

Sediment basin saves 450 tonnes of soil entering the Great Barrier Reef lagoon in the Herbert Catchment

Recent estimates revealed that a sediment basin built in 2010, has prevented approximately 450 tonnes of sediment (45T per annum) from leaving a Bambaroo sugarcane farm, south of Ingham.

Why build a sediment basin?

Without the sediment basin, approximately 20 truckloads of topsoil, which would have otherwise washed into nearby creeks and eventually ended up in the Great Barrier Reef (GBR) Lagoon, has been recycled and returned to paddocks, just in the last 10 years.

Sugarcane farmer Robert Bonassi, initiated the project after noticing that his grassed spoon drains were silting up with sandy material after heavy rain which required regular reprofiling and costly laser levelling to maintain their effectiveness as a spoon drain and filter strip on his farm.

After contacting his local NRM office to assist with the design and application, Robert's project was successful. With the ongoing assistance of Terrain NRM and funding from the Australian Government's Reef Rescue Grants Program, the sediment basin was completed in 2010.

The sediment basin was designed to significantly slow down and treat the overland flow running through the Bonassi's farm. The basin also receives run-off from neighbouring cane farms, as well as forested areas on the ranges, with a total catchment area of approximately 350 hectares (Figure 1).



Figure 1: Bonassi Farm - sediment basin with catchment in background.

Sediment basins (or traps) are particularly effective at trapping coarse, i.e. sandy, material. They work by slowing the relative velocity and energy of the water, allowing these heavier sediments to fall out of suspension and settle to the bottom of the basin.

Sediment basins can be placed strategically in drains or points of confluence at numerous locations in the landscape to maximise their effectiveness. They can take up a relatively small amount of space, relative to some other treatment systems, such as treatment wetlands. But unlike these other systems they do not effectively remove fine sediments or nutrients.

Note: sediment basins, as the name suggests, are only effective at trapping sediment... Unless they are large enough to capture and store enough water from first flush rainfall events and the water is subsequently used for irrigation (as they do with recycle pits in the Burdekin); the capacity of sediment traps to treat pesticide and nutrient contamination is likely to be limited.

What maintenance is needed?

Like all good tools, sediment basins (and all treatment systems) require regular maintenance to ensure they maintain their functionality and efficiency.

"I remove approximately 90 tonnes of sediment from this particular sediment basin every two years and like the others... it just gets spread back on the fallow paddocks." Robert Bonassi, sugarcane farmer

The regular maintenance of sediment basins on his property maximises the sediment catching capacity of the basins by extending the residence time of the water and allowing most particles to settle out. Robert also discovered that the water captured by the sediment basin has become an important source of reliable irrigation water during the drier months.

"Having this as a backstop is like an insurance policy later in the year when rain can be unpredictable, especially in recent years, where establishing a crop is particularly high risk if the rain doesn't come at the right time."

On the day we visited the sediment basin (mid-July 2020), there were cormorants and Whistler ducks also taking advantage of the stored water supply.



Figure 2: Robert Bonassi explaining some of the benefits of installing a sediment trap on his farm.

Sediment basins as a whole of farm approach to improve water quality

Since installing the sediment basin in 2010, Robert and his family have adopted many other 'best practice' farming initiatives. They have continued to be involved in water quality improvement programs such as Project Catalyst and Reef Trust to support their journey of continuous improvement and a holistic approach to farming.

Robert is a third-generation cane farmer and has two boys who are now involved in the sugarcane industry. So, the family is very motivated to make their farming enterprises as sustainable and profitable as possible.

To date, based on funding this project received, it has already delivered a return on investment of ~\$25 per tonne of sediment from entering the GBR lagoon and will continue to do so for many years to come.

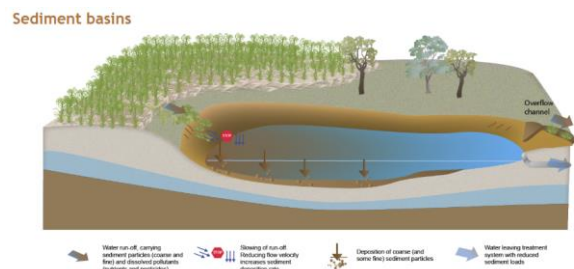


Figure 3: Conceptual sediment basin design, courtesy of <https://wetlandinfo.des.qld.gov.au/wetlands/>

If you would like to learn more about whether a sediment basin or other treatment system might be advantageous to your farming enterprise, contact HCPSL, DAF or the Herbert River Catchment and Landcare Group to find out more about the latest in funding opportunities. Visit

wetlandinfo.des.qld.gov.au (search treatment systems) for more detailed information on sediment basins and other treatment systems applicable to improving water quality and managing agricultural run-off.

This case study was developed by Michael Nash in partnership with Herbert River Catchment Landcare Group and Herbert Cane Productivity Services with funding from the Department of Agriculture and Fisheries, under the Queensland Reef Water Quality Program.

