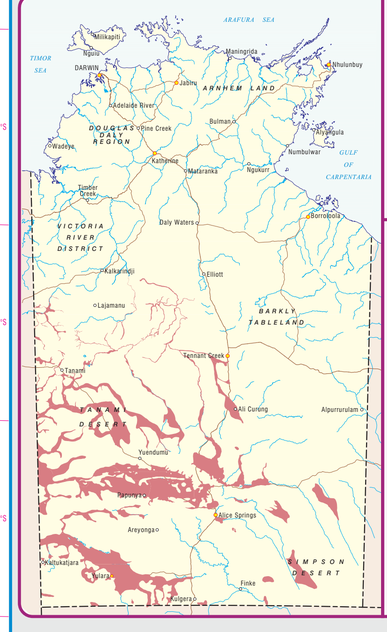
- Karstic Aquifers

Source:

Hydstra Database and existing hydrogeological maps. Northern Territory Department of Land Resource Management.

km 0 250 500 km

PALAEOVALLEYS



A relict drainage system that formed in the Tertiary era between 2 and 65 million years ago is preserved in the south western part of the Territory. It comprises small sedimentary basins and narrow palaeovalleys.

Aquifers are developed in river sands and gravels that form part of the channel and basin fills. Shallow calcrete layers can host fractured and karstic aquifers.

Apart from the Ti-Tree Basin and some palaeovalleys in the Tanami desert, few of these deposits have been investigated for their groundwater potential.

This map has been compiled from geological maps, satellite imagery and water bore data. In many places it is highly speculative due to the sparse drilling in those areas.

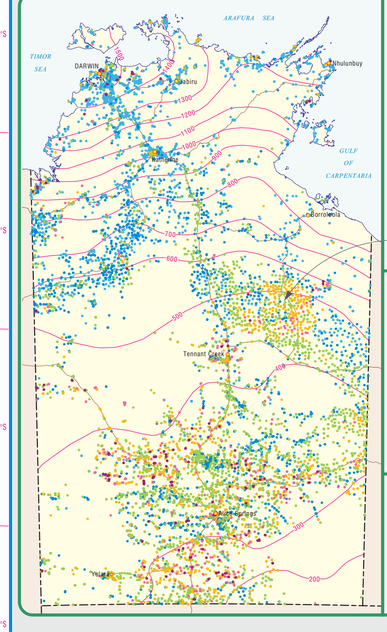
- Palaeovalleys and Sedimentary Basins

Source:

Paleovalley Groundwater Project, Northern Territory Department of Land Resource Management and Geoscience Australia, Australian Government.

km 0 250 500 km

SALINITY and RAINFALL



GROUNDWATER SALINITY

All groundwaters contain dissolved salts, derived either from weathering of the host rock, from the minute amounts contained in rainfall or from evaporite deposits. The latter are salt deposits formed at the same time as the surrounding sedimentary rocks.

The map depicts groundwater salinities measured from individual water bores.

It shows generally low salinities in the north. In those areas, high rainfall, higher recharge rates and a faster through-flow of groundwater leads to less opportunity for salts to concentrate by evaporation in the soil before they are flushed down to the aquifer.

The reverse is true in the arid zone to the south where salinities are highly variable and range up to values almost twice the concentration of seawater (34,000 mg/L TDS). Low salinities observed in the arid zone reflect localised areas of enhanced recharge such as along rivers and floodouts.

A prominent area of saline groundwaters to the north east of Tennant Creek reflects extensive evaporites within the Georgina Basin. Both gypsum (calcium sulphate) and halite (sodium chloride) occur in the rocks of that area.

TOTAL DISSOLVED SOLIDS (TDS)

		Human Consumption	Domestic	Irrigation	Stock
0 - 500 mg/L	Fresh				
500 - 1000 mg/L	Fresh				
1000 - 3000 mg/L	Brackish				
3000 - 7000 mg/L	Saline				
7000 - 14000 mg/L	Saline				
14000 - 59000 mg/L	Saline, unsuitable for most purposes				

- Annual Rainfall (mm)

Source:

Hydstra Database. Northern Territory Department of Land Resource Management.

Median Annual Rainfall, 2003. Bureau of Meterology. Australian Government.

km 0 250 500 km

YIELD

BORE YIELD

The map shows the most likely range of bore yields that can be expected for a particular area. Note that higher or lower yields can be encountered depending on local conditions.

The higher yields (more than 5.0 Litres/second) occur in fractured and karstic aquifers.

Most fractured rock aquifers give intermediate yields (0.5 - 5.0 Litres/second), while low yielding aquifers include granite and shale.

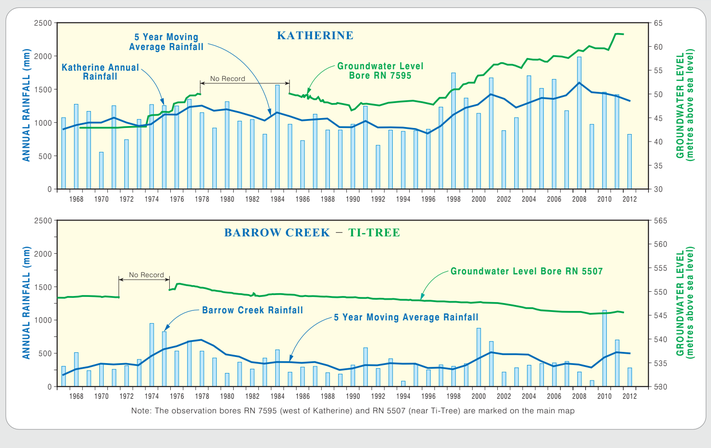
- 5.0 - 50.0 Litres/second
- 5.0 - 10.0 Litres/second
- 0.5 - 5.0 Litres/second
- 0.5 - 2.5 Litres/second
- 0.05 - 0.5 Litres/second

Source:

Hydstra Database. Northern Territory Department of Land Resource Management.

1 : 2 500 000 scale digital geology, Geological Survey, Northern Territory Department of Mines and Energy.

km 0 250 500 km



Note: The observation bores RN 7595 (west of Katherine) and RN 5507 (near Ti-Tree) are marked on the main map

kilometres 50 0 50 100 150 200 kilometres

Lamberts Conformal Conic Projection
Standard Parallels, (1st) 12°40' South and (2nd) 23°20' South Central Meridian 133° 30' East
Geocentric Datum of Australia 1994 (GDA94)

GDA This map was produced on the Geocentric Datum of Australia 1994 (GDA 94)

Warning: Colours will fade with prolonged exposure to light

Produced by the
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LEGEND

DARWIN	Main Population Centre
Barunga	Major Population Centre
Jilkminggan	Minor Population Centre
Ti-Tree	Locality
Florina	Pastoral property
	Property boundary
GOVE	Water Control District
	Water Control District and Water allocation Plan
TI-TREE	Water Allocation Plan
OWEN SPRINGS RESERVE	National Park, Reserve or managed for conservation
	State / Territory border
	Road - National Highway
	Road - State Arterial
	Road - Secondary
	Railway
	Gas pipeline
	Gas Field, Oil & Gas Field
	Mine - Open Pit, Underground
RN 5507	Observation Bore / Number
	Watercourse, Major Spring

Northern Territory Government