Haughton River Catchment
Local Knowledge Map

Resilient Queensland
Queensland Reconstruction Authority

QUEENSLAND GOVERNMENT

Catchment Overview

The Haughton River Sub-catchment comprises the Haughton River and Barratta Creek sub-catchments, and takes in parts of three Local Government areas being the Burdekin Shire, Townsville City Council and Charters Towers Regional Council. The headwaters of the Haughton River is located in the Charters Towers Regional Council and headwaters of the Barratta Creek is located in the Burdekin Shire. Both system flow in a northerly direction before draining into the Pacific Ocean. Each system is remarkedly responsive to rainfall and flood events during the monsoonal and cyclonic weather events.

Major towns situated in the Haughton River Sub-catchment include Ayr, Clare and Giru which is situated near the Haughton River and is particularly susceptible to flooding from this River.

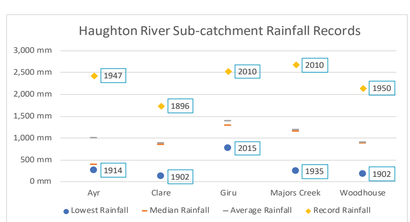
Climate & Rainfall

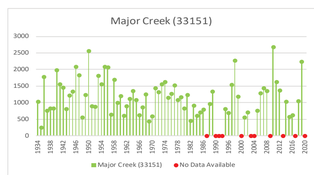
Weather and climate characteristics in the Haughton River sub-catchment in the last 30 years (1989 - 2018):

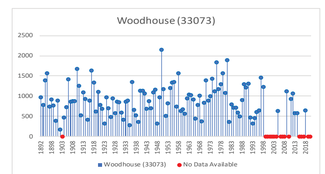
The catchment is very responsive to rainfall from coastal influences and depressions, with rainfall at Mingela being a key indicator.

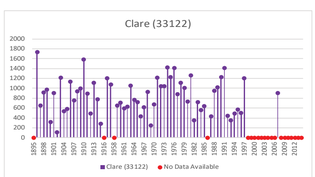
Annual rainfall has been relatively stable, however growing season rainfall averages have decreased.

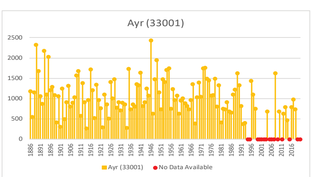
In the last 30 years (1989-2018), dry years have occurred 12 times and wet years have occurred 12 times. The three-monthly rainfall totals leading into the dry season have increased slightly.

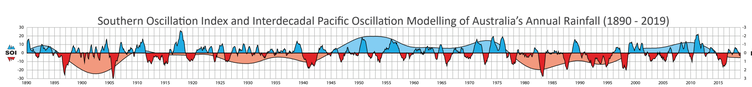








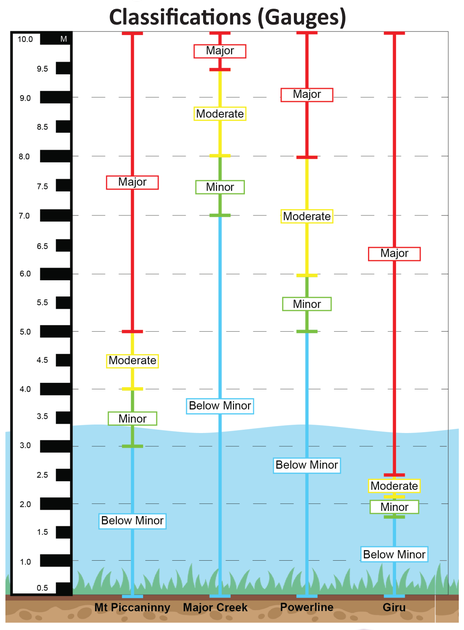




How to use this guide:

The information below provides local knowledge on landscape characteristics and flood behaviour. This is provided for local land managers, Council staff, and State Government officers to better understand the Haughton River Sub-catchment and its unique characteristics. This guide has used the best available information at present. It is intended to help you assess what type of flood is likely to occur in your area and indicate what amount of feed you might expect. You may wish to record your own flooding and landscape characteristics on the map.

Haughton River BoM Flood Classifications (Gauges)



The maximum height of the flood waters during the 2019 event were similar to previous flood events even though the river height was much higher. The delta disperses the tailwaters.

The frequency and exposure of yearly events has contributed to Giru's resilience, as well as how well connected the community is.

The area around Giru is prone to flooding due to the clay concentrations in the soil impeding water infiltration and more ponding of water is generally experienced.

It would be a major concern if Giru's western was breached.

Corner of Mills and Drysdale Streets are considered high risk areas due to proximity to drain entrances and flood velocity.

Once a breakout commences at a particular location, it proceeds progressively upstream as the river flow increases.

The size and length of a disaster is a key consideration. Flooding in Giru isn't unusual, but it comes a problem if the flood event lasts for days.

Giru is used to flood heights rising and falling, however the 2019 monsoon trough was a long event.

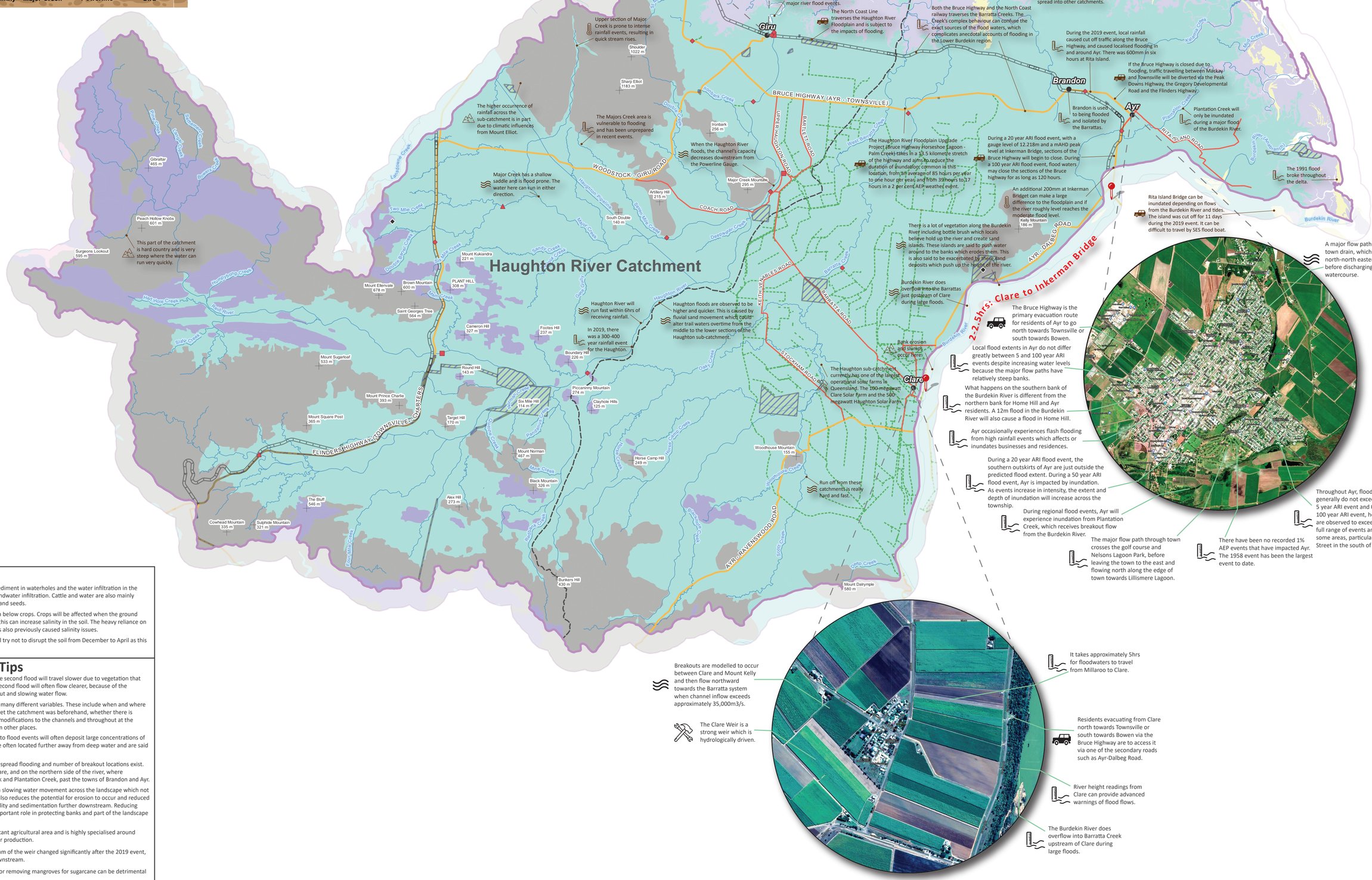
Floodplain behaviour in downstream areas experience a higher frequency of inundation than in upstream areas due to breakouts occurring along the lower reach where there is low waterway capacity. This frequency does not equate to increased flood severity due to the increase in breakouts in the upstream reaches.

There are perceieved linkaged between flooding at Giru with flooding at Ayr and Home Hill.

An increase in the frequency of breakouts in the floodplain is a result of the natural process of river widening and shallowing of the river sections.

Constructed levees have tended to alter the natural pattern of breakouts from the river resulting in an inequitable redistribution of flooding within the floodplain and disrupting the natural behaviour of the river.

N



Tips for Graziers

Agriculture practices influence the sediment in waterholes and the water infiltration in the area. Sediment can also impact groundwater infiltration. Cattle and water are also mainly responsible for the spread of weeds and seeds.

The average ground water level is 3m below crops. Crops will be affected when the ground water rises to 2m below the crop as this can increase salinity in the soil. The heavy reliance on groundwater used to water crops has also previously caused salinity issues.

Farmers along the Burdekin River will try not to disrupt the soil from December to April as this may cause erosion.

Handy Catchment Tips

Where floods occur in succession, the second flood will travel slower due to vegetation that has grown from the first flood. The second flood will often flow clearer, because of the vegetation filtering more sediment out and slowing water flow.

Flood travel times are dependent on many different variables. These include when and where the water hits the catchment, how wet the catchment was beforehand, whether there is vegetation in the catchment, recent modifications to the channels and throughout at the catchment, and water flowing in from other places.

Alternating rainfall which contribute to flood events will often deposit large concentrations of sand and silt. Large sand deposits are often located further away from deep water and are said to increase flood heights.

The Burdekin River is subject to widespread flooding and number of breakout locations exist. These include around the town of Clare, and on the northern side of the river, where breakouts follow Sheep Station Creek and Plantation Creek, past the towns of Brandon and Ayr.

Vegetation plays an important role in slowing water movement across the landscape which not only helps retain surface water, but also reduces the potential for erosion to occur and reduced the associated issues with water quality and sedimentation further downstream. Reducing flow speed of runoff also plays an important role in protecting banks and part of the landscape prone to gully and rill erosion.

The Burdekin Shire region is a significant agricultural area and is highly specialised around agribusinss, especially cane and sugar production.

Bathymetery of the Burdekin upstream of the weir changed significantly after the 2019 event, it moved alot of sand / sediment downstream.

Growing sugarcane near mangroves or removing mangroves for sugarcane can be detrimental to the farm.

The clearing of debris from tributaries can enhance the flow of water down the catchment. If debris is retained, this can mitigate fast flows and stop flooding.

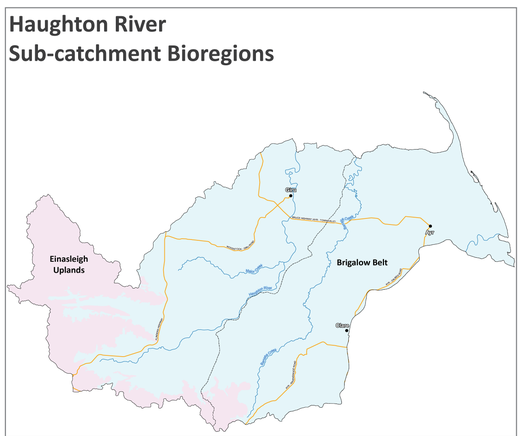
Weeds will often grow more quickly when the water is clear as opposed to when there is a lot of sediment.

Alluvium concentration can often indicate sandy deposits along a system. Where a system also has a rocky creek or river bed can indicate that the system is fast flowing and has washed the sediment out.

Legend

- Tidal flats and beaches
- Coastal dunes
- Alluvial river and creek flats
- Clay plains
- Old loamy and sandy plains
- Inland dune fields
- Ironstone jump-ups
- Basalt plains and hills
- Undulating country on fine grained sedimentary rocks
- Consolidated sediments
- Sandstone ranges
- Hills and lowlands on metamorphic rocks
- Hills and lowlands on granitic rocks
- Manual Gauge
- Automatic Gauge
- Stock Route
- Cat D Proposed Gauges
- Mountains
- Flood related information
- Agriculture/Feed information
- Vegetation related information
- Pinpoint between locations
- Community related information
- Water related information
- Fire related information
- Infrastructure related information
- Climate related information
- Road and Transport related information
- Mining related information
- Severe storm/weather related information
- Property related information
- Topography related information
- Towns
- Mines
- State Controlled Roads
- Train Line
- Watercourses
- Irrigation System
- Tropical Cyclone/Cyclonic related weather

Haughton River Sub-catchment Bioregions



General Risk Awareness Information

The Haughton flood season in 1991 was unique where flooding was caused in response to rain and equated to a total of eight flood events occurring over 54 days, amounting to all significant events over the previous 10 years. The Haughton responded to influences which generated floods in both the Bowen - Bogie systems, and the upper Burdekin catchment. The floods came from every part of the catchment which was rapidly responsive to any significant rainfall due to the persistent presence of a monsoonal trough.

The Haughton sub-catchment is highly responsive to local rainfall, such that flood warning for the Lower Burdekin are not equally attributable to the Haughton catchment despite their relative proximity. Haughton flood peaks precede Burdekin floods sourced from the Bowen River by a few hours, and floods sourced in the upper Burdekin by a few days.

Any assessment of flooding potential must be based only on rainfall readings, and Giru, Clare, Woodstock, and Mingela would have to be used, but standard 9am reporting is unlikely to be satisfactory.

A significant portion of the lower coastal floodplain area downstream of Clare, including the township of Ayr is severely inundated in extreme events. Ayr occasionally experiences severe flooding which affects or inundates businesses and residences.

The rail network that connects Far North Queensland to southern regions of the state is vulnerable to flooding at multiple locations in the Burdekin River Basin.

Flood events generally follow heavy rainfall with most common floods occurring in February and March. Very large floods generally occur between January and April, and significant events occurring from December till July.

Major floods are generated by general shallow overland flow through the heavy wet season vegetation, and occur after the soil profile has been filled or the infiltration rate has been reduced to that of the deep drainage rate.

The Burdekin Falls Dam traps up to 65% of coarse sediments that would otherwise pass through to the coastal floodplain and Great Barrier Reef lagoon. Finer particulates are more difficult to trap as they rarely settle and turbidity is an ongoing challenges for the receiving environment. Turbidity has further resulted in long-term ecological strain, is a challenges for local water boards, increases infrastructure maintenance and can reduce aquifer recharge rates and capacity.

There are two aerodromes and a number of smaller airstrips which are maintained by the Burdekin Shire Council which are utilised when other transport networks are inundated during flood events.

The frequency and duration of road closures in the sub-catchment results in disruptions in access to essential services and facilitates, reduced community resilience and delays in emergency response.

Agricultural levees raised over the years have created challenges and differences in flood flows.

The biggest vulnerability to travellers include being unprepared, getting stuck, and lack of communication of what to expect during an event or what to do.

The 2017 flood event was a relatively small event where flood waters feed into the Barratta Creeks (also around the Mona Park area) which backed up and flooded several farms. This had a flow on effect which impeded the seasonal harvest, which then impacted Wilmar. While this was a small event, there were significant agricultural and economic implications from the clean up process.

Control structures along waterways make it difficult to consider flood effects. The flood dynamic of the sub-catchment is determined by the volume of water released from the Burdekin Falls Dam.

Flooding can often be exacerbated by weeds that are blocking drains. The Bruce Highway has previously been flooded because of this.

If there is an electricity outage during an event, mobile connectivity may be impacted for a period of time if telecommunication towers do not have reserve power measures in place. Generally, telecommunication towers will have a 12 hour reserve power supply. Some will automatically switch over if external power is disconnected; others may need to be started manually. Events in other parts of the state can also impact and affect the telecommunication network.

The remediation of discontinued mine sites is an ongoing challenge in the catchment during flood events. Mining leachate can often infiltrate the catchment when flood waters overflow mining sites. Primary producers have identified this as being an issue.

General Landscape Knowledge

The volume of rainfall in one area of the catchment does not reflect the whole catchment.

Deltas in the Haughton Sub-Catchment will usually spread the flood flows which limit the river rise throughout the sub-catchment.

The lower channel crosses the western part of the Burdekin floodplain and loses capacity in a downstream direction, causing widespread overbank flow. The joint floodplain is drained by Barratta Creek which receives overbank discharges from both the Haughton and Burdekin and also floods from it's own catchment.

There are conservation and natural areas across the catchment. Protected areas are particularly located in the northern quadrant of the catchment. Bowling Green Bay is a Ramsar site and a declared Dugong Protection Area.

Grazing is one of the main land uses as most of the landscapes have been significantly degraded by a combination of land clearing, historical fire use, and overstocking through the long dry winter, spring and early summer period.

In the Haughton sub-catchment, the Burdekin River has a wide sandy bed while the riparian zones are typically vegetated with grass and large trees or mangroves in the lower reaches.

The upper to mid Haughton sub-basin has mostly natural seasonal flows including flood flows. Lowland hydrology is affected by leveed flood outbreaks on the main river channel, on- and off-stream floodplain storage (e.g. Horseshoe and Pink Lily lagoons), supplemented flows, tailwater discharges and elevated groundwater levels associated with the BHWSS, two weirs on main river channel (Val Bird and Giru), and floodplain levelling and drainage.

Water quality issues across the wider Burdekin region are associated with: fine sediments and turbidity or total suspended sediments (TSS); dissolved inorganic nitrogen (DIN) and participate nutrients; photosystem-II inhibiting herbicides (PSII herbicides); and- low dissolved oxygen.

Underground water tables are mainly recharged from rainfall and leaching from irrigation (paddocks), together with seepage from channels and waterways, and most abstraction is for irrigation. Colloidal materials can be a problem as they can be suspended in recharge channels.

In the Delta, sand dams and recharge pits are also used to facilitate groundwater recharge. Some pit areas can recharge up to 20 megalitres per day.

There are many paleo channels which run through the system. The Haughton River used to be the main channel of the Burdekin. The system has moved a lot over the different ages.

The mouth of the Burdekin River originally came through the Haughton.

The Barratta's have local events and catchment spill from other catchments in certain circumstances.

Water is pumped from the dam and into the channels to recharge pits which allow groundwater aquifers to recharge. Water is then directed to irrigation channels. Ground water is determined by the volume of groundwater present.

There is a lot of groundwater movement in the Burdekin and Haughton catchments. Often half the Burdekin can be flooding while the Haughton is not and vis versa.

How the catchment's water behaviour and flow conditions vary between the wet and dry season determine the character, function and associated values of the catchment's aquatic ecosystems. This sensitive balance has easily been disrupted by altering and changing the catchment's water behaviour through irrigation systems and the construction of dams, impacting the quality of water, increased weed infestations and limit the passage of fish.

Map Authors: