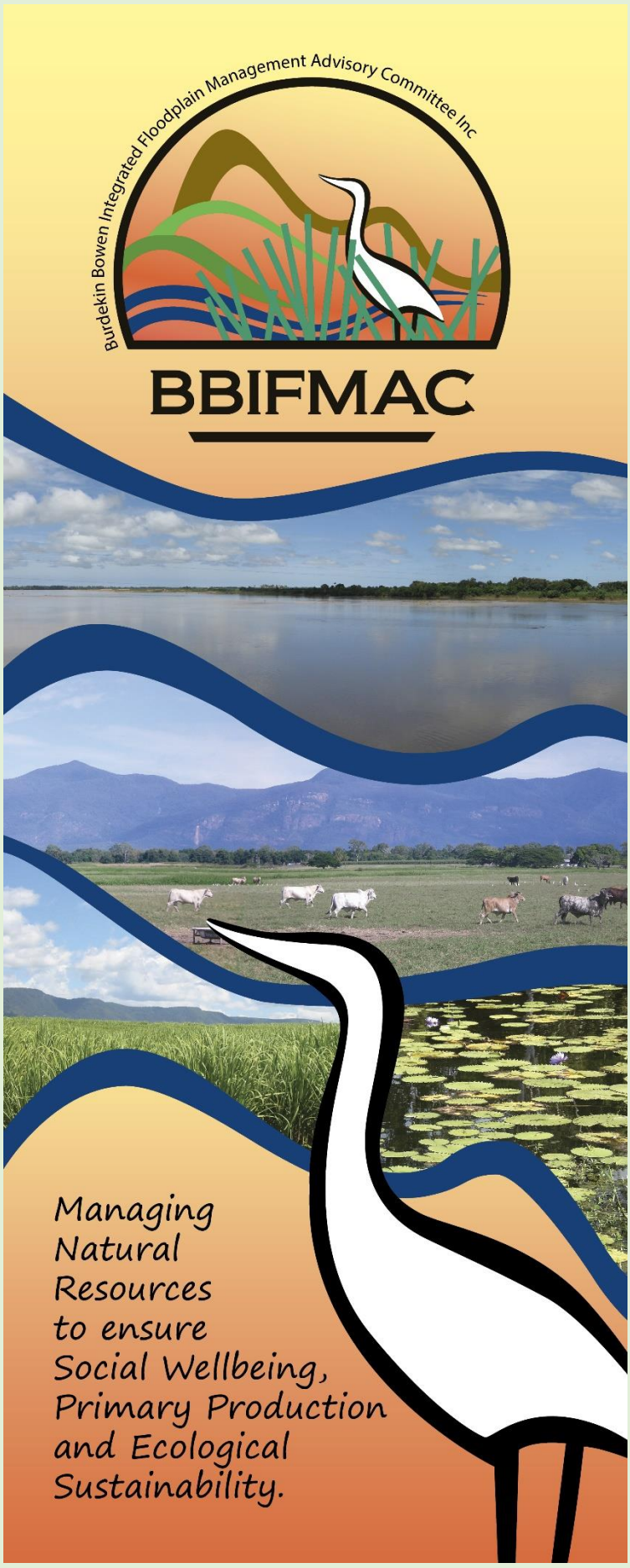
# NEWSLETTER

Issue 16 August 2021




## Recent Events

BBIFMAC hosted a general meeting on 18th August at the Burdekin PCYC. Attendees enjoyed hearing the Manager's update from Arwen Rickert, and the Chair's update from Steve Attard, which informed everyone of BBIFMAC's current and recently completed projects, as well as a reminder that memberships are due for renewal!

BBIFMAC Manager, Arwen Rickert presented an update on current and recently completed projects.

Matt Sinclair, Real-time Water Quality Scientist at the Department of Environment and Science (DES) attended via video link to give a presentation on the progress to date with the installation of water quality sensors in priority catchments in the Burdekin, and how to access the real time data via the 1622 web app.

BBIFMAC staff member, Luke Buono was able to give insights into the interpretation of the data, based on his experience working on the ground for this project. Dr Ryan Turner, Principal Scientist, for the DES Water Quality Investigations team, also joined via video link to assist Matt and Luke in fielding questions on the project.

Matt Sinclair and Ryan Turner of DES attended via video link to discuss the Fine Scale Water Quality Monitoring Project with Luke Buono of BBIFMAC.

Terry Granshaw, District Manager for SRA in the Burdekin also provided a guest presentation at the meeting. Terry spoke about the new Burdekin Irrigation Project (BIP), it's purpose and opportunities for local growers and industry.

Terry Granshaw, District Manager at SRA, presented on the new Burdekin Irrigation Project (BIP).

## Greening Australia Bioreactor – Project Completed

The Greening Australia West Haughton Bioreactor project commenced in October 2019, and monitoring was completed in May 2021. The aim was to demonstrate the effectiveness of a denitrifying bioreactor bed to intercept and reduce the dissolved nutrients contained in sugar cane irrigation tail water. BBIFMAC was engaged to conduct the water quality monitoring at the bioreactor for two seasons.

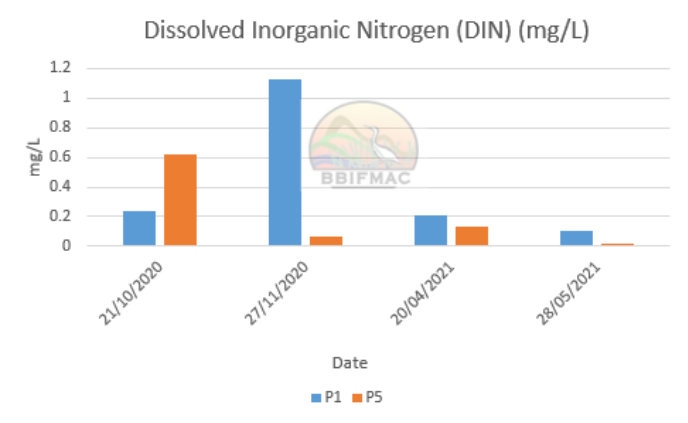
The site is located in the Haughton River Catchment, within the Burdekin Haughton Water Supply Scheme, adjacent to a 52 hectare cane field. It was designed to capture and treat the irrigation tailwater from up to 20 hectares of this field at any one time.

Throughout the second season of monitoring at the West Haughton bioreactor, the dissolved inorganic nitrogen (DIN) removal efficiency averaged 11.5% across the four monitored irrigation events. The reductions ranged from zero to 94.5% depending on the status of the bioreactor and crop stage. For example, the lowest DIN reduction was observed in the first monitored event after the bioreactor been dormant for the dry down and harvest of the previous crop.

The second monitored irrigation event saw the highest DIN reduction as expected, based on BBIFMAC's experience conducting paddock-scale and bioreactor monitoring in the Burdekin when nitrates are often highest in tailwater following the second or third irrigation after fertiliser application. The DIN removal efficiency of the bioreactor tailed off for the following two irrigation events as the nitrogen levels in the tailwater had declined. The bioreactor system is more efficient at removing nitrates when the inputs are high, and becomes limited in its ability to remove nitrogen when incoming concentrations are low.

There were several limitations and learnings from the two years of monitoring at the site. Irrigation occurred monthly, meaning that no water was passing through the bioreactor for long periods of time which may impact the bioreactor's effectiveness due to accelerated breakdown of woodchip or effects on the denitrifying bacteria. There was some surface leakage evident in the vicinity of piezometer 3 and 4 from the very first irrigation post bioreactor construction. The surface leakage may have affected the hydraulic residence time within the bioreactor.

Additionally, inflow and outflow water volumes at the bioreactor were unable to be measured due to the site characteristics being unsuitable for the installation of the necessary equipment. This means that the flux (or load in kg/ha) of nutrients could not be calculated. Rainfall events were also unable to be monitored due to the site being inaccessible, hence unknown activity was occurring at the bioreactor during inaccessible months.



This figure shows the dissolved inorganic nitrogen concentrations at the bioreactor inlet (P1) and outlet (P2) for the four monitored irrigation events in season 2 of the project.

Overall, whilst bioreactors are effective at removing DIN from tailwater in agricultural settings, the volume of runoff water in furrow irrigated systems, paired with the residence time required for bioreactor treatment, means that they are unable to treat the entire volume of tailwater coming from a typical furrow irrigated cane field.