



Redland
CITY COUNCIL

Redlands

Waterway Recovery Report

2011



Royal Spoonbill



Magpie geese



White -eyed duck



Purple-spotted Gudgeon



Fly-speckled Hardyhead



Whistling duck

Welcome to the Redlands Waterway Recovery Report 2011.

The purpose of this report is to present you with an update on the health of our waterways. In it we look at the overall health of our freshwater creeks for the current year, and the trends in water quality and waterway health indicators from 2004 to 2011.

Council has monitored 23 ambient water quality sites across the entire city this year and surveyed 26 sites for fish and water bugs on the mainland, Coochiemudlo and North Stradbroke Islands.

Strategic hot spot monitoring was undertaken at 36 sites and is included in this year's report. The identification of hot spots will help us determine where to focus future efforts for on-ground action.

A hot spot is where extremely high loads of pollutants, for example, nutrients and/or sediment have been exported from the catchment into a waterway following significant rainfall.

The report also highlights some of the key actions that have taken place over the past twelve months to improve waterway health.

If you would like to learn more about the catchment in which you live and what you can do to help repair the damage to our waterways please log on to Redland City Council web site and follow the links. <http://www.redland.qld.gov.au/>.

Waterway health Summary 2011

You will be pleased to learn that generally water quality in mainland creeks is showing signs of improvement from previous years. The two types of indicators we use are 1) the physical and chemical characteristics of water and 2) the biological characteristics of the waterway. It is the water chemistry that is showing the most improvement, in particular, the dissolved oxygen. There has been a notable improvement in the levels of dissolved oxygen in Weinam, Upper Tingalpa and Eprapah Creeks. This result is most likely due to the higher amount of rainfall the City has experienced over the last twelve months, enabling the creeks to flow more regularly. The rating for Upper Tingalpa and Eprapah has improved to an **A** which is **very good**.

In addition to the water chemistry showing signs of improvement, there is a positive result in the overall water quality for the mainland creeks. The water quality trend for the majority of creeks has remained steady and has improved for Tarradarrapin, Cleveland and Thornlands. However, there has been a slight decline in Eprapah, Coolnwynpin and Serpentine Creeks. This result is primarily due to high levels of nutrients, primarily phosphorous, and total suspended solids, reducing the overall water quality.

Monitoring on the Southern Moreton Bay Islands (SMBI) is new and with time we will be able to determine a long term indicator trend.

The 2011 fish and bug survey indicates that the native fish and water bug populations have remained steady, apart from North Stradbroke Island, Tarradarrapin and Serpentine Creeks. Unfortunately, the abundance and diversity of native fish has reduced at these sites.

There are 14 hot spots that were identified this year. These hot spots are located across seven of the city's catchments. Our aim is to find the source of nutrients and sediment entering the waterways.

How to read the report

Please take the time to look over the creek health summary. Refer to the map on page 4 to locate the catchment that interests you. When you are looking at the tables in the report, look at the trends to see if our waterways are changing. See if they are declining, staying the same or improving. Green is good and red is poor.

If you would like to make an assessment of the raw data by all means do so. You can find it on our waterways web site.

Final note

Council is developing a Waterways Strategy for Redland City in 2011. Keep a look out for the strategy as we will be seeking your input. The development of the strategy will make sure that Council is doing everything it can to meet the challenge of waterway recovery by 2030.

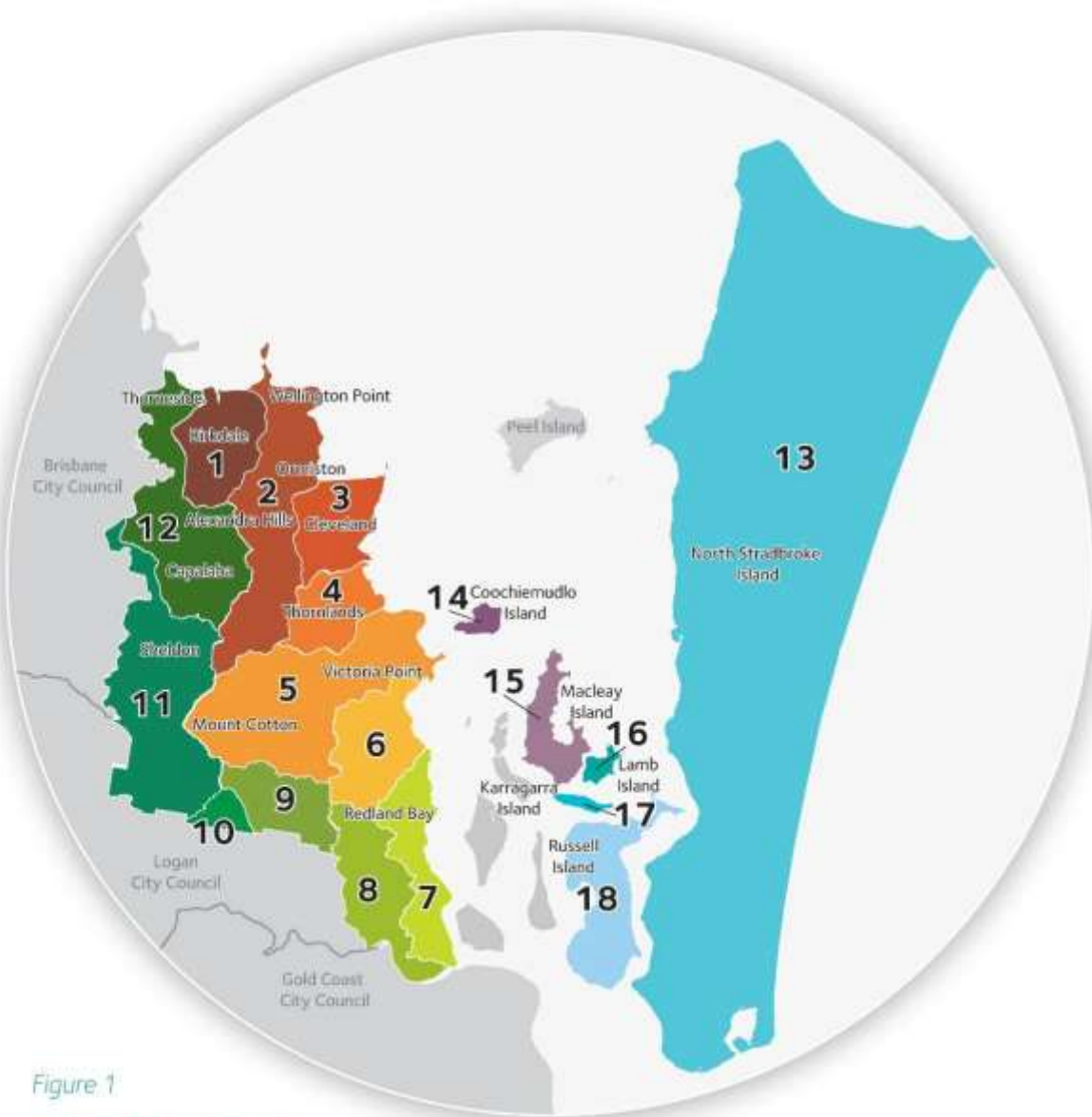


Figure 1

Redland catchments

1. Tarradarrapin Creek Catchment	8. Serpentine Creek Catchment	13. North Stradbroke Island
2. Hilliards Creek Catchment	9. Native Dog Creek Catchment	14. Coochiemudlo Island
3. Cleveland Catchment	10. California Creek Catchment	15. Macleay Island
4. Thornlands Catchment	11. Upper Tingalpa Creek Catchment	16. Lamb Island
5. Erapah Creek Catchment	12. Lower Tingalpa and Coolnwynpin Creek Catchment	17. Karragarra Island
6. Moogurrapum Creek Catchment		18. Russell Island
7. Southern Redland Bay Catchment		

Tarradarrapin Creek Health – Catchment 1

Summary 2011

Monitoring	Water quality	Hot Spots ⁷	Native Fish	Water bugs
VERY GOOD	GOOD	None identified	POOR	GOOD

Indicators 2004-2011

Water quality compared to objectives										
Tarradarrapin										
	Notes	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11	
Overall water quality	3	B	B	B	C	Worsening	D	B	Improving	
Monitoring frequency	1,2,9	4				*	4	4	Steady	
Monitoring sites	2,9	13				*	2	7	Improving	
Event monitoring	1,2,9	-				*	-	-	*	
Hotspot monitoring	1,2,9	13				*	-	2	*	
Ambient monitoring	2,9	4				*	2	2	Steady	
Fish and bug survey	9	-	-	-	2	*	-	3	*	
Dissolved oxygen	3	A	A	B	C	Worsening	C	C	Steady	
pH	3	A	A	A	A	Steady	A	A	Steady	
Conductivity	3	A	A	A	A	Steady	A	A	Steady	
Total suspended solids	6,9	-	-	-	-	*	F	A	Improving	
Turbidity	3	A	A	A	A	Steady	A	A	Steady	
Phosphorus	3,4	C	B	B	C	Worsening	C	C	Steady	
Nitrogen	3,5	D	C	C	D	Worsening	F	C	Improving	
Chlorophyll- <i>a</i>	8	B	A	A	A	Steady	F	A	Improving	
Fish	9	-	-	-	C	*	-	D	*	
Water bugs	9	-	-	-	A	*	-	B	*	

Notes:

❖ All ratings are shown as Dark green=very good, Light green=good, Yellow=Fair, Orange=Poor, Red=very poor

- Monitoring frequency is based on the ambient monitoring program consisting of four sampling occasions during a twelve month period. Where ambient monitoring did not occur the frequency score is based on the three rainfall events per year. Hot spot and event monitoring sampling sites are monitored across three rainfall events per year.
- Monitoring site coverage shows the number of sites monitored along the length of a creek.
- Overall water quality is based on the ambient monitoring results. DERM(2009) water quality guideline objectives for lowland freshwater creeks is used for comparisons.
- Phosphorous ratings are based on the average levels of total phosphorous and filterable reactive phosphates.
- Nitrogen ratings are based on the average levels of total nitrogen, ammonia and oxidised nitrogen.
- High levels of total suspended solids (TSS) are an indicator of the presence of a variety of material such as silt, decaying plant and animal matter, nutrients, industrial waste or sewage.
- Trigger levels for hot spot identification is TSS, TP or TN loads >500 % difference to expected loads under DERM (2009) guidelines. Refer to city wide assessment and part 2 of the report for details about hot spot locations.
- Chlorophyll-*a* ratings are based the recommended guideline of 5 µg/L.
- “*” indicates insufficient data & “-” indicates no available data.

Hilliards Creek Health – Catchment 2

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
GOOD	GOOD	Identified	FAIR	VERY GOOD

Indicators 2004-2011

Water quality compared to objectives								
Hilliards								
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Overall water quality	B	C	B	C	Steady	*	B	*
Monitoring frequency	4				*	3	4	Steady
Monitoring Sites	13				*	3	11	Improving
Event monitoring	3				*	3	3	Steady
Hotspot monitoring	8				*	-	4	*
Ambient monitoring	3				*	-	2	*
Fish and bug survey	-	-	-	2	*	-	2	*
Dissolved oxygen	B	C	A	C	Worsening	-	B	*
pH	A	A	A	A	Steady	-	A	*
Conductivity	A	A	A	A	Steady	-	A	*
Total suspended solids	-	-	-	-	-	-	F	*
Turbidity	A	A	A	A	Steady	-	A	*
Phosphorus	C	C	C	C	Steady	-	C	*
Nitrogen	C	B	B	C	Steady	-	C	*
Chlorophyll- <i>a</i>	F	D	A	D	Improving	-	B	*
Fish	C	C	C	C	Steady	-	C	*
Water bugs	A	A	A	A	Steady	-	A	*

❖ Refer to notes on page 5 for an explanation of the table.

Cleveland and Thornlands Creek Health – Catchments 3 and 4

Summary 2011

	<i>Monitoring</i>	<i>Water quality</i>	<i>Hot Spots</i>	<i>Native Fish</i>	<i>Water bugs</i>
<i>Cleveland</i>	<i>VERY GOOD</i>	<i>GOOD</i>	<i>Identified</i>	-	-
<i>Thornlands</i>	<i>GOOD</i>	<i>GOOD</i>	<i>Identified</i>	-	-

Indicators 2004-2011

Water quality compared to objectives.											
	Cleveland						Thornlands				
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11	09/10	10/11	Data Trend 2009-11
Overall Water Quality	C	C	C	C	Steady	C	B	Improving	C	B	Improving
Monitoring frequency	4				*	4	4	Steady	4	4	Steady
Monitoring sites	2				*	2	3	Improving	3	3	Steady
Event monitoring	-				*	-	-	*	-	-	*
Hotspot monitoring	-				*	1	2	Improving	2	2	Steady
Ambient monitoring	2				*	1	1	Steady	1	1	Steady
Fish and bug survey	-	-	-	-	*	-	-	*	-	-	*
Dissolved oxygen	B	B	C	B	Steady	A	B	Worsening	A	C	Worsening
pH	A	A	A	A	Steady	A	A	Steady	A	A	Steady
Conductivity	A	A	A	A	Steady	A	A	Steady	A	A	Steady
Total suspended solids	-	-	-	-	*	F	A	Improving	F	A	Improving
Turbidity	A	A	A	A	steady	A	A	Steady	A	A	Steady
Phosphorus	F	C	F	F	Steady	D	B	Improving	C	A	Improving
Nitrogen	D	D	D	D	Steady	C	C	Steady	C	D	Worsening
Chlorophyll- <i>a</i>	A	A	A	A	Steady	F	C	Worsening	A	C	Worsening
Fish	-	-	-	-	*	-	-	*	-	-	*
Water bugs	-	-	-	-	*	-	-	*	-	-	*

❖ Refer to notes on page 5 for an explanation of the table.

Eprapah Creek Health – Catchment 5

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
VERY GOOD	POOR	Identified	FAIR	VERY GOOD

Indicators 2004-2011

Water quality compared to objectives								
Eprapah								
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Overall water quality	C	D	C	D	Steady	C	D	Worsening
Monitoring frequency	4				*	4	4	Steady
Monitoring sites	14				*	5	12	Improving
Event monitoring	3				*	3	3	Steady
Hotspot monitoring	11				*	-	6	*
Ambient monitoring	4				*	2	2	Steady
Fish and bug survey	-	-	-	1	*	-	1	*
Dissolve oxygen	C	D	B	F	Worsening	C	A	Improving
pH	A	A	A	A	Steady	A	A	Steady
Conductivity	A	A	A	A	Steady	A	A	Steady
Total suspended solids	-	-	-	-	*	F	F	Steady
Turbidity	A	A	A	A	Steady	A	A	Steady
Phosphorus	F	D	B	F	Worsening	C	F	Worsening
Nitrogen	B	D	C	D	Worsening	D	F	Worsening
Chlorophyll- <i>a</i>	A	A	A	A	Steady	A	C	Worsening
Fish	D	C	C	C	Steady	-	C	*
Water bugs	B	A	A	A	Steady	-	A	*

❖ Refer to notes on page 5 for an explanation of the table.

South-eastern Creek Health – Catchments 6 and 7

Moogurrapum Creek and Southern Redland Bay catchment

Summary 2011

	Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
Moogurrapum	GOOD	FAIR	Identified	POOR	GOOD
Weinam	GOOD	FAIR	Identified	-	-
Torquay	GOOD	-	None identified	-	-

Indicators 2004-2011

Water quality compared to objectives								
	Moogurrapum							
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Overall water quality	C	C	C	D	Worsening	C	C	Steady
Monitoring frequency	4				*	4	4	Steady
Monitoring sites	4				*	1	8	Improving
Event monitoring	-				*	-	-	*
Hotspot monitoring	-				*	-	4	*
Ambient monitoring	2				*	1	2	Steady
Fish and bug survey	-	-	-	-	*	-	2	*
Dissolved oxygen	C	D	D	F	Worsening	C	C	Steady
pH	A	A	A	A	Steady	A	A	Steady
Conductivity	A	A	A	A	Steady	A	A	Steady
Total suspended solids	-	-	-	-	*	D	F	Worsening
Turbidity	A	A	A	A	Steady	A	A	Steady
Phosphorus	B	C	C	D	Worsening	C	C	Steady
Nitrogen	D	D	C	F	Worsening	F	D	Improving
Chlorophyll-a	F	A	C	D	Worsening	F	B	Improving
Fish	C	D	D	D	Declining	-	D	*
Water bugs	B	A	B	B	Steady	-	B	*

❖ Refer to notes on page 5 for an explanation of the table

South-eastern Creek Continued

Southern Redland Bay catchments

Indicators 2004-2011

Water quality compared to objectives											
	Weinam								Torquay		
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11	09/10	10/11	Data Trend 2009-11
Overall water quality	A	C	C	D	Worsening	-	C	*	-	-	*
Monitoring frequency	4				*	-	3	*	3	3	Steady
Monitoring sites	1				*	-	3	*	3	2	Worsening
Event monitoring	-				*	-	-	*	-	-	*
Hotspot monitoring	-				*	-	3	*	3	1	Worsening
Ambient monitoring	1				*	-	-	*	-	-	*
Fish and bug survey	-	-	-	-	*	-	-	*	-	1	*
Dissolved oxygen	A	D	D	F	Worsening	-	C	*	-	-	*
pH	A	A	A	A	Steady	-	A	*	-	-	*
Conductivity	A	A	A	A	Steady	-	A	*	-	-	*
Total suspended solids	-	-	-	-	*	-	F	*	-	-	*
Turbidity	A	A	A	A	Steady	-	A	*	-	-	*
Phosphorus	A	B	B	C	Worsening	-	C	*	-	-	*
Nitrogen	A	A	A	C	Worsening	-	D	*	-	-	*
Chlorophyll- <i>a</i>	F	A	F	D	Improving	-	A	*	-	-	*
Fish	-	-	-	-	*	-	-	*	-	-	*
Water bugs	-	-	-	-	*	-	-	*	-	-	*

❖ Refer to notes on page 5 for an explanation of the table

Southern Creek Health – Catchment 8, 9 and 10

Including Serpentine Creek, Native Dog Creek and California Creek

Summary 2011

	<i>Monitoring</i>	<i>Water quality</i>	<i>Hot Spots</i>	<i>Native Fish</i>	<i>Water bugs</i>
<i>Serpentine</i>	<i>FAIR</i>	<i>POOR</i>	<i>None identified</i>	<i>VERY POOR</i>	<i>GOOD</i>
<i>Native Dog</i>	<i>VERY GOOD</i>	<i>FAIR</i>	<i>Identified</i>	<i>FAIR</i>	<i>GOOD</i>

Indicators 2004-2011

Water quality compared to objectives								
	Serpentine				Native Dog			
	04/08	09/10	10/11	Data Trend 2004-11	04/08	09/10	10/11	Data Trend 2004-11
Overall water quality	-	C	D	Worsening	-	C	C	Steady
Monitoring frequency	1	4	4	Improving	3	4	4	Steady
Monitoring sites	1	1	2	Improving	6	7	6	Steady
Event monitoring	-	-	-	*	-	-	-	*
Hotspot monitoring	-	-	-	*	6	6	3	Worsening
Ambient monitoring	-	1	1	Improving	-	1	2	Improving
Fish and bug survey	1	-	1	Steady	1	-	1	Steady
Dissolved oxygen	-	D	-	*	-	B	B	steady
pH	-	A	A	Steady	-	A	A	Steady
Conductivity	-	A	A	Steady	-	A	A	Steady
Total suspended solids	-	F	F	Steady	-	F	F	Steady
Turbidity	-	A	A	Steady	-	A	A	Steady
Phosphorus	-	C	D	Worsening	-	C	C	Steady
Nitrogen	-	B	C	Worsening	-	C	C	Steady
Chlorophyll- <i>a</i>	-	F	-	*	-	F	B	Improving
Fish	C	-	F	Worsening	F	-	C	Improving
Water bugs	C	-	B	Improving	C	-	B	Improving

❖ Refer to notes on page 5 for an explanation of the table

Upper Tingalpa Creek Health – Catchment 11

Including Wallaby Creek and Buhot Creek tributaries

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
POOR	FAIR	None identified	FAIR	VERY GOOD

Indicators 2004-2011

Water quality compared to objectives								
Upper Tingalpa								
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Overall water quality	B	B	B	B	Steady	C	C	Steady
Monitoring frequency	4				*	4	4	Steady
Monitoring sites	3				*	1	3	Improving
Event monitoring	-				*	-	-	*
Hotspot monitoring	-				*	-	-	*
Ambient monitoring	1				*	1	1	Steady
Fish and bug survey	-	-	-	2	*	-	2	*
Dissolved oxygen	D	D	C	D	Worsening	D	A	Improving
pH	A	A	A	A	Steady	B	A	Improving
Conductivity	A	B	A	A	Steady	A	A	Steady
Total suspended solids	-	-	-	-	*	F	F	Steady
Turbidity	A	A	A	A	Steady	A	A	Steady
Phosphorus	A	A	A	A	Steady	A	C	Worsening
Nitrogen	B	B	C	B	Steady	B	D	Worsening
Chlorophyll- <i>a</i>	F	B	F	F	Worsening	A	F	Worsening
Fish	F	D	C	D	Worsening	-	C	*
Water bugs	A	A	A	A	Steady	-	A	*

❖ Refer to notes on page 5 for an explanation of the table

Lower Tingalpa Creek Health – Catchment 12

Including Coolnwynpin Creek tributary

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
VERY GOOD	FAIR	None identified	FAIR	GOOD

Indicators 2004-2011

Water quality compared to objectives.								
Coolnwynpin Creek								
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Overall water quality	C	B	B	C	Steady	B	C	Worsening
Monitoring frequency	4				*	4	4	Steady
Monitoring sites	7				*	1	10	Improving
Event monitoring	-				*	-	-	*
Hotspot monitoring	-				*	-	5	*
Ambient monitoring	3				*	1	2	Improving
Fish and bug survey	-	-	-	3	*	-	3	*
Dissolved oxygen	C	C	C	C	Steady	A	A	Steady
pH	A	A	A	A	Steady	A	A	Steady
Conductivity	A	A	A	A	Steady	A	A	Steady
Total suspended solids	-	-	-	-	*	F	F	Steady
Turbidity	A	A	A	A	Steady	A	A	Steady
Phosphorus	C	A	B	B	Steady	A	F	Worsening
Nitrogen	C	C	B	D	Worsening	C	D	Worsening
Chlorophyll- <i>a</i>	F	B	D	A	Improving	B	C	Worsening
Fish	D	D	C	C	Improving	-	C	*
Water bugs	B	A	B	B	Steady	-	B	*

❖ Refer to notes on page 5 for an explanation of the table

North Stradbroke Island Creek Health – Catchment 13

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
VERY GOOD	-	-	POOR	GOOD

Indicators 2007-2011

Water quality compared to objectives.								
	North Stradbroke Island							
	04/05	05/06	06/07	07/08	Data Trend 2004-08		10/11	Data Trend 2007-11
Monitoring frequency	-	-	-	1	*		1	Steady
Fish and bug sites	-	-	-	8	*		8	Steady
Fish	-	-	-	B	*		D	Worsening
Water bugs	-	-	-	A	*		B	Worsening

Coochiemudlo Island Creek Health – Catchment 14

Summary 2011

Monitoring	Water quality	Hot Spots	Native Fish	Water bugs
FAIR	-	-	*	FAIR

Indicators 2007-2011

Water quality compared to objectives.								
	Coochiemudlo Island							
	04/05	05/06	06/07	07/08	Data Trend 2004-08	09/10	10/11	Data Trend 2009-11
Monitoring frequency	-	-	-	-	*	-	1	*
Fish and bug sites	-	-	-	-	*	-	1	*
Fish	-	-	-	-	*	-	*	*
Water bugs	-	-	-	-	*	-	C	*

❖ Refer to notes on page 5 for an explanation of the table.

Southern Moreton Bay Island Creek Health – Catchments 15 to 18

Including Macleay, Lamb, Karragarra and Russell Island catchments

Summary 2011

	<i>Monitoring</i>	<i>Water quality</i>	<i>Hot Spots</i>	<i>Native Fish</i>	<i>Water bugs</i>
<i>Russell Island</i>	<i>GOOD</i>	<i>FAIR</i>	<i>None identified</i>	<i>VERY POOR</i>	<i>POOR</i>
<i>Karragarra Island</i>	<i>FAIR</i>	<i>FAIR</i>	<i>None identified</i>	-	-
<i>Macleay Island</i>	<i>VERY GOOD</i>	<i>POOR</i>	<i>None identified</i>	<i>VERY POOR</i>	<i>POOR</i>
<i>Lamb Island</i>	<i>POOR</i>	<i>POOR</i>	<i>None identified</i>	-	-

Indicators 2009-2011

Water quality compared to objectives.						
	Russell Island			Karragarra Island		
	09/10	10/11	Data Trend 2009-11	09/10	10/11	Data Trend 2009-11
Overall water quality	B	C	Worsening	C	C	Steady
Monitoring frequency	4	4	Steady	4	4	steady
Monitoring sites	3	4	Steady	1	1	Steady
Event monitoring	-	-	*	-	-	*
Hotspot monitoring	2	2	Steady	-	-	*
Ambient monitoring	1	2	Improving	1	1	Steady
Fish and bug survey	-	1	*	-	-	*
Dissolved Oxygen	C	C	Steady	A	B	Worsening
pH	A	A	Steady	A	A	Steady
Conductivity	A	A	Steady	F	F	Steady
Total suspended solids	F	C	Improving	F	F	Steady
Turbidity	A	A	Steady	A	A	Steady
Phosphorus	A	F	Worsening	C	D	Worsening
Nitrogen	A	C	Worsening	D	C	Improving
Chlorophyll- <i>a</i>	A	C	Worsening	F	A	Improving
Fish	-	F	*	-	-	*
Water bugs	-	D	*	-	-	*

❖ Refer to notes on page 5 for an explanation of the table.

Southern Moreton Bay Island Creek Health Cont

Indicators 2009-2011

Water quality compared to objectives.						
Macleay Island				Lamb Island		
	09/10	10/11	Data Trend 2009-11	09/10	10/11	Data Trend 2009-11
Overall water quality	C	D	Worsening	B	D	Worsening
Monitoring frequency	4	4	Steady	4	4	Steady
Monitoring sites	4	5	Steady	1	1	Steady
Event monitoring	-	-	*	-	-	*
Hotspot monitoring	2	2	Steady	-	-	*
Ambient monitoring	2	2	Steady	1	1	Steady
Fish and bug survey	-	1	*	-	-	*
Dissolved oxygen	F	D	Improving	B	D	Worsening
pH	A	A	Steady	A	A	Steady
Conductivity	A	A	Steady	A	A	Steady
Total suspended solids	F	F	Steady	D	F	*
Turbidity	A	A	Steady	A	A	Steady
Phosphorus	A	C	Worsening	A	D	Worsening
Nitrogen	B	D	Worsening	C	C	Steady
Chlorophyll- <i>a</i>	F	F	Steady	F	F	Steady
Fish	-	F	*	-	-	*
Water bugs	-	D	*	-	-	*

❖ Refer to notes on page 5 for an explanation of the table.

City Wide Status

Summary 2011

	<i>Monitoring</i>	<i>Water quality</i>	<i>Hot Spots</i>	<i>Native Fish</i>	<i>Water bugs</i>
1. Tarradarrapin	<i>VERY GOOD</i>	<i>GOOD</i>	<i>None Identified</i>	<i>FAIR</i>	<i>GOOD</i>
2. Hilliards	<i>GOOD</i>	<i>GOOD</i>	<i>Identified</i>	<i>FAIR</i>	<i>VERY GOOD</i>
3. Cleveland	<i>VERY GOOD</i>	<i>GOOD</i>	<i>Identified</i>	-	-
4. Thornlands	<i>GOOD</i>	<i>GOOD</i>	<i>Identified</i>	-	-
5. Eprapah	<i>GOOD</i>	<i>POOR</i>	<i>Identified</i>	<i>FAIR</i>	<i>VERY GOOD</i>
6. Moogurrapum	<i>GOOD</i>	<i>FAIR</i>	<i>Identified</i>	<i>POOR</i>	<i>GOOD</i>
7. Weinam	<i>GOOD</i>	<i>FAIR</i>	<i>Identified</i>	-	-
7a. Torquay	<i>VERY GOOD</i>	-	<i>None Identified</i>	-	-
8. Serpentine	<i>FAIR</i>	<i>POOR</i>	-	<i>VERY POOR</i>	<i>GOOD</i>
9. Native Dog	<i>VERY GOOD</i>	<i>FAIR</i>	<i>Identified</i>	<i>FAIR</i>	<i>GOOD</i>
10. California	-	-	-	-	-
11. Upper Tingalpa	<i>FAIR</i>	<i>FAIR</i>	-	<i>FAIR</i>	<i>VERY GOOD</i>
12. Coolnwynpin	<i>VERY GOOD</i>	<i>FAIR</i>	<i>None Identified</i>	<i>FAIR</i>	<i>GOOD</i>
13. North Stradbroke	<i>VERY GOOD</i>	-	-	<i>POOR</i>	<i>GOOD</i>
14. Coochiemudlo	<i>GOOD</i>	<i>FAIR</i>	<i>None Identified</i>	<i>VERY POOR</i>	<i>POOR</i>
15 -18. SMBI	<i>FAIR</i>	-	-	*	<i>FAIR</i>

Refer to the section about waterway recovery actions for more detail about hot spots.

City Wide Status

Refer to notes on p5 for an explanation of the tables

Indicators 2004-2011

Freshwater monitoring coverage					
2004 -2008			2009-2011		
Creek/Catchment	Approx. Coverage	Total # Sites	Approx. Coverage	Total sites	Data Trend 2004-2011
1. Tarradarrapin	0.73	13	1.58	6	Steady
2. Hilliards	2.80	13	4.05	11	Worsening
3. Cleveland	-	-	1.30	3	Improving
4. Thornlands	-	-	3.27	3	Improving
5. Erapah	3.71	14	2.43	10	Worsening
6. Moogurrapum	7.90	4	3.95	8	Steady
7. Weinam	8.49	1	2.12	3	Improving
7a. Torquay	-	-	1.33	3	Improving
8. Serpentine	16.52	1	5.51	2	Improving
9. Native Dog	1.38	7	1.20	8	Steady
10. California	-	-	-	-	*
11. Upper Tingalpa	8.51	4	8.51	4	Steady
12. Coolnwynpin	1.52	7	0.99	8	Steady
13. North Stradbroke	-	8	-	7	Steady
14. Coochiemudlo	-	-	-	6	Improving
15 -18. SMBI	-	-	-	1	*

Overall water quality							
Creek/Catchment	04/05	05/06	06/07	07/08	09/10	10/11	Data Trend 2004-11
1. Tarradarrapin	B	B	B	C	D	B	Steady
2. Hilliards	B	C	B	C	-	B	Steady
3. Cleveland	C	C	C	C	C	B	Improving
4. Thornlands	-	-	-	-	C	B	Improving
5. Erapah	C	D	C	D	C	D	Steady
6. Moogurrapum	C	C	C	D	C	C	Steady
7. Weinam	A	B	B	D	-	C	Worsening
7a. Torquay	-	-	-	-	-	-	*
8. Serpentine	-	-	-	-	C	D	Worsening
9. Native Dog	-	-	-	-	C	C	Steady
10. California	-	-	-	-	-	-	*
11. Upper Tingalpa	B	B	B	B	C	C	Worsening
12. Coolnwynpin	C	B	B	C	B	C	Steady
13. North Stradbroke	-	-	-	-	-	-	*
14. Coochiemudlo	-	-	-	-	B-C	C-D	Worsening
15 -18. SMBI	-	-	-	-	-	-	*

City Wide Status

Indicators 2004-2011

Water bugs						
Creek/Catchment No.	04/05	05/06	06/07	07/08	2011	Data Trend 2004-11
1. Tarradarrapin	-	-	B	-	B	Steady
2. Hilliards	A	A	A	A	A	Steady
3. Cleveland	-	-	-	-	-	*
4. Thornlands	-	-	-	-	-	*
5. Erapah	B	A	A	A	A	Steady
6. Moogurrapum	B	A	B	B	B	Steady
7. Weinam	-	-	-	-	-	*
7a. Torquay	-	-	-	-	-	*
8. Serpentine	-	-	C	-	B	Improving
9. Native Dog	-	-	C	-	B	Improving
10. California	-	-	-	-	-	*
11. Upper Tingalpa	A	A	A	A	A	Steady
12. Coolwynpin	B	A	B	B	B	Steady
13. North Stradbroke	-	-	A	-	B	Worsening
14. Coochiemudlo	-	-	-	-	D	*
15 -18. SMBI	-	-	-	-	C	*

Native fish						
Creek/Catchment	04/05	05/06	06/07	07/08	2011	Data Trend 2004-2011
1. Tarradarrapin	-	-	F	-	C	Improving
2. Hilliards	C	C	C	C	C	Steady
3. Cleveland	-	-	-	-	-	*
4. Thornlands	-	-	-	-	-	*
5. Erapah	D	C	B	C	C	Steady
6. Moogurrapum	C	D	D	D	D	Worsening
7. Weinam	-	-	-	-	-	*
7a. Torquay	-	-	-	-	-	*
8. Serpentine	-	-	C	-	F	Worsening
9. Native Dog	-	-	F	-	C	Improving
10. California	-	-	-	-	-	*
11. Upper Tingalpa	F	D	C	D	C	Improving
12. Coolwynpin	D	D	C	C	C	Improving
13. North Stradbroke	-	-	B	-	D	Worsening
14. Coochiemudlo	-	-	-	-	F	*
15 -18. SMBI	-	-	-	-	*	*

City Wide Status

Hot Spot Identification 2011

Hot spots					
Catchment	Hot spots	Site code	TN	TP	TSS
Hilliards	1	H1	318%	803%	192%
Cleveland	2	BS1	907%	133%	50%
Thornlands	3	TH2	240%	418%	1273%
Eprapah	4	LE1	236%	867%	198%
Eprapah	5	LE4	440%	1580%	352%
Eprapah	6	MC1	234%	523%	453%
Eprapah	4	LE1	339%	1414%	266%
Eprapah	5	LE4	341%	1837%	313%
Eprapah	7	MC5	219%	119%	666%
Moogurrapum	8	MO2	398%	3144%	146%
Moogurrapum	8	MO2	437%	4034%	66%
Moogurrapum	9	MO6	226%	311%	600%
Weinam	10	WE1	151%	1667%	275%
Weinam	11	WE2	115%	766%	202%
Weinam	12	WE3	152%	196%	560%
Native Dog	13	ND1	694%	2630%	536%
Native Dog	14	ND4	364%	604%	2222%

- ❖ Hot spot identification measures estimated loads of pollutants such as total nitrogen (TN), total phosphorous (TP) and total suspended solids (TSS) entering our waterways from the catchment during a significant rainfall event. TN, TP attach to sediment particles and are transported to the waterway by overland flow. Pollutant load estimation is based on calculating the percent difference between the actual pollutant loads and the expected amount of pollutants that enter a waterway if nutrients and total suspended solid levels were at recommended guideline levels.
- ❖ Total nitrogen, total phosphorous or total suspended solid loads > 500% difference to expected loads is identified as a hot spot that requires further investigation. Expected loads are based on 2009 Queensland water quality guidelines.
- ❖ Very high levels of TSS, TP and TN exist in most of the hot spot sites. However, there are some sites that are extremely bad and they are where we need to target our actions. Some sites have values of 4000% which is 40 times greater than expected levels.





Redlands

Waterway Recovery On-ground Actions

2011

Waterway Recovery

Redland City Council's vision is to improve all aquatic based ecosystems in the Redlands by the year 2030. Our freshwater creeks will have clean water and support a wide range of native flora and fauna, in particular native fish. To achieve this goal we need to properly manage our waterways so that they can eventually look after themselves.

From July 2010 to June 2011 a number key activities to help repair our waterways have been undertaken. We have:

Monitored water quality and waterway health.

Monitoring is a critical part of the waterway recovery program. It helps us to understand water quality impact and identify where to focus waterway recovery efforts.

Revegetated creek banks and extended wildlife habitat. Revegetation and regeneration is a major component of our on-ground operational work program. Native vegetation is planted and weeds are treated in-stream and along creek banks.

A healthy riparian zone improves it's capacity to filter pollutants and stabilise creek bank erosion. Shade and woody debris provides in-stream habitat for fish and water bugs. Native vegetation enhances biodiversity and connects wildlife corridors throughout the city.

Partnered with landholders for waterway recovery. Our Waterway Extension Program provides advice and incentives to participants who want to reduce water quality degradation. Private landholders are shown ways to improve land management practices and stop nutrients and sediment from entering our waterways.

Engaged with Bushcare and Creek Crew. We help residents to develop property management plans and plant native trees to protect wildlife, bushland and waterway habitat. We also help volunteers to monitor the quality of water in creeks.

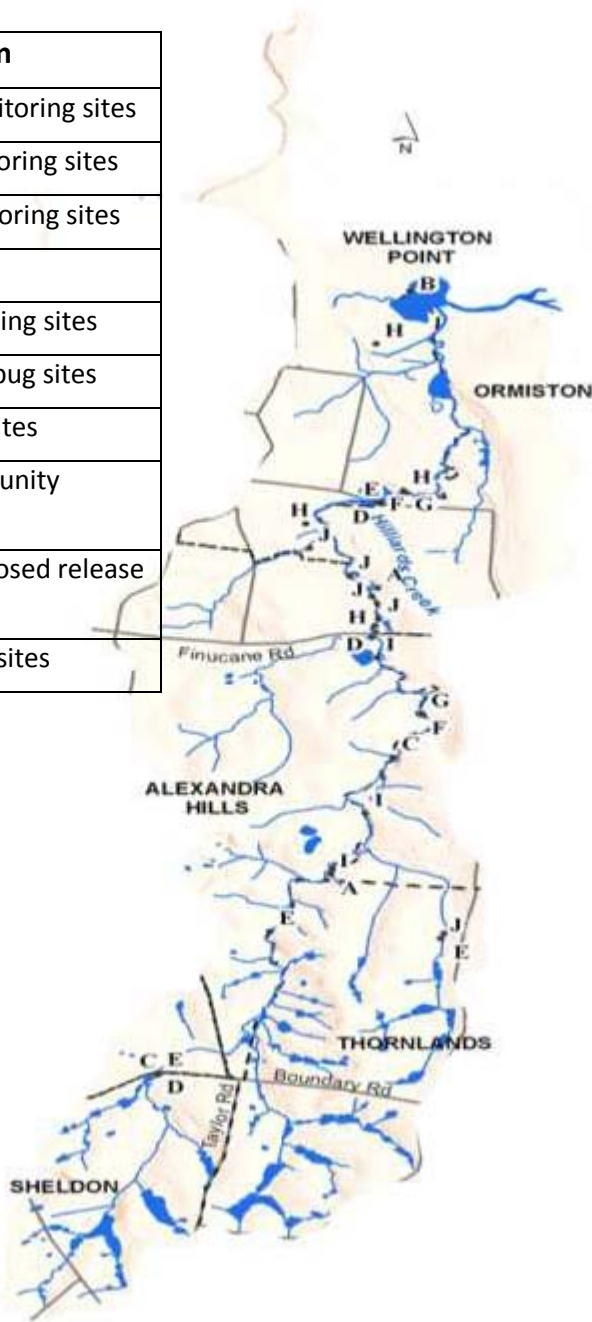
Read on to find out what waterway recovery actions have taken place in your catchment.



Hilliards Creek Catchment

Refer to the map below of Hilliards catchment area to show you where monitoring, management and waterway rehabilitation activities have taken place.

Symbol	Description
A	EHMP freshwater monitoring sites
B	EHMP estuarine monitoring sites
C	Council ambient monitoring sites
D	Council event sites
E	Council hot-spot sampling sites
F	Council fish and waterbug sites
G	Creek Crew sampling sites
H	Bushcare Group community planting sites
I	Fish, Creeks & Us proposed release sites
J	Council re-vegetation sites



Hilliards Creek catchment area is a focus for many of our waterway recovery actions

Monitoring

In 2011, our hot spot monitoring identified extremely high levels of total phosphorous in the creek at Sturgeon Street, Wellington Point. Further investigation is needed to track the source of phosphorous from within the catchment.

Our 2011 fish and water bug survey recorded **eight** species of native fish from two sites in Hilliards Creek.

Strategic Planning

Several strategic environmental planning projects have been carried out to guide management and rehabilitation of Hilliards.

A Creek Functional Study was undertaken to prioritise catchment areas so that we know where to target on-ground actions. The study gave Hilliards Creek a medium priority rating.

Hilliards Creek Waterway Management Plan identifies where riparian rehabilitation is needed on council land.

Hilliards Creek Catchment Management Plan identifies Council's requirements for flood and stormwater quality management.

On-ground work on Council land

Revegetation commenced at various locations along the creek this year. In total 6700m² of creek bank was planted at Lorikeet Drive, Troy Street, Platypus Corridor and Starkey Street Wetland. We plant trees to revegetate and rehabilitate riparian land, stabilise embankments and enhance wildlife habitat.

Bushcare

Currently four bushcare groups are active within the catchment.

Station Street Wetland Group was established in 1997 and meets regularly to manage weeds in the Station Street Wetlands which adjoin Hilliards Creek. This group has planted over 2000 plants in the past 12 months.

Hilliards Creek Group was established in 2002 and meets every month to clear weeds near the bridge over Hilliards Creek in Hilliards Creek Park. They have also planted around 50 plants in the past 12 months, mainly *Melaleuca quinquenervia* (broad-leaved Paperbark) and koala food trees.

Montgomery Drive Group was established in 2009 and meet monthly to undertake weed control and native tree planting along Montgomery Drive nature link. The group has planted over 200 plants in the past 12 months.

Creek Crew was established in 2007 and undertakes regular water quality monitoring near Clarkes Street Bushland Refuge, Hilliards Creek Platypus Corridor and Hilliards Park Corridor.

Partnership Programs

Council has partnered with SEQ Catchments to revegetate a 200m section of the creek.

Council has also partnered with Bushcare, Energex, Landcare and Cleveland State School in a junior Landcare community planting. Approximately 400 plants were planted by students along the creek.

Wastewater Management

The Cleveland Wastewater Treatment Plant is located adjacent to Hilliards Creek. Allconnex Water is required to undertake an environmental investigation to determine the effect of effluent disposal on water quality in Hilliards Creek. This investigation is currently underway and the project is expected to be completed in 2012.

Tarradarrapin Creek Catchment

Monitoring

In 2011, our monitoring found **no** hot spots in Tarradarrapin Creek. However, high total phosphorous and total suspended solids were detected along the eastern branch. We will continue to monitor this site.

Our 2011 fish and water bug survey recorded **five** native fish species from the eastern and western branches of the creek.

On-ground work on Council land

Council has undertaken weed control and riparian land rehabilitation at Judy Holt, William Street and Valentine Parks.

A new area of riparian land (2100m²) along the western branch was rehabilitated at Mary Street. Approximately 700 trees were planted.

Active Extension programs

- Your backyard garden
- Land for Wildlife
- Rural Support

Bushcare

Approximately 5000 riparian plants were added to wetland and waterway areas at Crossley Drive Wetlands, Birkdale Bush, Judy Holt Bushland and Mary Street Bushland. The plantings commenced in 2006 and were completed in 2011.



Cleveland and Thornlands Creeks Catchment

Monitoring

In 2011, our monitoring identified **two** hot spot sites in each catchment: One was identified at Redland Bay Road in Pinklands and the other one was found at Wellington Street in Cleveland. The results indicate very high levels of nutrients and total suspended solids which warrant further investigation to determine the source.

On-ground work on Council land

Council has undertaken weed control and riparian revegetation along a section of Ross Creek at Smith Street Cleveland. Approximately 1800 seedlings were planted.

Active Extension programs

- Waterways extension
- Your backyard garden
- Land for Wildlife

Bushcare

In 2006 plantings commenced in Cleveland Creek and Thornlands catchments. Approximately 2050 native plant seedlings were added to Black Swamp Wetland, Kooringa Urban Habitat and Ross Creek Corridor over a five year period.

Eprapah Creek Catchment

Monitoring

In 2011, our monitoring identified **three** hot spots in Eprapah Creek: **Two** were found in Little Eprapah Creek and **one** along the main channel of Eprapah Creek. Further investigation is needed to determine the source of high levels of phosphorus and total suspended solids.

During the 2011 fish and bug survey **six** native fish species were found in Little Eprapah Creek. The locally significant Ornate Rainbow Fish was not recorded in Eprapah Creek this year.

On-ground work on Council land

Council has undertaken weed control and riparian land rehabilitation along the main channel of Eprapah and Little Eprapah Creeks.

A new area of riparian land (9000m²) was rehabilitated at Barcrest Court, behind the Cinaplex and Sandy Drive in Victoria Point.

We increased the planting area along the creeks with approximately 4200 seedlings.

Active extension programs

- Waterway extension
- Your backyard garden
- Land for wildlife
- Rural support

Participants in the Waterway Extension Program are trying out different land management practices that may reduce nutrient and sediment input to the nearby creek. The trials include:

- Pasture regeneration
- Manure containment
- Septic system inspections
- Farm dam investigations

Bushcare

Approximately 3500 seedlings were planted at Luke Street Victoria Point, Egret Colony Wetlands, Eprapah Creek Corridor at Intrepid Drive and Ondine Court from 2006 to 2011.



South eastern and Southern Creek Catchments Including Moogurrapum Creek, Weinam Creek and Southern Redland Bay catchment; Serpentine Creek, Native Dog Creek

Monitoring

In 2011, our monitoring identified **eight** hot spots in the southeastern and southern creek catchments: **Two** were found in Moogurrapum Creek; **three** along Weinam Creek and **two** in Native Dog Creek. The high nutrient levels, primarily phosphorus and total suspended solids warrants further investigation to identify the source.

During the 2011 fish and water bug survey, **four** native fish species were recorded in Moogurrapum Creek and **three** recorded in both Serpentine and Native Dog Creeks.

On-ground work on Council land

Council has extended koala habitat along Moogurrapum at Weinam Creeks. New areas in Redland Bay were planted at Sunningdale Drive (2650m²) and Donald Road (12,149m²).

In total we added approximately 8000 native plants to the new areas.

Active Extension Programs

- Land for Wildlife
- Rural Support
- Your backyard garden
- Koala Conservation Agreement

Bushcare

Approximately 6200 plants were planted in Southern Redland Bay Catchment from 2006 to 2011. Most of the trees were added to the Junee Street Wetlands at Redland Bay.

Photo by Leo O'Reilly: Ornate Rainbow Fish.



Tingalpa Creek Catchment Including Coolwynpin Creek

Monitoring

Five additional sites were monitored in Coolwynpin Creek this year; one for ambient monitoring and four to look for hot spots. **No** hot spots were identified this year. However, levels of nutrients and total suspended solids are high at four sites. We will continue to monitor these sites.

During the 2011 fish and water bug survey **four** native fish species were recorded in Upper Tingalpa and **eight** in Coolwynpin Creek. The locally significant Ornate Rainbow Fish was found in Upper Tingalpa and Coolwynpin Creeks.

On-ground work on Council land

Council has extended koala habitat by 800m² at the Eastern Escarpment in Upper Tingalpa Creek Catchment.

New areas of revegetation (8550 m²) were extended along Coolwynpin Creek at Moreton Bay Road Link Conservation Area, Dan Street, Crotona Road, and Windemere Road Bushland Reserve.

Active Extension Programs

- Land for Wildlife
- Voluntary Conservation Agreement
- Rural Support
- Koala Conservation Agreement

Bushcare and Creek Crew

Revegetation commenced at Coolwynpin Creek Corridor, Indigiscapes and John Fredricks Park in 2006. The areas are now enhanced with 9200 native trees.

Creek crew regularly monitor water quality in both creeks.

North Stradbroke Island Catchment

Monitoring

In 2011, eight sites were surveyed on North Stradbroke Island for fish and water bugs. During the survey **seven** native fish species were recorded on the island.

The locally significant Ornate Rainbow Fish was not found on Stradbroke during the 2011 survey. However, it has been recorded in previous years in Aranarawai Creek.

On-ground work on Council land

Council has revegetated an area of land adjacent to the dam at Myora Landfill with approximately 500 native plants.

Bushcare

Two bushcare groups are active on North Stradbroke Island; one at Dunwich and one at Point Lookout.



Coochiemudlo and Southern Moreton Bay Island Catchments

Including Macleay, Lamb, Karragarra and Russell Island catchments

Monitoring

In 2011, our monitoring identified **no** hot spots on the Southern Moreton Bay Islands.

During the 2011 fish and water bug survey **three** species of native fish were recorded on the Southern Moreton Bay Islands. **Two** were found on Macleay and **one** on Russell Island. There were **no** native fish recorded on Coochiemudlo Island, only exotic fish.

Active Extension Programs

- Land for Wildlife
- Your backyard garden

Bushcare

Bushcare is active on the Southern Moreton Bay Islands. Revegetation occurs primarily in wetlands areas.

On-ground work on Council land

Weed control and natural regeneration has occurred at Borrows Street Wetland on Russell Island, Melaleuca Swamp on Coochiemudlo Island and many areas on Macleay Island.





Redland City Council was awarded the 'BMT WBM - Government Award' at the 2011 Healthy Waterways Awards for their **Waterways Extension Program (WEP)**-Council partnering with landholders for waterways recovery.

Redland City Council has partnered with over 47 landholders resulting in 370 ha of private land being managed in a manner that helps support waterway recovery.

The program offers more on-ground waterway restoration projects, including repairs to failing septic systems, erosion control and revegetation of in-stream and riparian vegetation. Monthly water quality monitoring of farm dams on private land was also undertaken.

During 2010-2011 four trials were undertaken through the Waterway Extension Program, with the following results:

A 'pasture regeneration trial' was offered to landholders with horses. The program enabled property owners to test their soil and determine its nutrient status. Property Management Plans were developed to optimise pasture coverage and reduce nutrient and sediment runoff. Water quality runoff has improved from properties which have improved their pastures.

A 'manure compound trial' was completed this year. Nine manure containment compounds were constructed on private horse properties. The compounds have

isolated more than 780m² of manure which may have polluted the waterway.

A 'septic system trial' was offered to landholders in rural residential areas of Eprapah and Hilliard Creek Catchments. The aim of the program was to inform landholders about the water quality impact from failing on-site septic systems.

Septic system health checks were undertaken at 187 properties. The health checks lead to several properties joining the waterways extension program and taking advantage of incentives offered by council to repair failing septic systems. We now have landholders educated about the maintenance requirements of septic systems to keep them operational, stopping effluent leachate to waterways.

A 'faecal tracer sampling trial' commenced in 2010. Microbial source tracking is a method to determine if faecal pollution is present and whether it comes from animals or humans. Two rounds of sampling indicate that the waterway tested is at moderate risk of septic pollution.

Council commissioned a study to investigate water quality impact from private farm dams and council lakes. The water quality results indicate that most of the waterbodies tested are in poor condition. It is likely that dams and lakes are a significant factor contributing to the decline in waterway health. The results from this investigation will assist us to plan how to manage these waterbodies better and to reduce their negative impact on downstream waterways.

The benefits of good land management practice

Mr Greg Wyeth who resides in the Eprapah Catchment is a participant of Council's Waterways Extension Program. Mr Wyeth has achieved excellent results in improving water quality, by implementing best practice land management, on his horse agistment property.

The land management improvements undertaken were:

A manure compound was built to contain horse manure and isolate it from the creek. The manure is used as compost and given away to local residents.

A footbridge was built for horses to prevent them from crossing a drainage line and causing bank erosion.

A pasture management plan was developed for the property. The plan outlined methods to cover bare soil and improve pasture. The recommendations included: isolating the feeding area; fencing and resting paddocks to aid pasture regeneration and stopping the use of synthetic fertiliser. Less land is now used for pasture and more land has become available to allow natural regeneration.

Soil was tested to determine the condition of the soil. The result helped to understand what soil improvements needed to be made for growing native grasses palatable to horses.

Aquatic weeds were removed from the farm dam and the creek.

Riparian vegetation was planted to help stabilise the banks of creek and the farm dam.

Water quality improvements are obvious in the farm dam. Aquatic weeds are no longer present and the amount of sediment and nutrients entering the dam has reduced. The latest monitoring results show that over a six month period the levels of chlorophyll-*a*, total suspended solids and nutrients are lower. This will have positive flow on effects to downstream water quality in Eprapah Creek.



Before: Main passage through the property producing high amounts of sediment and nutrients.



After: Formal causeway to prevent leeching of nutrients and sediment into the creek.



Redland
CITY COUNCIL

PO Box 21, Cleveland Qld 4163
phone 07 3829 8999 fax 07 3829 8765
For more information visit our website www.redland.qld.gov.au