



BARRA BIOREACTORS

In an Australia-first, barramundi producer Marty Phillips is looking beyond wetlands to bioreactors to treat the water leaving his farms.

For 20 years Marty Phillips has relied on a series of natural wetlands to remove nitrogen from the water leaving his barramundi farms in the Innisfail district. Now he is also turning his attention to bioreactors, with the help of university researchers.

Put simply, these bioreactors are woodchip-filled containers. They can remove excess nitrogen in surface water and groundwater by creating the right conditions – a low-oxygen environment and carbon – for microbes to convert nitrate into harmless nitrogen gas.

After a series of trials on cane farms across the Wet Tropics in recent years, the innovative water treatment

systems have now been trialled in the aquaculture industry.

James Cook University's Alexander Cheesman says fish farms have ideal conditions for trialling woodchip bioreactors because of their more stable flows of water and their production of nitrate (a result of the fish eating protein-rich food).

His team installed a series of 10m-long, 1.8m-wide and 1.5m-deep bioreactor beds between aquaculture ponds and treatment wetlands on one of Marty's farms and regularly collected water samples at different points.

"Bioreactors ramp up the microbial process that naturally occur in

wetlands. Our trials showed they are an effective water quality treatment system in aquaculture. So now the challenge is applying them cost effectively at a large-scale commercial level."

Mainstream Aquaculture Queensland has the capacity to produce five thousand tonnes of fish each year. Marty says as his business expands his challenge is managing water sustainably.

"We've always treated our waste water through a series of natural wetlands and we've also investigated growing algae in the water as another way to remove nutrients, which works but it would be difficult to scale that up to the level we need. Woodchips offer a more compact footprint. We are now looking at a combination of all three.

"We all have a responsibility to do the right thing by the environment. We take water from the creek - we have a greater vested interest than many others to keep our waterways healthy."

The bioreactor trials were funded by the Australian Government and Mainstream Aquaculture.

CANE & BANANA BIOREACTOR TRIALS

There have been 30+ bioreactor trials in Queensland over the last seven years. Seven bioreactors are on cane and banana farms in the Tully and Johnstone catchments. Designs were modified to suit the Wet Tropics.

"There's no 'one size fits all' solution. The variability of soil, land and water flow led us to tailor each bioreactor to the conditions. The ideal site is freely draining with leaching through the soil." - Terrain NRM.

Trials have led to useful guidelines at www.qld.gov.au