

Cairns Regional Council Area

WQIPs & Urban Stormwater
Management

28/10/09

Water Quality Improvement Plan for the catchments of the Barron River and Trinity Inlet

October 2009



Fiona Barron and David Haynes



Barron WQIP

Developing an implementation plan



Water Quality Improvement Plan

Douglas Shire
Far North Queensland

December 2006



Australian Government

Douglas WQIP

Completed & in implementation phase

Table 7. Average land use area and modeled contribution of TSS, TN and TP by land use class (1977-2007) (Hatley *et al.* 2009).

| Landuse | Area (km ²) | Area (%) | TSS (t/year) | TSS (%) ^A | TN (t/year) | TN (%) ^A | TP (t/year) | TP (%) ^A |
|---------------------|-------------------------|------------|---------------|----------------------|--------------|---------------------|-------------|---------------------|
| Forest | 1,178 | 47 | 35,600 | 46 | 640 | 40 | 68 | 27 |
| Grazing | 736 | 29 | 23,500 | 30 | 170 | 11 | 26 | 10 |
| Sugarcane | 145 | 6 | 2,800 | 4 | 140 | 9 | 10 | 4 |
| Cropping | 181 | 7 | 11,200 | 14 | 110 | 7 | 24 | 10 |
| Urban | 178 | 7 | 3,100 | 4 | 220 | 14 | 30 | 12 |
| Plantation forestry | 33 | 1 | 900 | 1 | 20 | 1 | 1 | 0.5 |
| Dairying | 19 | <1 | 300 | 0.4 | 6 | 0.4 | 1 | 0.3 |
| Mining | 9 | <1 | 400 | 0.5 | 15 | 0.9 | 3 | 1.1 |
| STP | | <1 | 290 | 0.4 | 280 | 17 | 88 | 35 |
| Total | 2,500 | 100 | 78,000 | 100 | 1,600 | 100 | 250 | 100 |

^A% of total load.

Table 8. Summary of modelled average annual pollutant sources in the Barron and Trinity Inlet catchments (1977-2007) (Hatley *et al.* 2009).

| Catchment | % Total SS load | % Total N load | % Total P load |
|------------------|-----------------|----------------|----------------|
| Upper | 11 | 12 | 9 |
| Middle (Mareeba) | 15 | 8 | 7 |
| Middle (Kuranda) | 27 | 20 | 13 |
| Lower | 46 | 60 | 71 |
| Total | 100 | 100 | 100 |

Tables extracted from the Barron WQIP

Cairns City Council

Final

**Urban Stormwater Quality
Management Plan for Cairns**

April 2004



Strategy

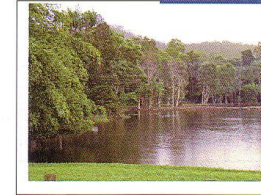
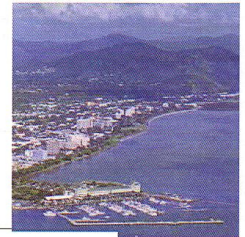
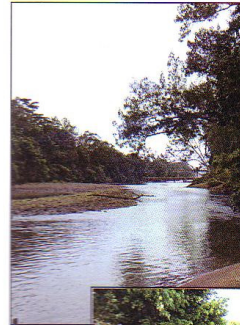
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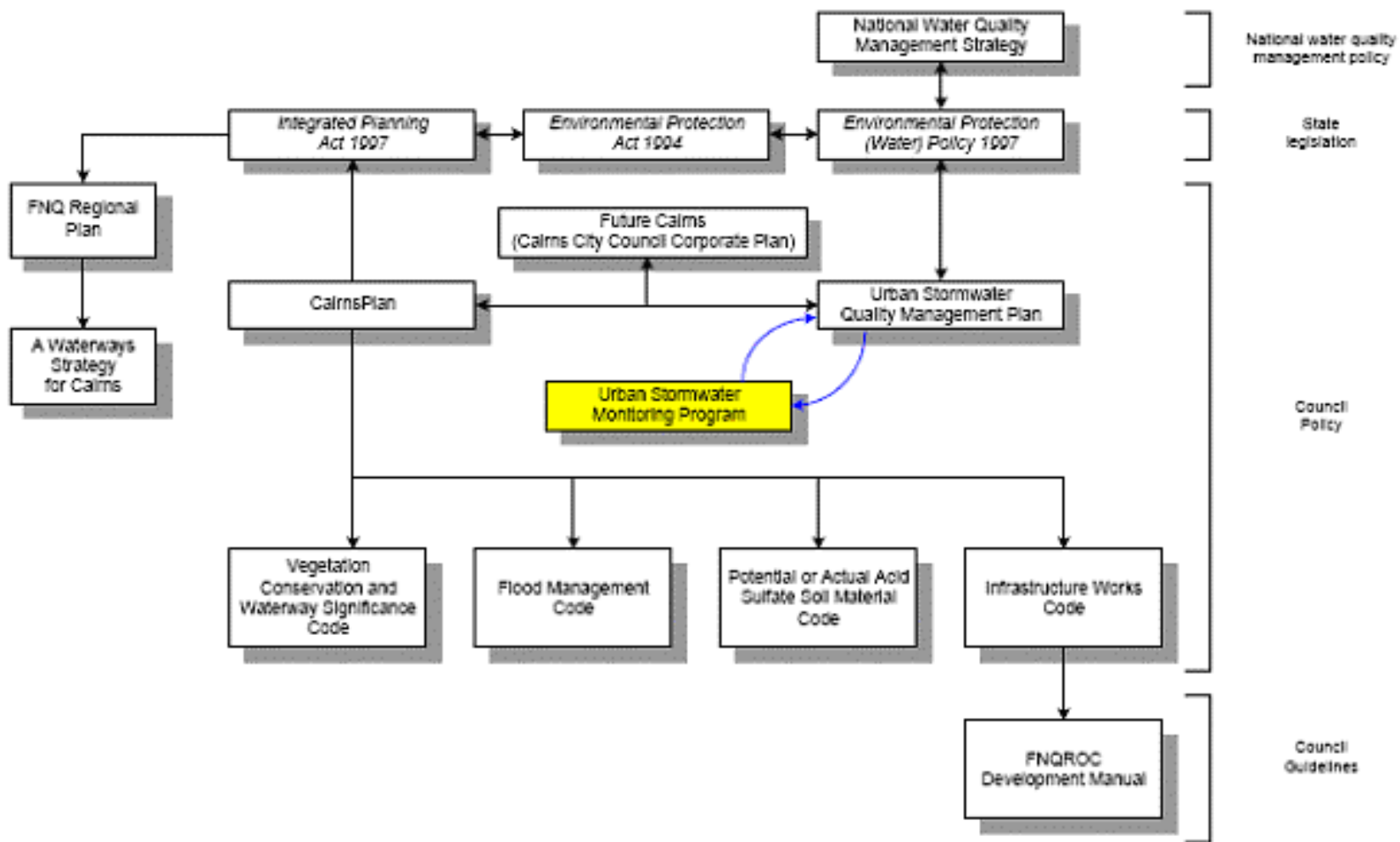
**Design of an Urban Stormwater
Monitoring Program**

Stage Two - Monitoring Program Design
Final Report

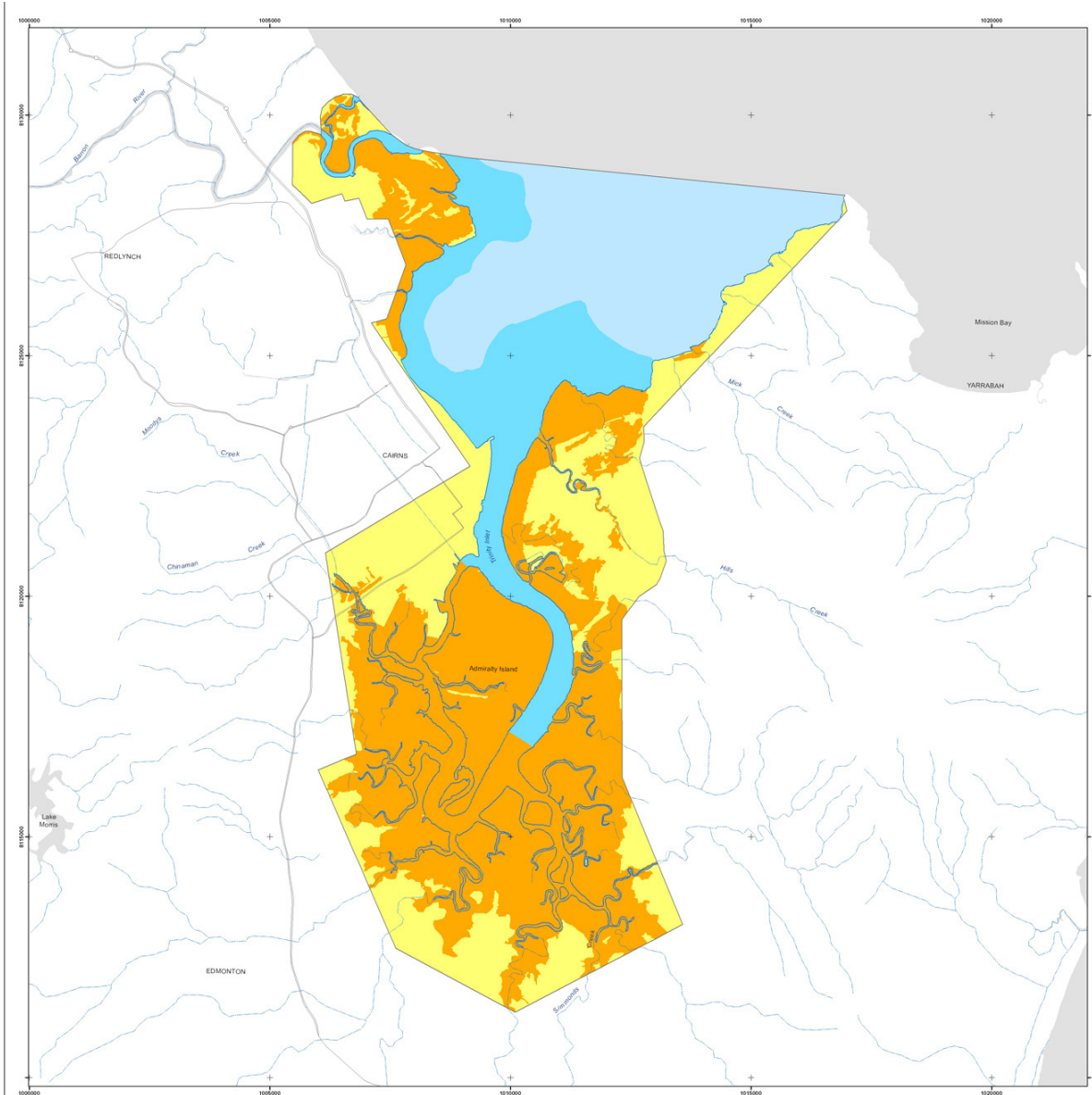
May 2006



Monitoring Design



Zoned area within the Trinity Inlet Management Plan



Legend

Water Types
Marine/Estuarine Waters

Water Type

- open coastal
- enclosed coastal, lower estuary
- middle estuary

Lowland Freshwaters (<150m)

- lowland streams

Other

- Trinity Inlet Management Plan - Study Area
- Drainage network - creeks (DLD)
- Roads

PLAN WQ1111 TRINITY INLET

This plan forms part of the Trinity Inlet scheduling document, prepared pursuant to the Environmental Protection (Water) Policy 1997.



LOCALITY MAP



Table 4.1. Water quality ratings for a number of receiving waters in the Cairns area (from DEH and DNR, 1999)

| Site | AMTD ¹ (km) | Type | Conductivity | Dissolved Oxygen | Turbidity | Total Phosphorus | Oxidised Nitrogen | Chlorophyll a |
|------------------|------------------------|-----------|--------------|------------------|-----------|------------------|-------------------|---------------|
| Barron River | 14.2 | Estuarine | - | Moderate | Good | Good | Moderate | Moderate |
| Barron River | 18.0 | Riverine | Fresh | Good | Moderate | Good | Good | Good |
| Freshwater Creek | 0.1 | Estuarine | - | Moderate | Moderate | Good | Moderate | Moderate |
| Freshwater Creek | 18.5 | Riverine | Fresh | Good | Good | Good | Moderate | Good |
| Chinaman Creek | 1.8 | Estuarine | - | Moderate | Good | Moderate | Moderate | Moderate |
| Chinaman Creek | 3.2 | Estuarine | - | Moderate | Good | Moderate | Moderate | Moderate |
| Trinity Inlet | - | Coastal | - | Good | Good | Good | Good | Good |
| Trinity Inlet | - | Coastal | - | Moderate | Good | Good | Good | Moderate |
| Skeleton Creek | 1.6 | Estuarine | - | Poor | Good | Good | Good | Poor |
| Skeleton Creek | 3.4 | Estuarine | - | Poor | Good | Good | Moderate | Poor |
| Smiths Creek | - | Coastal | - | Poor | Good | Good | Good | Poor |
| Smiths Creek | - | Coastal | - | Poor | Good | Good | Good | Poor |
| Smiths Creek | - | Coastal | - | Poor | Good | Moderate | Moderate | Poor |
| Smiths Creek | - | Coastal | - | Moderate | Good | Moderate | Moderate | Moderate |
| Mulgrave River | 15.9 | Riverine | Fresh | Good | Good | Good | Moderate | Good |
| Babinda Creek | 0.2 | Riverine | Fresh | Good | Good | Good | Moderate | Good |

Table 10.4: Final Subcatchment Priorities

| Subcatchment | Final Priority |
|--------------------------------------|----------------|
| Chinaman Creek | 1 |
| Smithfield/ Yorkeys Knob/ Moon River | 2 |
| Saltwater Creek | 3 |
| Blackfellows Creek | 4 |
| Barron River Delta | 5 |
| Freshwater Creek | 6 |
| Dillon Close Drain | 7 |
| Collinson McKinnon Creek | 8 |
| Moores Gully/ Trinity Park | 9 |
| Crowleys Creek/ Sawpit Gully | 10 |
| Deep Creek/ Kewarra Beach | 11 |
| O'Leary Mackey Creek | 12 |
| Stoney Creek | 13 |
| Buchans Point | 14 |
| Sweet/Delaney Creek/Palm Cove | 15 |
| Deadmans Gully/ Clifton Beach | 16 |
| Bella Vista | 17 |
| Cayley Street Drain/ Trinity Beach | 18 |
| Rices Gully | 19 |
| Redlynch | 20 |
| Skeleton Creek | 21 |
| Fearnley Street Drain | 22 |
| Cairns Business District | 23 |

What are the Key Recommendations?

Recommendations for the City

All urban areas:

1. Adopt a long-term 'best practice' objective for stormwater management, in which all stormwater runoff is passed through a treatment train;
2. Continue the current sewage overflows abatement program;
3. Implement the best practice measures over the next 20 years on a prioritised basis;
4. Focus treatment on priority pollutants – particularly nitrogen, phosphorus, suspended solids, pathogens and litter;
5. Retain and protect natural wetlands, natural creeks and estuaries;
6. Amend the Cairns Plan to incorporate Water Sensitive Urban Design;
7. Conduct a targeted education program;
8. Increase the level of support for stream rehabilitation programs, particularly riparian revegetation;
9. Implement a long term monitoring program to measure the effectiveness of stormwater management;
10. Require all new stormwater infrastructure to be subject to environmental assessment to minimise impacts on other values;
11. Undertake a comprehensive analysis of benefits of urban stormwater control in Cairns; and
12. Revise this plan every four years.

Future urban areas (Developer capital costs, Council operational costs):

13. Require all new developments and redevelopments to use an appropriate treatment train of best practice controls, including gross pollutant traps, buffer strips, swales, bioretention systems and detention basins (the inclusion of wetlands and rainwater tanks should be evaluated on a case-by-case basis);
14. Investigate opportunities for the construction of a 'trial wetland' and subsequent monitoring to determine trapping efficiencies, environmental impacts and maintenance costs;
15. Adopt the stormwater discharge criteria in Table 10.5 for all new development;
16. Adopt the BMP design parameters in Table 10.6; and
17. Require developers to contribute to a fund to support community education about stormwater management.

Existing urban areas (Council capital and operational costs):

18. Develop an internal policy for retrofitting existing urban areas, drawing on the analysis in this Plan. Development of the policy should consider the cost effectiveness of retrofitting urban stormwater systems compared to introducing other management practices into rural areas. Any decision to proceed with retrofitting should consider:
 - progressively introducing best management practices (BMPs) over the next 20 years;
 - selecting BMPs on the basis of life cycle cost effectiveness and overall environmental benefit; and
 - sizing BMPs based on the waterway management plan recommendations.

Recommendations for individual catchments

- 19 Adopt the waterway management plans set out in Appendix F as the basis for refining Priority Infrastructure Plans;
- 20 Subject to recommendation 18, adopt the indicative staging plan shown in Appendix G, with highest priority for Chinaman Creek, Smithfield/Yorkeys Knob/Moon River and Saltwater Creek;
- 21 Adopt the implementation plan shown in section 11; and
- 22 Develop catchment management plans that incorporate the waterway management plans and provide for management of rural and other non-urban lands.

Mt Peter Master Plan

