

## Lessons Learned From 21 GBR Coastal Wetlands Pilot Projects 2005-2007

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### **Abstract:**

*21 pilot wetland projects were established with local government, regional NRM bodies, Landcare groups and landholders along 1200 km of coastal Queensland from Bundaberg to the Daintree. Prospective sites were selected by consensus at the local level and work plans developed. Pilot projects were confined to freshwater to brackish wetlands. A total of \$2.25 million, plus substantial local co-investment, was applied to implement a first-round of activities as part of an integrated approach to wetland management. All sites were assessed in terms of their potential to be better protected and managed in order to deliver improved water quality and biodiversity outcomes. The integrated approach required each site to be assessed in terms of site values, threats to the wetland and capacity to achieve change. The main threats identified were altered hydrology, invasive weeds, impeded fish passage, vegetation decline, impacts of grazing / fire and feral pigs. This paper provides an insight into what worked / failed in trialling various techniques to engage stakeholders in delivering tangible outcomes to improve wetland management and protection. It provides an insight into the on-ground works undertaken and achievements in capacity building at the local level.*

### **INTRODUCTION**

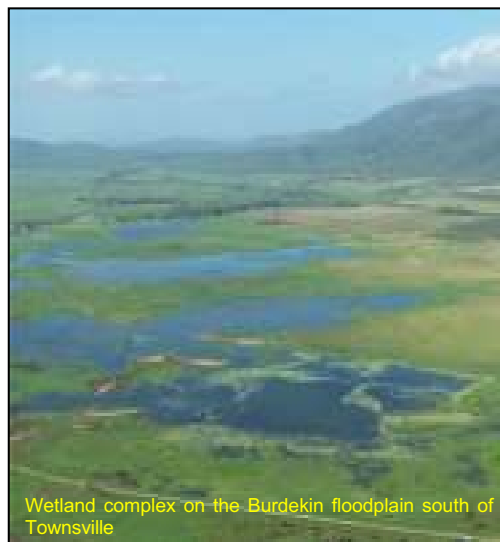
The aim of Great Barrier Reef Coastal Wetlands Protection Programme, Pilot Programme (CWPP-PP) was to 'Develop and implement measures for the long-term conservation and management of wetlands in the Great Barrier Reef Catchment'. The tasks included developing, implementing and managing an on-ground programme to conserve and manage priority wetlands. This entailed identifying priority wetland areas and trialling management techniques as well as attempting to secure voluntary conservation agreements using incentives including fencing, vegetation buffer restoration and weed control.

CWPP-PP aimed to ensure that wetland rehabilitation and protection proposals furthered the actions under the Reef Water Quality Protection Plan and complemented the regional plans developed under the Natural Resource Management Programmes, the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP).

### **BACKGROUND**

The CWPP-PP was announced in 2003 as a response to the Reef Water Quality Protection Plan. \$8 million in funding was allocated by the Australian Government for expenditure over 5 years to be managed by Department of Environment and Water Resources. The CWPP-PP is part of the Queensland Wetlands Programme, which is jointly funded by Australian and Queensland Governments.

The Project Team comprised Conservation Volunteers Australia, WetlandCare Australia, Australian Centre for Tropical Freshwater Research and Econcern. The task was to develop and implement projects by direct negotiation with stakeholders. There was no public call for applications. Projects were assessed by an Independent Reference Group appointed by the Minister. The IRG comprised agency, community and industry representatives with expertise in wetlands.



Wetland complex on the Burdekin floodplain south of Townsville

## METHODOLOGY

The Project Team, from the outset, embraced an integrated approach to wetland protection and management by scoping with project partners, the full range of issues impacting on each priority wetland. This typically included weeds, grazing / fire, revegetation, hydrology, fish passage, feral pigs, constructed wetlands, planning and monitoring. Where a management response was feasible within the CWPP-PP timeframe and budget, justified in terms of expenditure of public funds and there was a local driver and landholder(s) agreement, then a work plan and budget was prepared. Table 1 illustrates that for most sites, it was possible to implement an integrated approach to multiple issue wetland management and protection.

**Table 1 Pilot Programme project sites and applied integrated management strategies**

Site	Weeds	Grazing + Fire	Revegetation	Hydrology	Fish Passage	Feral Pigs	Constructed Wetlands	Planning	Monitoring
Wawu Dimbi	✓	✓	✓						
Douglas Shire	✓	✓		✓	✓				
Russell / Mulgrave	✓		✓	✓			✓		
Tully / Murray	✓	✓	✓	✓	✓			✓	
Lagoon Creek	✓								✓
Thuringowa	✓	✓	✓					✓	
Stuart Creek	✓	✓	✓	✓	✓			✓	✓
Serpentine	✓	✓							✓
Cungulla	✓	✓	✓	✓				✓	
Healeys Lagoon	✓		✓		✓				✓
Horseshoe Lagoon	✓	✓	✓	✓	✓				✓
Barrattas	✓	✓	✓	✓	✓			✓	
Goorganga	✓	✓				✓		✓	✓
Southern Pioneer	✓	✓	✓		✓				✓
Tedlands	✓	✓	✓			✓			✓
Fitzroy	✓	✓	✓		✓				✓
Kinka		✓		✓	✓				
Padaminka	✓	✓	✓						✓
Splitters Creek	✓	✓	✓	✓	✓			✓	
Pasturage Reserve	✓	✓		✓			✓	✓	✓
Canegrowers BMP	✓	✓	✓	✓	✓	✓	✓	✓	

The steps used by the Project Team in preparing proposals included an assessment of environmental threats, rationale for action, tasks, work plan / outputs, timing and costs. Project work plans were structured to satisfy contractual arrangements and included monitoring, evaluation and reporting. Projects needed to be feasible within a timeframe, affordable within the budget and have a local 'driver'. The project proposals were made available to project partners, and to the general public upon request. The CWPP-PP generated a high level of participation and enthusiasm from stakeholders, as well as pledges for co-investment from NRMs, during the initial 'roadshow' scoping phase.

## WHAT WORKED –LESSONS LEARNED

The following section outlines what worked and the lessons learned during the conduct of CWPP-PP, in delivering on-ground wetland management, with the underlying aim of improving water quality entering the GBR Lagoon, as well as enhancing local biodiversity.

### Wetland Weeds

Wetland weeds comprise 1) *terrestrial / riparian weeds* (above inundation zone), 2) *floating / submerged aquatic weeds* and 3) *emergent / fringing weeds* (occupy the bank margin / water interface). Each had specific management requirements.

*Terrestrial Weeds:* Trials were established at 5 locations to demonstrate the combined use of fire, grazing and herbicide techniques. A catchment-wide postal questionnaire survey was used in the Splitters Creek (Burnett Catchment) project to define weed distribution, to engage stakeholders and to determine weed management priorities. Results were encouraging and provided the basis for ongoing investment and refinement by local land managers.

*Aquatic Weeds:* Spraying and sinking weed rafts exacerbates deoxygenation and increases nutrient export. CWPP-PP provided the opportunity to trial innovative and efficient removal, management and maintenance of aquatic weeds. Methods employed at Lagoon Creek (Herbert River) demonstrated a range of tools available to local communities. These included:

- Herbicide along edge – to break the weed raft binding to banks;
- Brine spraying - to weaken weed raft;
- Flood removal - limited success but very low cost;
- Mechanical break-up of rafts - using weed harvester;
- Wind harvesting;
- Mechanical removal using 'dozer' boats and excavator; and
- Follow-up boat and bank chemical spraying (4 treatments per year).



Weed harvester and excavator removing Water Hyacinth from Lagoon Creek near Ingham

The Lagoon Creek multi-faceted approach has achieved a dramatic improvement in water quality.

At Healeys Lagoon and Horseshoe Lagoon project sites, landholders signed management agreements (brokered by Burdekin Shire Council) pledging to contribute to a pool of funds to employ a contractor to control weeds 4-times per year for the next 3 years.

*Emergent / Fringing Weeds:* Invasive exotic pasture grasses constitute one of the most significant threats to the ecological values and functions of coastal GBR catchment wetlands. In many coastal cropping landscapes, grazing has been alienated from wetland and riparian areas as cropping has become more intensive. The impacts of removal of grazing are realised with both instream aquatic and terrestrial riparian habitats, and include:

- competitive exclusion of native wetland plants;
- organic loading impacts on water quality;
- associated fish habitat loss;
- fish passage barrier creation;
- loss of waterfowl feeding and nesting resources;

- large fire fuel load generation;
- blockages of flood flow paths; and
- increased sedimentation.

Reintroduction of grazing and fire has been demonstrated to be key management tools in wetlands management.

### Grazing and Fire

Since eradication of exotic grasses is not feasible, efforts were directed toward grazing and burning to deliver broadacre management of exotic pasture impacts in wetlands. Controlled grazing / fire trials were established in all GBR NRM regions. Results achieved included weeds controlled, native macrophytes promoted and practical methods demonstrated. A major communication and promotion campaign is required to further increase adoption of these practices. Trials need to be continued over many years to refine techniques and to maintain landholder engagement. There is still significant resistance amongst some conservation groups and individuals to the concept of the use of fire and/or grazing as environmental management tools.



### Riparian Revegetation

Revegetation of riparian areas is important for bank stabilisation, nutrient filtering, shading out weeds and fish passage. It also improves terrestrial and instream habitat. The technique used for revegetation during CWPP-PP was determined by site needs, as well as by landholder attitudes. These attitudes were found to span a broad spectrum ranging from opposition, tolerance, acceptance as well as full commitment. However, even 'committed' landholders may lack capacity to deliver on-ground works. This was especially so when it came to responsibility/commitment for ongoing maintenance where long-term funding is required but rarely available.

### Hydrology / Drainage

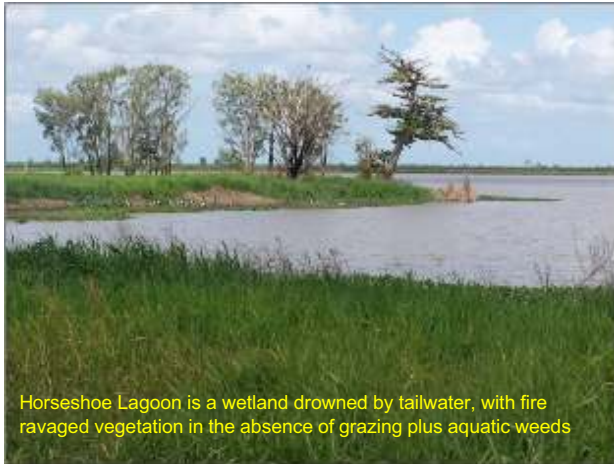
Four main hydrological / drainage issues were found to be impacting on wetlands in the GBR Wetlands including:

- Drowning of wetlands with irrigation water leading to a loss of riparian vegetation, invasion by aquatic weeds and water quality problems;
- Drains depriving wetlands of regular inundation as well as drawing down groundwater leading to a decline in wetland vegetation, increased fire risk / damage and increased grazing pressure;
- Floodgates depriving wetlands of tidal inundation and potentially exporting acid (when constructed in Acid Sulfate Soil landscapes) leading to a decline in water quality, fish habitat / passage decline and increase aquatic weeds; and
- Coastal levees depriving wetlands of tidal exchange replacing estuarine wetlands with freshwater wetlands often characterised by poor water quality, impeded fish passage and invasion by aquatic weeds.

Management responses to redress hydrology and drainage issues during the CWPP-PP focused on reinstating natural flows to/from wetlands and reinstating regulated tidal flows. Success on the ground was generally poor, with a proposed floodgate redesign initially considered by a landholder and then

strongly rejected by another. A water level control structure to allow seasonal raising and lowering of water levels that had initial landholder consensus, was stalled by a moratorium on water licences, and then vetoed by the landholder who initiated the idea.

CWPP-PP demonstrated that reinstatement of hydrology is extremely difficult, requiring landholder endorsement, satisfying multiple management objectives (therefore political), expensive design and works, and multiple approvals all adding to significant delays.



Horseshoe Lagoon is a wetland drowned by tailwater, with fire ravaged vegetation in the absence of grazing plus aquatic weeds

### Barriers to Fish

Approximately 30% of the freshwater fish community in tropical coastal catchments has some estuarine life history dependency and therefore requires uninterrupted or seasonal passage to and from estuaries. Both physical and chemical barriers can prevent or restrict fish passage. Fish surveys are often necessary to identify the impact of individual fish passage barriers.

*Physical Barriers:* Rectification options were identified and designs completed for three (3) sites. Generally there was a high capacity (agency, private and NRM) to address fish passage barrier issues,

because of the high level of involvement of Department of Primary Industries and Fisheries. There is also a high level of community support for fish passage barrier rectification works.

*Chemical Barriers:* Low dissolved oxygen (DO) is the most important water quality parameter affecting fish in GBR coastal floodplain wetlands. Low DO levels in freshwater wetlands act as a chemical barrier to fish, or in other instances, a death trap. The often poor ecological condition of coastal freshwater wetlands is caused predominantly by high nutrient levels (nitrogen and phosphorus) and associated floating and emergent aquatic weeds. Weed removal and ongoing control in the easily fixed coastal wetlands are the critical issues to removing chemical barriers to fish passage and the discharge of poor water quality to the GBR Lagoon. A much more focused effort is required to identify priority wetlands in need of intervention, and to provide long-term weed control programs to achieve enduring benefits to meet Reef Plan Objectives.

### Feral Pigs

Two 'Co-ordinated Pig Control Groups' were established in Proserpine and Sarina to see if improvements could be made on previous ad hoc attempts at controlling feral pigs. Co-ordinated control involved defining the damage that pigs cause, defining a strategic pig control area, engaging stakeholders and developing with them a strategy based on seasonal sitings as preferred feeding patterns, labour availability, monitoring and strategy review. Stakeholders agreed on techniques to be used and allocation of tasks.

The CWPP-PP initiative evoked a strong commitment and acceptance of the need for a strategic co-ordinated approach. Landholders' preference was to do the job themselves (baiting and trapping), with technical and material assistance with 1080 baits, traps, feed. Both 1080 baiting and trapping are highly seasonal and required a high level of local community engagement to be effective. It was essential that the co-ordinated pig control group had a local Landcare / Council 'driver'.

### **Constructed Wetlands**

Constructed wetlands are gaining popularity by cane growers, but their effectiveness in improving water quality is limited by available 'unused' land on cane farms. Despite the absence of detailed scientific results to quantify their effectiveness, constructed wetlands are popular amongst innovative cane farmers for their biodiversity values (fish, birds, reptiles and riparian vegetation), as well as their aesthetic and educational value.

The CWPP-PP provided an opportunity to promote the concept at one site. Acid sulfate soil testing was undertaken and the site was found not to have any significant problems. The landholder advised early in the project that the subsoil clay material was unsuitable for cane paddock levelling. Further investigation established that there would be a high cost in trucking the clay to other potential reuse sites (flood mounds) and that there was no immediate need for the material. A staged approach was thus proposed to allow clay material to be stockpiled until a cost-effective use could be found, given the limited resources available through the CWPP-PP.

### **Other activities**

Other activities undertaken within the CWPP-PP included scientific monitoring, wetland protection using Planning Schemes, wetland Decision Support System for prioritising investment in wetlands and developing 'Best Management Practice' (BMP) Guidelines - Riparian and Wetlands on Cane Farms.

CWPP-PP was part of the much larger Queensland Wetlands Programme that continues to provide valuable tools to protect and manage wetlands. WetlandCare Australia is also currently producing Wetland Rehabilitation Guidelines for GBR Catchment Wetlands.

CWPP Stage 2 funding has been allocated to 3 NRM groups to continue wetland projects into 2008.

### **TAKE HOME MESSAGES**

CWPP-PP has provided another building block for increasing local capacity to deliver on-ground wetland protection and rehabilitation projects throughout GBR coastal catchments. This foundation has been built by:

- combining local enthusiasm to manage wetlands with technical support;
- encouraging a 'learning-by-doing' approach;
- promoting to local partners the need to take an 'integrated approach' to wetland management i.e. redress the adverse impacts of weeds, grazing, fire and changed hydrology on wetland function;
- taking every opportunity to document local knowledge and experience by preparing Information Bulletins to broaden communication; and
- undertaking detailed project planning, closely monitoring progress and frank reporting of successes and failures.

Future success now hinges on wetlands remaining high on the priority list for funding.

There is a need for a strategic education programme to promote the use of the large number of wetland management tools now coming on-line through the Queensland Wetlands Programme.

The CWPP-PP Final Report, soon to be available on [www.wetlandcare.com.au](http://www.wetlandcare.com.au), provides an overview of the Pilot Programme as well as local contacts for each project. Detailed documentation of all 21 Pilot Projects and over 50 associated technical publications on all aspects of wetland management can be obtained on CD from [cassieburns@wetlandcare.com.au](mailto:cassieburns@wetlandcare.com.au)

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