



Australian Government

MACKAY WHITSUNDAY

WATER QUALITY IMPROVEMENT PLAN UPDATE



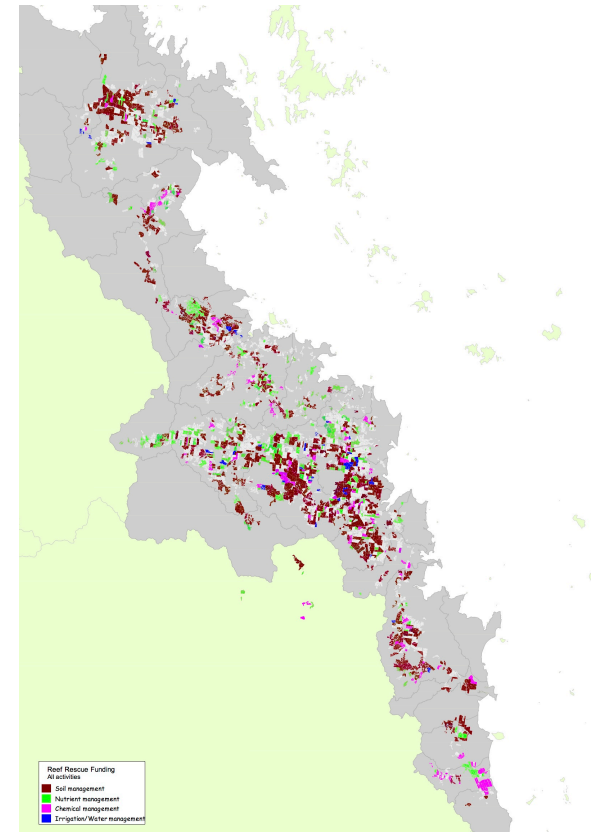
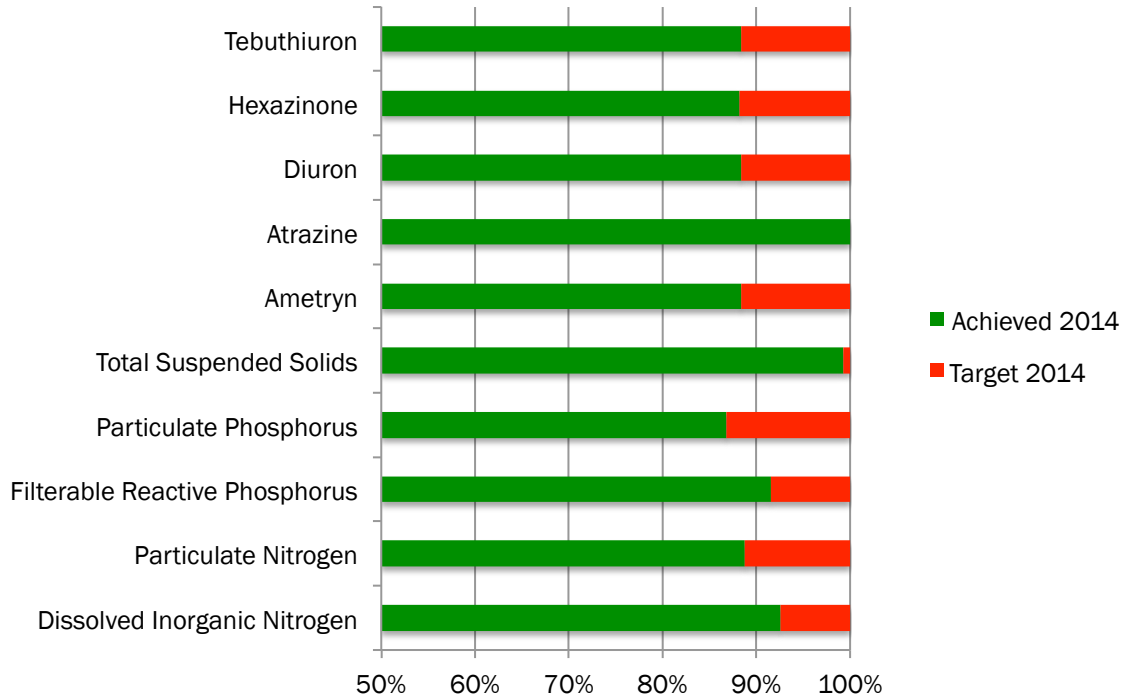
WQIP 1.

- Completed WQ data monitoring and developed WQ baseline for the region
- Completed ABCD frameworks and quantified WQ change from A and B management practices
- Calculated investment required for WQ improvement
- Set Targets for WQ and Ecosystem Health

WQIP 2.

- Update water quality baseline incorporating WQ change from improved land management
- Develop new WQ and System Health Targets
- Update new ABCD frameworks including new developed landuse frameworks
- Determine the connection between WQ and Ecosystem Health through the development of Ecological Indicators

UPDATE REGIONAL WATER QUALITY VALUES



UPDATE REGIONAL WATER QUALITY VALUES O'CONNEL RIVER CATCHMENT

















Key Pollutant	Event Freshwater Quality Values					Draft Cane & Horticulture Priority			Draft Grazing Priority				Cost \$ '000s
	Objective 2050	Condition 2007	Target 2014	Achieved 2014	Draft Target 2021	Soil	Nutrient	Pesticide	Soil	Riparian	Nutrient	Pesticide	
Dissolved Inorganic Nitrogen µg/L	300	380	300	308	300								
Particulate Nitrogen µg/L	340	371	314	342.5	314								
Filterable Reactive Phosphorus µg/L	30	46	37	38	30								
Particulate Phosphorus µg/L	70	127	108	117.5	70								
Total Suspended Sediment mg/L	CC	158	CC	CC	CC								
Ametryn µg/L	CC	<LOD	CC	CC	CC								
Atrazine µg/L	0.06	0.08	0.06	0.065	0.06								
Diuron µg/L	0.028	0.38	0.028	0.116	0.028								
Hexazinone µg/L	0.04	0.06	0.04	0.045	0.04								
Tebuthiuron µg/L	0.16	0.22	0.16	0.22	0.16								

Land Use	Management Practices	Key Pollutant	2007 % Adoption			2014 % Adoption Target			2014 % Adoption Achieved			Effort realised	% of target	Draft 2021 % Adoption Target			Cost \$ '000s
			D	C	B	A	D	C	B	A	D			C	B	A	
Cane & Horticulture	Soil		D	C	B	A	D	C	B	A	H	95	C	B	A		
	Nutrient		D	C	B	A	D	C	B	A	H	90	C	B	A		
	Pesticide		D	C	B	A	D	C	B	A	H	75	C	B	A		
Grazing	Soil		D	C	B	A	D	C	B	A	L	10	D	C	B	A	
Existing Urban Management	Nutrient		D	C	B	A					?	?	C	B	A		
New Urban Development	Soil		D	C	B	A					?	?	C	B	A		

D = old practice; **C** = common practice; **B** = Currently promoted practice; **A** = cutting-edge practice

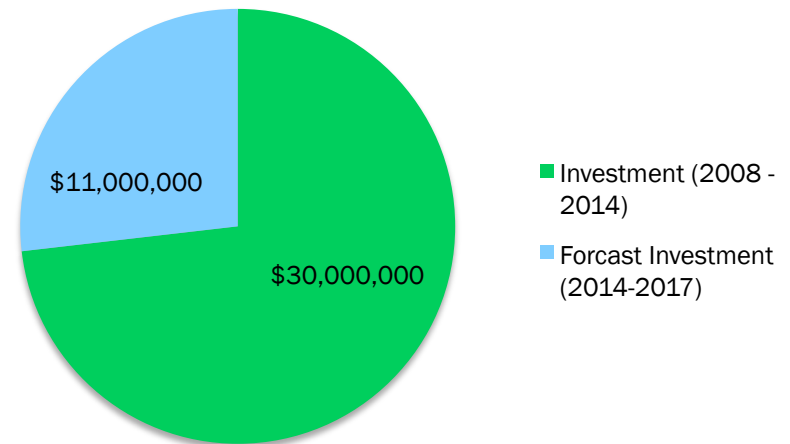
SYSTEM HEALTH RATINGS

O'CONNEL RIVER CATCHMENT

System rating (A=excellent, E=poor)						System repair actions	Draft Priority
Value rated	Objective 2050	Condition 2007	Target 2014	Achieved 2014	Draft Target 2021		
 Fish community	A	C	B	B	A	Flow, Instream Habitat and Riparian Vegetation repair actions priority	
 Event water quality	B	D	C	C	B	Crop & grazing priority actions	
 Flow	B	D	C	C	B	Implementation of voluntary irrigation restrictions to maintain waterhole during low flow	
 Barriers to Migration	A	C	B	B	A	Monitoring & maintenance fishways & incorporate fish passage into new barriers	
 Instream Habitat	A	C	B	C	B	Restoration & stabilisation of 10 priority reaches	
 Riparian Vegetation	B	D	C	C	B	Active restoration & connectivity of priority reaches. Grazing management on riparian land	
 Estuary Modification	A	B	A	B	A	Active restoration & management to encourage recovery, natural habitat & channel stabilisation	
 Mangroves & Saltmarsh	B	D	C	D	C	Management to encourage recovery	

SETTING NEW WQ & SYSTEM HEALTH TARGETS

- New targets will be influenced by projected investment levels and the predicted capacity to obtain additional investment into A and B practice changes and system repair activities
- Targets will be set high with a focus on stretching Reef Catchments to reach targets beyond what could be easily predicted.



REVIEW WATER QUALITY BASELINE



ABCD FRAMEWORKS

- Work with industry working groups to updated ABCD Frameworks for Grazing Cane & Horticulture
- Develop with the Healthy Waterways Alliance and industry groups ABCD frameworks for Urban, Fisheries and Farm Forestry

Dated cane soil management Practices that are superseded or unacceptable	Conventional cane soil management Farming practices that meet minimum expectations
<p>Description:</p> <ol style="list-style-type: none"> 1. Cultivated bare fallow 2. Fully cultivated plant cane 3. Cultivated ratoons <p>Planning and record keeping:</p> <ol style="list-style-type: none"> 1. Records kept in head <p>Machinery:</p> <ol style="list-style-type: none"> 1. Standard equipment 2. Machinery and equipment does not match crop row spacing 	<p>Description:</p> <ol style="list-style-type: none"> 1. Minimum till bare fallow with chemical weed control 2. Rotational crops may be grown 3. Reduced cultivation of plant cane replaced by strategic chemical weed control 4. Broadcast application of ameliorants (ash, lime, gypsum, etc) 5. Strategic ripping of wheel tracks in ratoons <p>Planning and record keeping:</p> <ol style="list-style-type: none"> 1. Written records kept <p>Machinery:</p> <ol style="list-style-type: none"> 1. Standard equipment 2. Harvester and haulout equipment does not match crop row spacing
Best practices cane soil management Current practices promoted by the industry	Aspirational cane soil management Innovative practices that require further validation
<p>Description:</p> <ol style="list-style-type: none"> 1. Controlled traffic permanent wheel tracks matched to harvesting machinery wheel centres 2. Initial row establishment formed with Global Positioning System (GPS) guidance as a minimum 3. Rotational crops grown on all fallow where practicable and managed to maintain some ground cover 4. Strategic or zonal tillage of fallow crops and plant cane including bed renovation 5. Site specific application of ameliorants based on soil mapping 6. Strategic ripping of wheel tracks in ratoons, only when necessary 7. Headlands, drains and waterways managed as filter strips <p>Planning and record keeping:</p> <ol style="list-style-type: none"> 1. Identify soil types and productivity zones using existing maps, digitised mill data and other technology 2. Technology for spatially identifying problem areas 3. Develop computer skills enabling access to digital mill data and Geographic Information System (GIS) software 4. Develop basic 'Soil Management Plan' utilising soil mapping (slope, soil type, flooding, specific soil problems) 5. Records kept in paddock journal and/or electronic data capture <p>Machinery:</p> <ol style="list-style-type: none"> 1. Matched wheel spacing for planting equipment based on harvesting machinery wheel centre measurements 2. GPS guidance on row establishment equipment 3. Zonal tillage equipment 4. Rotational crop establishment equipment 	<p>Description:</p> <ol style="list-style-type: none"> 1. Controlled traffic permanent wheel tracks matched to harvesting machinery wheel centres with GPS guidance on planting, zonal tillage, harvesting and haulout machinery 2. Rotational crops grown on all fallow where practicable and managed to maintain good ground cover until planting 3. Strategic or zonal tillage of fallow crops and plant cane including bed renovation as required 4. Site specific banded application of ameliorants based on specialist recommendations from soil mapping and analysis 5. Utilisation of harvesting technology to reduce impact on crop and soil condition 6. Headlands, drains and waterways managed as filter strips <p>Planning and record keeping:</p> <ol style="list-style-type: none"> 1. Spatially identified soil types and management zones across blocks and farms utilising remote sensing and Electro Magnetic (EM) soil mapping technology 2. Integrate a spatial based Soil Management Plan, addressing Land and Water Management Plan (LWMP), or current environmental risk management criteria 3. Geo-referenced spatial data captured in GIS software systems 4. Records kept in electronic data capture 5. Production of harvester yield maps <p>Machinery:</p> <ol style="list-style-type: none"> 1. Matched wheel spacing on all equipment based on harvester centres 2. GPS auto guidance systems used on bed-formers, zonal tillage, planting equipment and harvesting machinery including haulouts 3. Minimum till rotational crop and cane planting equipment (e.g. Double Disc Opener Planters) 4. Automated base cutter height fitted to harvester 5. Yield monitors fitted to harvester

ECOLOGICAL INDICATORS

- Current literature
- Reference sites (near natural catchments with similar attributes)
- Regional knowledge of condition trends (ie. coloration between Riparian vegetation and in stream habitat)
- Ground trothing evidence at specific regional locations



ECOSYSTEMS

Coral (mainland ringing, island fringing, deep muddy reef)

Seagrass (intertidal and deep seagrass)

Fish (catadromous, marine, freshwater)

Estuarine Wetlands (saltmarsh, mangroves, mudflats)

Wetlands (lacustrine, palustrine , flood plains)

Riverine Wetlands (aquatic habitats, pools, riffles, macrophyte beds, large woody debris)

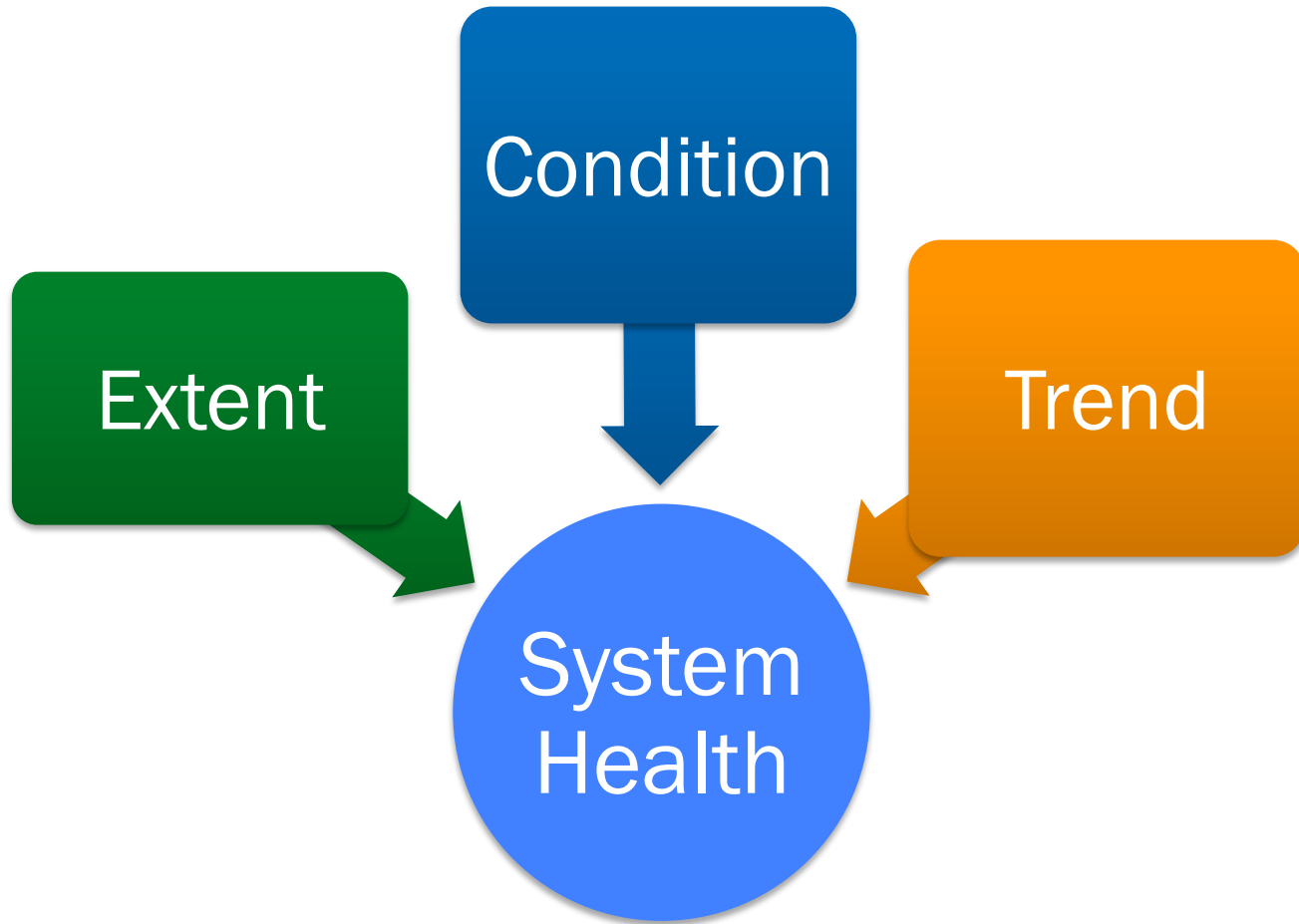
Riparian (bank, bed, vegetation)

Groundwater dependent ecosystems

Beaches (fore dunes, hind dunes)

Headwater/Uplands

Protected Areas (connectivity, independencies)



Extent

Extent (including % of Historic)

- Distribution Mapping
- Expert Opinion
- Seabed Mapping
- Depth of Substrate
- Reference Sites

Condition

Historic

Condition Mapping

Survey (species richness, cover/density)

Expert Opinion

Trend

Trend (Decline/Static/Increase)

Surveys over time

Reference vs Current

Historic vs Current

Species Indicators



System Health

Poor

- Improve WQ from land management practices

Moderate

- Improve WQ from land management practices
- Active System Repair Restoration Activities

Good

- Protect WQ from land management practices
- Minor restoration



THANKYOU



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