



Landscape Scale Constructed Wetlands for Improving Water Quality and Protecting the Great Barrier Reef

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Overview

Nutrient and sediment runoff from agricultural catchments places substantial pressure on the GBR leading to outbreaks of algal blooms, anoxia, Crown of Thorns Starfish infestations and impacts on tourism. The seriousness of the issue has prompted funding of projects which can reduce pollutant loads being exported from largely agricultural catchments in the wet tropics where annual rainfall can exceed seven metres.

The Babinda Wetland Project involved the collaborative rehabilitation 45 hectares of former cane land on a coastal floodplain through the reinstatement of floodplain processes including flooding, burning, direct seeding, revegetation and management of drainage hydraulics.

As a partnership with a local Aboriginal Corporation, the project is building capacity within indigenous communities in natural resource management.

While rehabilitation is ongoing, the wetland component of the site has been constructed for over 12 months and water quality monitoring is ongoing.

A key challenge for the project was winning support from landholders and overcoming concerns around adverse impacts on farm production.

Objectives

The Babinda Wetland Project aimed to reduce pollutants on a large scale, with sediment and dissolved inorganic nitrogen (DIN) being priority pollutants. A target of 20% reduction in suspended solids and 50% reduction in DIN are performance objectives.

Additional objectives include reinstatement of wetland and floodplain processes, creation of fauna habitat and to improve and increase the extent of notophyll vine forest and palustrine wetlands.

Method

Methods for works involved multiple stages including:

- Consultation with numerous stakeholders within the community, state and local government,
- Detailed field investigations including, survey, ecology, hydrology and soils,

- Hydrological and hydraulic modelling of a 2000ha catchment,
- Pollution export modelling and system sizing using MUSIC,
- Preparation of detailed design drawings and associated reporting
- Obtaining of relevant planning approvals,
- Construction phase supervision,
- Maintenance and monitoring (ongoing).

Results

The effect on the 45-hectare flooding has been transformative. The diversity of vegetation has increased dramatically via recruitment from the seed bank, direct seeding and planting.

The scale of the wetland means that construction costs were very low on a square metre basis (less than \$10/m² excluding monitoring).

Water quality is significantly improved with preliminary results showing that water quality objectives are being achieved, though ongoing monitoring will be important to understand long term function.

There has been widespread support for the project as the project has overcome initial concerns around project feasibility.

Following on from this work a large number of projects of a similar nature are being developed across the wet tropics, using the methodologies from the Babinda Constructed Wetland.

Conclusions

The Babinda Constructed Wetland is an important example of collaborative landscape scale catchment actions which are essential if water quality issues within the GBR catchment are to be effectively tackled. The works are extremely cost effective given the scale of the project and leverage multiple additional benefits beyond water quality.

Ongoing monitoring will assist in understanding hydrological function and long term ability to intercept nutrients and sediment and provide important knowledge for future projects.